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Are Transition Economy Labor Markets Less Efficient at Matching Workers to Appropriate Jobs?*

Vera A. Adamchik • Josef C. Brada • Arthur E. King

Abstract We examine the extent to which workers in transition and developed market economies are able to obtain wages that fully reflect their skills and labor force characteristics. We find that workers in two transition economies, the Czech Republic and Poland, are able to better attain the maximum wage available than are workers in a sample of developed market economies. This greater wage-setting efficiency in the transition economies appears to be more the result of social and demographic characteristics of the labor force than of the mechanisms for setting wages or of labor market policies.

Keywords labor markets - wage inefficiency - job search - stochastic frontier - economic transition

JEL classification J31 - P23

1. Introduction

The transition in Central and Eastern Europe has had a major impact on labor markets. Wage setting has changed from centrally established wage rates to market determined ones; there have been large shifts in employment from agriculture and industry into services; and relative wages for different skills and job categories have changed dramatically. Given such major upheavals in the process of allocating labor and rewarding workers for their contributions to production, the numerous changes in employment and the resulting need to search for a new job that workers in these countries faced, and the perceived rigidities in their labor markets, a natural question to ask is how efficiently do transition economy labor markets function in

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the face of such major changes in employment and wages.¹ In this study, we use stochastic frontier wage functions to analyze the degree of wage inefficiency in the Czech and Polish labor markets in 1996 and 2001 respectively, and we compare this level of inefficiency to that existing in a sample of mainly developed market economies. We find that wage efficiency in the Czech Republic is better than that in most of the more developed market economies, and Poland's wage efficiency is palpably higher than that in all other countries in our sample, suggesting that transition economy labor markets function better in terms of rewarding workers for their labor market attributes than do those of more developed market economies.

Wage inefficiency is defined as the gap between a worker's actual and potential wage, given his or her demographic and socio-economic characteristics.² It is thus a natural measure of the allocative efficiency of the labor market. Wage inefficiency may arise from causes such as incomplete labor market information, discrimination, a decentralized wage setting system, the absence of trade unions, weak employers' coordination, or an unregulated labor market.

Inefficient job matches where workers accept wages below the maximum wage that they could earn given their skills and characteristics result in both lower incomes for individual workers as well as noisier signals for workers and firms regarding the state of the labor market. Thus, such inefficiency results in both a private welfare loss borne by those workers who accept a wage lower than the highest one available to them as well as a social welfare loss borne by all employers and all workers who consequently face greater uncertainty about the wage-skill nexus.

2. Theoretical background and estimation technique

a. The Theory of the Underpayment of Labor

In their seminal article on the application of a stochastic frontier wage function to measure the underpayment of workers in the United States, Hofler and Murphy (1992) used job-search theory to explain the systematic deviation between observed and potential wages. This theory suggests a number of reasons why workers may terminate their job search before finding the highest wage that their skills and personal characteristics could obtain. One obvious cause is imperfect information on the part of both workers and employers. While searching for a job, workers do not know the exact market relationship between their skills and the going wage rate, nor do they know which firms will pay the highest wages for their set of skills. Because collecting this information is costly and time consuming, job search theory predicts that workers who face a budget constraint and who discount future income relative to current income will adopt a reservation wage that is below their notion of the maximum wage that they could earn and stop searching when they are offered this wage, which may occur before they discover the highest-paying job. Likewise, employers have imperfect information about potential hires. Employers face the same uncertainties and constraints, although their information, discount rate over future profits and perception of the wage-skill nexus may differ from that of workers. Nevertheless, the literature suggests that the major cause of the underpayment of workers is uncertainty on the part of workers rather than uncertainty on the part of employers. In part this

¹ The debate on labor market rigidities in transition economies is unsettled. See Boeri (1997), Boeri and Garibaldi (2006), Feldmann (2004) and Sorm and Terrell (2000).

² The literature often refers to this phenomenon as "underpayment" or "a shortfall in wages." Some researchers use "underemployment"; however, this term may be quite misleading (see Hofler and Murphy, 1992).

is due to the fact that employers are able to organize searches for workers to be simultaneous by considering a number of job candidates at one time, while the searches of workers tend to be more sequential.³

Second, wage inefficiency could reflect the wage setting process and the bargaining power of workers and employers. Wage efficiency is expected to be higher for more compressed wage distributions and lower for more dispersed wage distributions both because less wage dispersion leads to a better understanding of the wage-skill nexus by both firms and workers and because, with less dispersion, neither firms nor workers can use leverage to move too far from the norm in their offers or reservation wages. The empirical literature supports the view that labor market institutions, most notably collective bargaining, often proxied by trade union density or coverage by collective agreements; centralized or coordinated wage setting; and laws on minimum wages and progressive taxation, all serve to reduce the dispersion of earnings and compress wage differentials (Freeman, 1998; Blau and Kahn, 1999, 2002; Aidt and Tzannatos, 2002; Cardoso and Portugal, 2003;). OECD (2004) reports high bivariate and multivariate association between union density, bargaining coverage, and centralization/coordination, on the one hand, and overall earnings inequality as measured by the 90-10 percentile ratio on the other. The study concludes that “there is consistent evidence that overall earnings dispersion is lower where union membership is higher and collective bargaining more encompassing and/or more centralized/co-ordinated. This finding accords with a considerable number of earlier studies (...) and can be considered to be quite well established” (pp. 160-161).⁴

Finally, as Hofler and Murphy (1992) show, the degree of underpayment can be influenced by the characteristics of the labor force, including worker wealth and education, labor force attachment, gender, etc. Thus two countries with identical institutions for wage setting and information about the relationship between wages and skills could have different degrees of underpayment if the composition or characteristics of their labor forces differ.

b. The Stochastic Frontier Approach to Labor Market Inefficiency

We utilize a stochastic wage frontier approach to measuring underpayment or labor market inefficiency that is similar to that of Hofler and Murphy (1992). The stochastic wage frontier of the maximum wages that workers can achieve is based on a Mincerian (Mincer, 1974) earnings function of the form:

$$\ln w_i = \alpha + \beta'x_i + \varepsilon_i \quad (1)$$

where $\ln w_i$ is the logarithm of the observed wage of the i -th individual, x_i is a vector of socio-

³ Polachek and Yoon (1987, 1996) modeled this worker-employer search under uncertainty for both parties by means of a two-tiered stochastic wage frontier in which both employers and workers faced uncertainty. In such a model each hire effectively splits the difference between the reservation wage and the maximum wage between the firm and the hired worker. However, Polachek and Xiang (2006, p.42) show that “incomplete employee information varies far more than incomplete employer information” and thus the latter may be ignored without a significant loss of accuracy and generality. Polachek and Robst (1998) compared frontier estimates of incomplete information to direct measures of workers’ knowledge and concluded that “stochastic frontier estimates provide a reasonable measure of a worker’s incomplete wage information” (p. 231).

⁴ Of course this wage dispersion is not necessarily the result of inefficient wage setting. Rather, the causality runs from greater wage dispersion to larger differences in wage offers that searching workers may receive and to a less precise understanding of the wage-skill relationship.

economic characteristics of that individual, ε_i is an error term, and α and β s are parameters to be estimated.

Following Aigner *et al.* (1977), we separate the error term in Equation 1 into two parts, a white noise variable $v_i \sim N(0, \sigma_v^2)$ and a non-negative inefficiency term. Equation 1 can thus be rewritten as:

$$\ln w_{\max i} + v_i - u_i = \alpha + \beta'x_i + v_i - u_i \quad (2)$$

where $w_{\max i}$ is the deterministic frontier wage, the maximum wage that worker i can obtain given his or her characteristics. We assume a half-normal distribution for $u_i \sim N^+(0, \sigma_u^2)$ and that u_i and the independent variables are unrelated. Equation 2 is estimated using the log-likelihood function (Aigner *et al.*, 1977; Meeusen and van den Broeck, 1977). The conditional expectation value of u_i given ε_i is calculated as in Jondrow *et al.* (1982). The u_i -values are used to calculate individual efficiency (EFF) and inefficiency (INEFF) ratios measuring the gap between the actual wage and the stochastic wage frontier for the i -th individual as:

$$\text{INEFF}_i = 1 - \text{EFF}_i = 1 - \frac{\exp(\alpha + \beta'x_i + v_i - u_i)}{\exp(\alpha + \beta'x_i + v_i)} = 1 - \exp(-u_i) \quad (3)$$

3. Data

One part of our data consists of estimates by Polachek and Xiang (2006) of wage-setting inefficiency in 10 OECD countries including one transition economy, the Czech Republic, and Israel for years close to 2000. Because this sample includes only one transition economy, we supplement these results with our own estimate of a frontier wage function, using data from the Polish Labor Force Survey conducted by the Polish Central Statistical Office in May 2001. We restricted our attention to full-time hired workers because only this category of employees was required to report their net earnings at their main workplace during the preceding month. After these adjustments, we had a sample of 9,380 full-time hired workers for 2001.

4. Estimation results

4.1. Estimates of the Stochastic Wage Frontier

A problem that we encounter if we wish to make cross-country comparisons of the inefficiency of the wage-setting process is that the degree of inefficiency measured by the frontier wage function depends in part on which and how many explanatory variables are included in Equation 2. Polachek and Xiang (2006) used the following identical explanatory variables to measure wage-setting inefficiency their sample of countries: years of schooling, years of potential experience, years of potential experience squared and a dummy variable equal to one if the worker is a woman. Thus, we used the identical specification for the estimate of the Polish wage frontier.

The means for these explanatory variables, the maximum likelihood estimates of the parameters of Equation 2, and the estimate of inefficiency for Poland are presented in Table 1. Also reported in Table 1 are the corresponding means, parameter estimates, and inefficiency

Table 1 Variable means and maximum likelihood estimates of the wage frontier coefficients: International comparison, Polachek and Xiang (2006) specification

Country	Year	Variable means			Regression estimates				
		Years of schooling	Potential experience, years	Woman	Years of schooling	Potential experience, years	Potential experience squared	Woman	Wage inefficiency ratio
Canada	2000	13.288	18.450	0.487	0.098	-0.006	0.0002	-0.314	0.340
Czech R.	1996	10.413	23.784	0.466	0.093	0.020	-0.0003	-0.321	0.274
Finland	2000	11.693	22.208	0.491	0.065	0.043	-0.0005	-0.421	0.563
Germany	2000	12.607	27.399	0.516	0.105	0.020	-0.0002	-0.187	0.357
Ireland	1996	9.492	29.905	0.495	0.091	0.038	-0.0004	-0.110	0.353
Israel	1997	12.019	22.691	0.514	0.128	0.042	-0.0005	-0.514	0.341
Netherlands	1999	12.693	19.441	0.463	0.065	0.026	-0.0003	-0.058	0.297
Norway	2000	12.734	20.755	0.486	0.073	0.046	-0.0008	-0.460	0.484
Sweden	2000	12.207	22.140	0.491	0.092	0.036	-0.0005	-0.392	0.471
UK	1995	11.094	22.043	0.504	0.161	0.018	-0.0001	-0.368	0.204
US	2000	12.818	25.219	0.521	0.116	0.027	-0.0003	-0.307	0.384
Poland:	2001	11.985	20.750	0.445					
coefficient									0.109
std. error					0.085	0.018	-0.0002	-0.231	
$\lambda = 0.464$ (std.err. 0.080)					(0.002)	(0.001)	(0.0000)	(0.007)	
$\sigma = 0.345$ (std.err. 0.005)									
$\sigma^2 = 0.098$									
$\sigma^2 = 0.021$									
N obs. = 9380									

Source: Authors' computations for Poland. For other countries - Polachek and Xiang (2006), Tables 1 and 2. Polachek and Xiang estimated wage frontier equations for 11 OECD countries over a number of years. We are using the most recent year for each country from their study and 2001 for Poland.

estimates obtained by Polachek and Xiang (2006) for the Czech Republic, Israel and a sample of developed market economies. As the first three columns of Table 1 show, the means of the explanatory variables for the Czech Republic and Poland all fall within the range of values reported for the non-transition countries with the exception of the percentage of women, which, in the Polish sample, is somewhat lower than it is for the non-transition economies. Thus, any differences in efficiency between the transition economies and the rest of the sample cannot be attributed to inter-country differences in the labor force characteristics used to estimate the wage frontier.

The estimated frontier coefficients for Poland are all significant at quite robust p -value levels and entirely consistent with those obtained by Polachek and Xiang. Moreover, all the parameter estimates for the Czech Republic and Poland fall within the range of coefficients reported for the non-transition economies.⁵

Despite the similarities in sample characteristics and parameter estimates across the countries in the sample, the efficiencies of the two transition economies are surprisingly high. That of the Czech Republic is higher than that of any country in the sample save Poland and the UK, while Poland's efficiency is higher than that of the other countries in the sample by a surprisingly wide margin. Given the major changes in the Czech and Polish labor markets that occurred in the 1990s such low labor-market inefficiency is noteworthy, and we now turn to an explanation of this result.⁶

5. Why are transition economies' labor markets so efficient?

In Section 2, we discussed the two major determinants of wage inefficiency: incomplete worker information and the wage setting process as the two determinants of labor market efficiency. In this section we examine whether either of these determinants can account for the high efficiency of the wage search process in the transition economies. Because both incomplete worker information and the wage setting process have a number of separate dimensions to them while we have a very limited sample of countries, we are not able to study the causes of labor market efficiency by means of regression techniques. However, simple bilateral relationships between elements of labor market information and the wage setting process provide useful insights into why the transition economies' labor markets are so efficient.

5.1. Labor Market Information

Job search theory predicts that better labor market information improves the job-matching process, leads to higher wage offers and lowers underpayment. However, labor market information is imperfect and costly to obtain. Theory predicts that certain demographic groups possess more or better information than others, that some methods for collecting information are more efficient and lead to more and better information than do others, and that the availability of supplementary income lowers search costs, prolongs the period of job search, and allows workers to acquire more information.

⁵ While we use the Polish labor survey data, use of the Luxembourg Income Study data employed by Polachek and Xiang yields similar results.

⁶ To test for the robustness of the low estimate of Polish labor market inefficiency, we estimated inefficiency for other years and we also estimated the wage frontier with a richer set of explanatory variables (worker characteristics). The low inefficiency reported in Table 1 was found for other years and for a richer specification.

Socio-demographic groups and labor market information. Weak labor market attachment, an environment with limited public knowledge about wages, higher costs of job search, *etc.* lead to less complete information and, consequently, to higher wage inefficiency. Search theory suggests that men, married workers, prime age workers, workers with more education, workers in urban areas, union members, industrial workers, public sector workers, and natives experience less underpayment as compared to women, single workers, young workers, less educated workers, workers in rural areas, non-unionized workers, private sector workers, and migrants.⁷ Data on these characteristics of each sample country's labor force are reported in Table 2 and plotted against the estimate of labor market efficiency of each country in Figure 1. Overall, the results presented in Figure 1 are in accord with the predictions of search theory in that a country's wage efficiency is positively correlated with demographic characteristics of the labor force such as the share of male, married, prime-age, higher-educated, industrial, and native workers in the labor force. The exception is urbanization, which appears to be unrelated or negatively related to wage efficiency.

Panel *a* of Figure 1 shows a positive relationship between efficiency and the percentage of males in civilian employment. Indeed, if Ireland, a clear outlier, were dropped from the sample, this relationship would be particularly tight, and Poland and the Czech Republic both have relatively high percentages of male workers in civilian employment. In Panel *b* a high share of married people in the adult population 20 to 40 years of age also shows a positive influence on efficiency. In our sample Poland, at 57.7 percent, and the Czech Republic have the highest shares and Sweden the lowest at 28.0 percent.⁸ Considerable research in labor economics suggests that family interests make workers perform better in the labor market along several dimensions. Especially for men, marriage is likely to be a powerful source of pressure to get a good job and settle down. Married workers are believed to have greater motivation from the need to support their families, so they are more apt to search for jobs that pay well and to have a higher reservation wage than unmarried workers. On the other hand, companies search for workers whose need to earn more makes them more productive and committed at the workplace. Thus married workers have both a higher reservation wage and a higher likelihood of being offered a wage close to the frontier.⁹ We conclude that a greater share of married people in the Polish and Czech work forces thus contributes to a higher level of wage efficiency in these countries.

Panel *c* plots the share of prime-age (25-55 years of age) workers in employment against efficiency. Poland has the highest share at 81.5 percent and the Czech Republic scores relatively high as well. The weak labor market attachment of younger and older workers is a well-established fact. EU-OSHA (2007) analyzed youth employment in the EU-25 and concluded that:

“[t]emporary workers (...) are less informed” and that “[i]n 2005, one in four young workers had a part-time job.” (p. 1).

⁷ Meager et al. (2002) examined workers' awareness and knowledge of five specific groups of employment rights: legislation related to work-life balance; working time legislation; wages, terms and conditions (including the national minimum wage); anti-discrimination legislation; and unfair dismissal rights. Their results conclude that worker characteristics are associated with different levels of awareness/knowledge.

⁸ Poland also has the highest share of married people in the 20-40 age group among the 20 OECD countries.

⁹ Research shows that being married consistently has a statistically significant positive effect on men's earnings. For women, the relationship between marriage and earnings is more complex: the findings range from slightly positive to negative.

Table 2 Labor market characteristics in OECD countries

Country	Year (i)	Males, % of civilian employment (ii)	Married, % of the adult population 20 to 40 years of age (iii)	Prime age (25 to 55 years of age) workers, % of employment (ii)	Upper secondary & tertiary education, % of the labor force 25 to 64 years of age (iv)				Population residing in urban areas, % of population (v)	Union density, % (vi)	Industry, % of civilian employment (ii)	Foreign-born, % of total population (vii)
					(1)	(2)	(3)	(4)					(5)	(6)	(7)	(8)
Canada (CAN)	2000	54.0	41.8 (2001)	74.1	84 (1999)	79.4	28.1	22.5	18.1			
Czech R. (CZE)	1996	55.9	53.6 (2002)	75.4	90 (1998)	74.7 (1995)	46.3 (1995)	42.0	4.3 (1998)			
Finland (FIN)	2000	52.4	36.5 (2002)	77.5	76 (1999)	61.6	75.0	27.6	2.6			
Germany (DEU)	2000	55.9	44.6 (2002)	75.9	85 (1999)	87.5	25.0	33.7	12.5			
Ireland (IRE)	1996	61.1	41.7 (2002)	71.2	58 (1998)	57.9 (1995)	45.5	27.8	6.9			
Netherlands (NLD)	1999	57.3	53.7 (2002)	76.1	72	64.3 (2000)	24.6	21.4	9.8			
Norway (NOR)	2000	52.9	32.1 (2002)	73.0	88	75.8	53.7	21.9	6.8			
Poland (POL)	2001	54.9	57.7 (2002)	81.5	86	61.7 (2000)	14.7	30.5	1.6 (2002)			
Sweden (SWE)	2000	52.1	28.0 (2002)	72.6	80 (1999)	83.3	79.1	24.6	11.3			
UK (GBR)	1995	54.5	38.8 (2002)	72.6	85 (1998)	88.7	32.6	27.3	6.9			
US (USA)	2000	53.5	52.3	71.8	90 (1999)	79.1	12.8	23.0	11.0			

Table 2 (cont.) Labor market characteristics in OECD countries

Country	Year (i)	Internal regional migration (gross outflows), % of population 15 to 64 years of age (viii)	Informal job-search methods, % of those who rely on these methods (ix)	Unemployment benefits per unemployed, USD (x)	Unemployment benefit replacement ratio (xi)	Unemployment compensation, % of GDP (xii)	Ratio of minimum wages to median earnings of full-time workers (xiii)
(A)	(B)	(9)	(10)	(11)	(13)	(12)	(14)
Canada (CAN)	2000	1.11 (1998)	37 (2001)	5.3 (1997)	0.49 (1999)	0.78	0.41 (2003)
Czech R. (CZE)	1996	0.77 (2003)	49 (2001)	1.1 (1997)	0.24 (1998)	0.30 (1999)	0.37 (2003)
Finland (FIN)	2000	..	25 (2001)	..	0.54 (1999)	1.65	..
Germany (DEU)	2000	1.15 (1998)	..	..	0.37 (1999)	1.88	..
Ireland (IRE)	1996	..	32 (2001)	..	0.35 (1999)	0.63 (2001)	0.38 (2003)
Netherlands (NLD)	1999	2.15	..	13.6 (1997)	0.70	2.30	0.51 (2003)
Norway (NOR)	2000	..	29 (2001)	9.3 (1997)	0.62 (1999)	4.46	..
Poland (POL)	2001	0.30 (2003)	46	2.3 (1997)	0.36 (1998)	1.01	0.40 (2003)
Sweden (SWE)	2000	..	..	9.0 (1997)	0.74 (1999)	1.27	..
UK (GBR)	1995	2.60 (1999)	33 (2001)	5.0 (1997)	0.17 (1999)	0.63 (1998)	0.44 (2003)
US (USA)	2000	2.69 (1998)	46 (2001)	3.2 (1997)	0.29 (1999)	0.23	0.32 (2003)

NOTES:

Data not available.

(xiii) Source: Figure EQ2.2 on p. 71 in the Society at a Glance: OECD Social Indicators 2006 Edition, OECD, 2007. There is no national minimum wage in Finland, Germany, Norway and Sweden.

Table 2 (cont.) Labor market characteristics in OECD countries

Country	Year (i)	Collective bargaining coverage, % (xiv)	Bargaining centralization, index (xv)	Bargaining coordination, index (xv)	Bargaining governability, index (xvi)	Annual average earnings dispersion, 90-10 percentile ratios for the gross earnings of full-time employees (xvii)
(A)	(B)	(15)	(16)	(17)	(18)	(19)
Canada (CAN)	2000	32.0	1 (1995-00)	1 (1995-00)	4	3.65 (1995-99)
Czech R. (CZE)	1996	25.0+ (2000)	1 (1995-00)	1 (1995-00)	..	2.86 (1995-99)
Finland (FIN)	2000	90.0+	5 (1995-00)	5 (1995-00)	4	2.36 (1995-99)
Germany (DEU)	2000	68.0	3 (1995-00)	4 (1995-00)	4	2.87 (1995-99)
Ireland (IRE)	1996	..	4 (1995-00)	4 (1995-00)	1 (2000)	3.97 (1995-99)
Netherlands (NLD)	1999	80.0+ (2000)	3 (1995-00)	4 (1995-00)	3 (2000)	2.85 (1995-99)
Norway (NOR)	2000	70.0+	4.5 (1995-00)	4.5 (1995-00)	4	1.96 (1995-99)
Poland (POL)	2001	40.0+ (2000)	1 (1995-00)	1 (1995-00)	..	3.50 (1995-99)
Sweden (SWE)	2000	90.0+	3 (1995-00)	3 (1995-00)	4	2.23 (1995-99)
UK (GBR)	1995	30.0+ (2000)	1 (1995-00)	1 (1995-00)	1 (2000)	3.45 (1995-99)
US (USA)	2000	14.0	1 (1995-00)	1 (1995-00)	3	4.59 (1995-99)

NOTES:

Data not available.

(xiv) Source: Table 3.3 on p. 145 in the OECD Employment Outlook 2004. Figures with a + sign represent lower-bound estimates. For the purpose of calculating different estimates, OECD increased the indicated value by 2.5 percentage points.

(xv) Source: Table 3.5 on p. 151 in the OECD Employment Outlook 2004. The centralization indicator has a 1-4 (lowest to highest) scale; and the coordination indicator has a 1-5 (lowest to highest) scale.

(xvi) Source: Box 3.3 on p. 152 in the OECD Employment Outlook 2004. The governability indicator has a 1-4 (lowest to highest) scale reflecting the ability of the employer and trade union associations to control the behavior of their constituency or "rank and file."

(xvii) Source: Table 3.2 on p. 141 in the OECD Employment Outlook 2004.

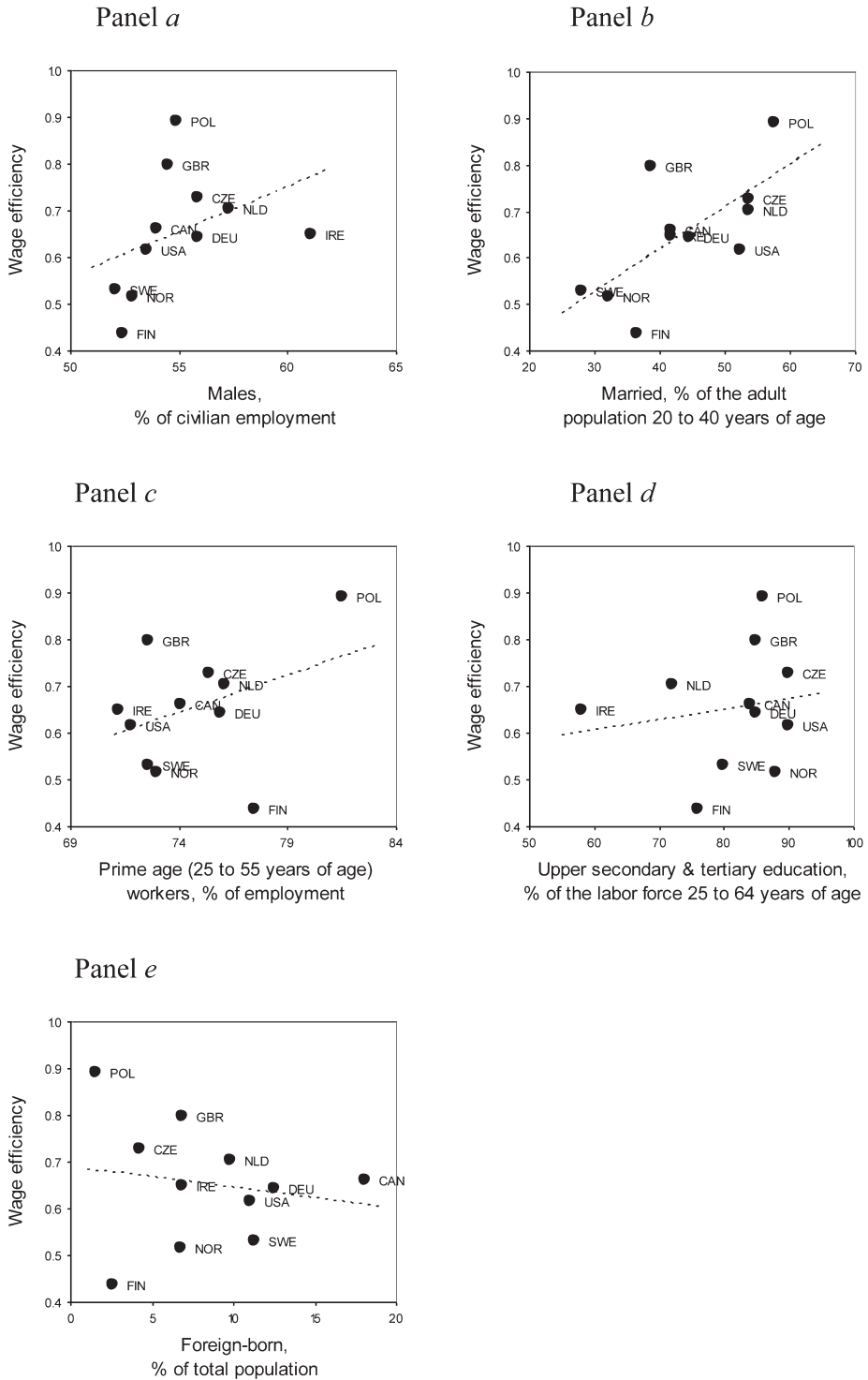


Fig. 1. Wage efficiency and demographic characteristics of the labor force. Older workers also have weak labor force attachment. OECD (2006) reviewed 21 OECD countries and found that:

“In 2004, less than 60% of the population aged 50-64 had a job, on average in the OECD, compared with 76% for the age group 24-49” (pp. 9-10) and that older workers who lose their job often face considerable difficulties finding a new job and suffer large potential wage losses. “In most of the review countries, older people appear to face a number of obstacles in obtaining adequate employment services to help them find a job. (...) Moreover, the level and type of support given to older jobseekers is not always the same as is given to younger jobseekers” (pp.76-77), and “[o]lder job seekers are under-represented in active labour market programmes in nearly all of the review countries” (p. 10).¹⁰

Weak labor market attachment of younger and older workers leads to their having poor labor market information. According to Meager (2002, p. 32), “levels of informed awareness (...) peak in the 36-45 age group, with those in the youngest and oldest groups the least informed.” The fact that in our sample Poland has the lowest share of younger and older workers while the Czech Republic is also below average for our sample means that they have high shares of prime-age workers who possess more information and hence experience greater wage efficiency.

Panel *d* of figure 1 shows that Poland and the Czech Republic do not differ much from the other countries in the sample, except for Ireland, which is something of an outlier here as well, in terms of the share of workers with secondary and tertiary education in the work force. The literature suggests that better educated workers are also better informed about wages and job opportunities, and, if Ireland is dropped from the picture, there is a strong relationship between educational attainment and wage efficiency in our sample. However, given that the educational attainment of Czech and Polish workers falls in the mid-range of the sample countries, this demographic characteristic does not help explain the greater wage efficiency in the two transition economies.

Finally, a low share of foreign-born population (*i.e.*, immigrants) tends to reduce observed wage efficiency, and this is borne out by Panel *e* of Figure 1, although the cross-country variation is quite large. Poland has the lowest proportion of foreign born and the Czech Republic, too, has a low proportion of the foreign born, in both countries a legacy of their communist past. In many countries, migrants do not integrate well into the labor market, and overqualification for the jobs they are able to get is a big challenge (Gurria, 2008). For instance, in the OECD countries the employment rate was on average 68.1 percent among the native-born population 15-64 years of age and 57.2 percent among immigrants in the same age category. Overall, in the OECD, unemployment among immigrants was higher than that among the native-born: 7.8 vs 11.7 percent, respectively. Furthermore, in almost all OECD countries, immigrants were more likely to be ‘overqualified’, that is, working in jobs or occupations for which their skills were too high, than were persons born in the country. Data in OECD (2008, p. 139, A profile) show that the percentage of employed foreign-born holding a job for which they were overqualified was 9.0 in Poland, 9.6 in the Czech Republic, 17.3 in the United States, 18.4 in the United Kingdom, 18.6 in Sweden, 21.0 in Ireland, 21.6 in Finland, 25.2 in Canada. Unfavorable labor market outcomes of immigrants may be due to poor information

¹⁰ OECD (2006) reports that older workers in several countries are much less likely than the young to be covered by active labor-market policies. Hence, public employment services need to provide tailored help to the over 50s. Several pilot initiatives have been launched, such as “Jobwise Workshops for older jobseekers and workers to provide them with information on the changing nature of the labor market (including their own local labor markets), effective job-search strategies and available assistance measures. Jobwise Self-Help Groups for older job seekers, allowing them to exchange experiences, provide mutual support, develop their job-search techniques and improve career decisions.” (p. 129).

about the local labor market, lack of host-country language proficiency, legal and administrative obstacles, and problems with transferability of human and social capital. As a result, immigrants may be more willing to accept unskilled jobs with low pay, even if their qualifications are higher. Hence, we may expect lower wage efficiency in those countries where the share of immigrants is high. Since the Czech Republic's and Poland's shares of immigrants are negligible and the labor market outcomes for them are more favorable than they are in other OECD countries, this, too, suggests a part of the explanation for the two transition economies' high wage efficiency.

Environmental factors and labor market information

The ability of workers to obtain information about wages may also depend on where they live and work, since the dissemination of wage information is, in large part, a social process. In Figure 2 we consider some indicators that relate to social factors that may promote or inhibit the spread of wage information. In Panel *a* of Figure 2 we consider the degree of urbanization. The assumption here is that if workers are located in urban agglomerations, they have more contact with workers employed by other firms and thus more information about wages in the local economy than do workers in a rural area where the majority of them may work for a single firm that dominates the local labor market. Unfortunately, Panel *a* shows that, for our sample of countries, this hypothesis lacks support.

Panel *b* of Figure 2 considers internal inter-regional migration. Like international migrants, internal migrants usually possess limited and incomplete information about local labor market conditions. As Table 2 shows, in Poland only 0.3 percent of population 15 to 64 years of age moved to another region within a year, the lowest level in our sample, and the Czech Republic has the second lowest level.¹¹ Not only were transition economies' internal migration rates low, but they decreased over the 1990s (Fidrmuc, 2004). Feldmann (2004) attributes the low rates of inter-regional migration in the transition countries to the legacy of central planning and its pervasive job security, to scarce housing and undeveloped housing markets, a higher share of the labor force in agriculture, low regional wage dispersion, and to the attitudes and habits of people. He suggests that "the reason for this attitude is the traditionally very close system of family ties. In fact, surveys in Poland have shown that people move, if at all, for family reasons in most cases and not because of jobs" (p. 284). Since permanent residents are usually better informed about the local labor market than new residents, low internal regional mobility supports higher wage, and this is borne out by Panel *b*.

Panel *c* considers the share of the labor force engaged in industry on the assumption that industrial jobs are relatively homogeneous and that wage information spreads more easily in large industrial plants. An examination of Panel *c* lends some support to this hypothesis, but the relationship seems largely driven by outlier countries, and the dispersion around the trend line is quite large, suggesting that this is not an important factor in the transition economies' good wage efficiency performance

Finally, in Panel *d* we consider the size of the public sector. A high degree of public ownership is a defining feature of the transition economies. Public sector workers are often assumed to be better informed than their private sector counterparts about labor laws, wages, incentives, work requirements and conditions. In many countries, what a public employee makes is, by law, a matter of public record. On the other hand, a private company is typically able to keep that information within the company, and could require employees not to reveal it to outsiders.¹² Hence, we expect

¹¹ We were unable to find comparable data for Finland, Ireland, Norway, and Sweden.

¹² For instance, Groot and Oosterbeek (1994, p. 388) conclude that "employees in the public sector possess more

that countries with a greater share of public sector employment will exhibit a greater degree of wage efficiency, and the data presented in Panel *d* of Figure 2 confirm these expectations.¹³ As is to be expected, the transition economies have a larger public sector despite the extensive privatization that took place in the 1990s, and this appears to play a role in wage efficiency

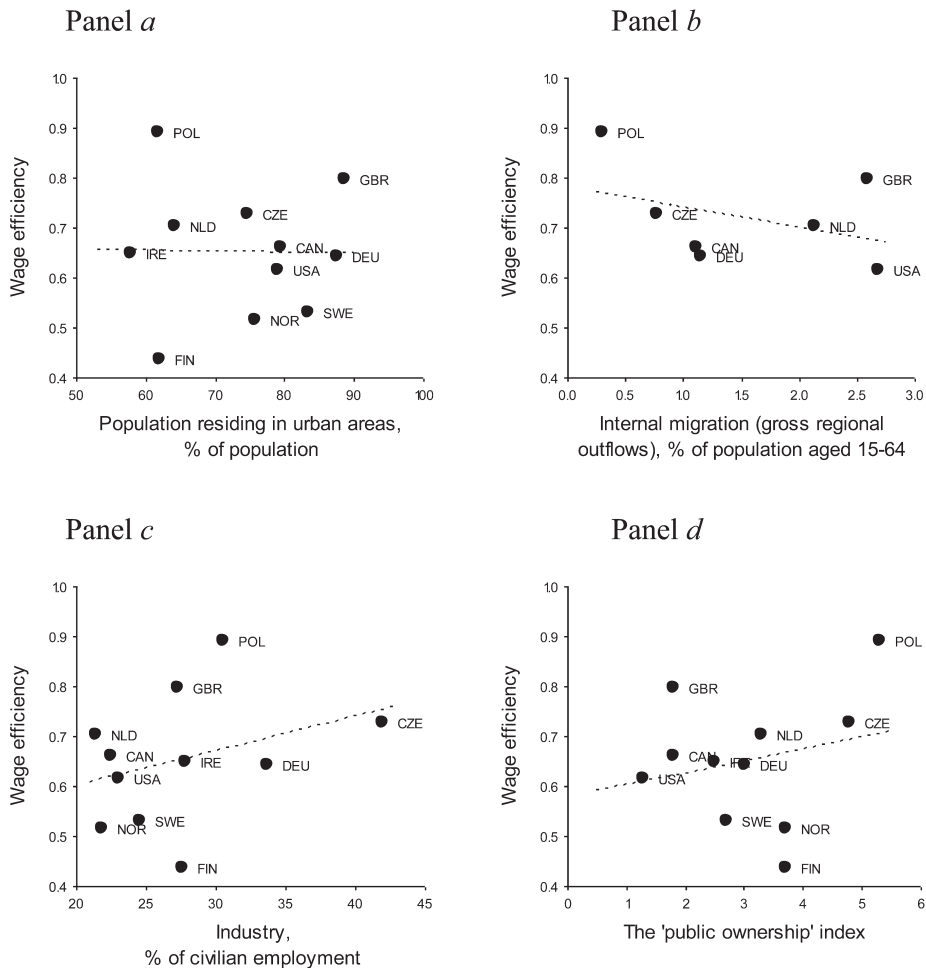


Fig. 2 Wage efficiency and environmental factors

market information than workers in the private sector. This is probably due to the fact that wage policies in the private sector are in general less public knowledge and more individually based.” Furthermore, Groot and Oosterbeek find that “public sector employers are more informed than private sector employers. By its size the public sector often exercises some sort of monopsony power on the labor market, leading to information advantages over employers in the private sector. When we view the public sector as one large employer, one may expect public employer ignorance to be lower than private employer ignorance, as a large employer probably has more information about the reservation wages of employees than a small-scale employer does” (p. 388).

¹³ To assess the size of the public sector in our sample of countries, we used an internationally comparable set of the OECD Product Market Regulation indicators (see Nicoletti et al., 1999; Conway et al., 2005). The “public ownership” indicator is made up of: (a) the scope of the public enterprise sector, (b) the size of public enterprise sector, and (c) the extent direct government control over business enterprises. The methodology and results are available from the authors upon request.

Job search channels and search costs. The job search of individuals in the labor market involves a number ways of obtaining information about available jobs. These are usually divided into three categories: institutional intermediaries such as employment agencies, market methods such as direct applications and responding to job advertizing, and social networks including family, social and professional links. The former two ways of searching for a job are considered as formal, and the latter one, informal. Job search methods vary in their costs, effectiveness, and access to different wage distributions. The time and money costs associated with informal job search are low in comparison to the costs associated with formal methods. Montgomery (1991), Mortensen and Vishwanath (1993, 1994) developed theoretical models of job search and argued that informal search methods generate job offers with higher wages; that is, even if applicants have the same productivity, individuals who have access to informal search channels will earn a higher wage. Studies have consistently found that informal methods may be as, or more, productive in generating job offers as formal methods. However, empirical studies addressing the extent to which different channels result in jobs with different wages yield conflicting results.¹⁴ Figure 3 plots the percentage of people obtaining information about jobs from informal sources such as family and friends in eight OECD countries in our sample. There is a positive relationship between reliance on informal search and the wage efficiency.¹⁵ In Poland, those who rely on informal networks amounted to 46 percent¹⁶, which is similar to the United States and slightly below the Czech Republic, which had the greatest share at 49 percent.

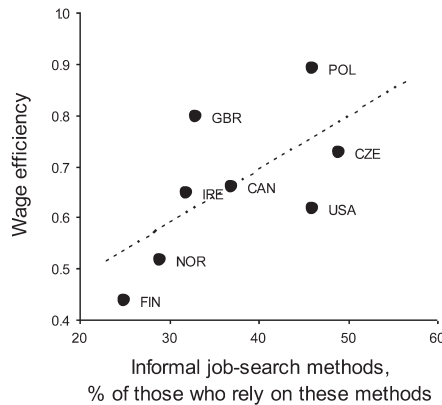


Fig. 3 Wage efficiency and ways of searching for jobs

¹⁴ For example, Granovetter (1974), Corcoran et al. (1980), Simon and Warner (1992), Addison and Portugal (2002), Boheim and Taylor (2002), Sabatier (2002), and Kugler (2003) found positive (albeit sometimes insignificant) wage premia for jobs found through referrals from relatives and friends. In contrast, Koning et al. (1997) conclude that formal and informal search methods do not generate wage offers that are significantly different. Bentolila et al. (2004) find that the use of social contacts helps find jobs one to two months sooner but leads to individual wage discounts of 5 to 7 percent.

¹⁵ Data on Germany, the Netherlands and Sweden are not available.

¹⁶ Our own calculations for 38,954 Polish individuals who were unemployed in 1994-2001 also show that 42 percent used social networks, which is consistent with the data in Paci et al. (2007). Further, 77 percent were looking for a job through institutional intermediaries (74 percent through regional labor offices and 3 percent through private employment agencies), 55 percent used other market search methods (39 percent contacted employers and 16 percent answered and placed announcements in newspapers), and 0.8 percent tried to start their own business. The total is greater than 100 percent because each respondent in the Polish Labor Force Survey could report up to three job search methods. On average, each person reported 1.77 search methods.

Unemployment benefits and search costs. Job search theory predicts that unemployment benefits decrease search costs, allow people to search for a job longer and, hence, to acquire more information, and lead to higher post-unemployment wages by increasing workers' reservation wages.¹⁷ Figure 4 shows three measures of the unemployment compensation system generosity in OECD countries in our sample: (1) expenditure on unemployment benefits in US

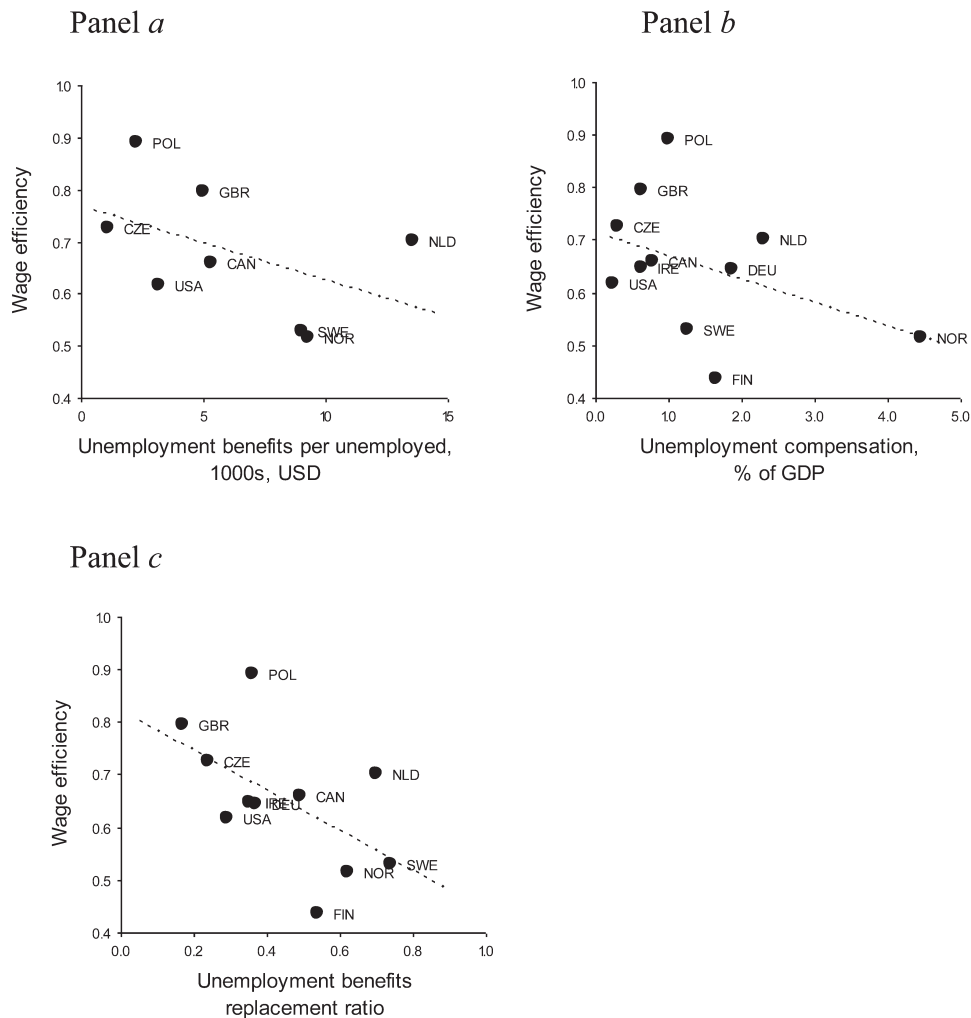


Fig. 4 Wage efficiency and unemployment benefits

PPP\$ per one unemployed¹⁸, (2) the unemployment benefits replacement ratio, and (3) the share of unemployment compensation in a country's GDP. The two post-communist transition

¹⁷ However, the link between job search theory and empirical work is rather frail. The most recent empirical research on reservation wages often produces negative coefficients on the unemployment benefits variable (Heath and Swann, 1999; Rødm, 2003; Prasad, 2003).

¹⁸ Data for Finland, Germany, and Ireland are not available.

countries in the sample, the Czech Republic and Poland, had the lowest unemployment benefits per unemployed person, but this is in part due to their lower *per capita* incomes, but their replacement ratios were relatively low compared to other countries, a fact that should lead to inefficient wage setting. The ratio of unemployment assistance to GDP measures, in part, the coverage and generosity of unemployment benefits, but obviously also depends on the level of unemployment.¹⁹ Figure 4 depicts an inverse relationship between all three measures of unemployment compensation and wage efficiency. Thus, there seems to be no evidence that unemployment benefits in OECD countries or in the transition economies significantly reduce the costs of acquiring information, extend the length of the job search longer, and result in better job matches with higher earnings.²⁰ We conclude that unemployment compensation does not help us shed any light on high wage efficiency in the transition economies.

5.2. The wage setting system

The literature suggests the institutions of wage setting also tend to influence the ability of workers to obtain a wage that is close to their maximum wage. Among the institutional factors are lower unionization and collective bargaining coverage, less centralized bargaining, and the absence of statutory minimum wages all of which tend to increase wage dispersion (see the literature review in Card *et al.*, 2007, as well as Koenig *et al.*, 2007 and Baccaro, 2008). Highly dispersed wage distributions are likely to produce opaque wage signals to job seekers who will have to acquire and process a greater amount of information than under a more compressed wage distribution.

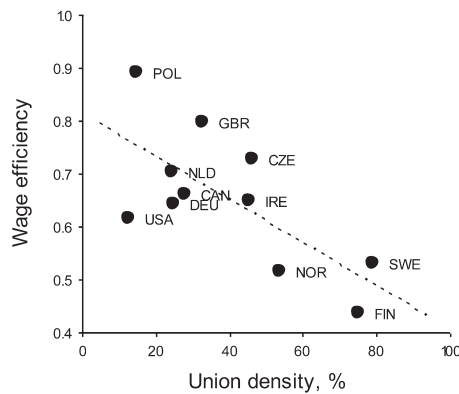


Figure 5. Wage efficiency and labor union density

¹⁹ In Poland, the level of unemployment benefits was uniform for all eligible jobseekers irrespective of their previous earnings. Unemployment benefits were reduced from 50 percent of the average national wage in 1991 to 36 percent in 1994 and to 21 percent in 2002. In addition, an open-ended unemployment benefit system was replaced by a maximum duration of 12 months. Finally, the eligibility rules for access to unemployment benefits were tightened, that caused a drastic drop in the proportion of the unemployed receiving benefits from 80 percent in 1991 to 50 percent in 1994 to less than 20 percent in 2002 (UNECE, 2003).

²⁰ Our own calculations for the extensive data set of 38,954 Polish individuals who were unemployed in 1994-2001 show that unemployment benefits increased the reservation wage by about 0.8 percent; however, the coefficient is significant (t-statistic=2.035) but small in economic terms. In the sample, 32 percent of the unemployed claimed unemployment benefits as their main source of personal income.

Trade unions. As Figure 5 shows, in our sample the highest levels of unionization were observed in the Scandinavian countries and the lowest level was recorded for the United States. Paradoxically, Poland, where trade unions initiated the market reforms in the 1980s, now has among the lowest levels of trade union density in Europe but the Czech Republic is solidly in the center of the distribution. Thus the relationship between efficiency and union density does help explain Poland's good wage efficiency, though it does not do so for the Czech Republic

Employers' coordination. Employers in Poland are not well organized. According to EIRO (2006, pp. 2, 4-5), employers' organization density in Poland was 20 percent versus 58 percent in the EU. The most notable associations were the Confederation of Polish Employers, the Business Center Club, the Polish Confederation of Private Employers, and the Association of Polish Crafts. The Confederation of Polish Employers was the biggest, with about 2 million members; however, it was more interested in acquiring political power than in negotiating collective agreements at the sectoral or multi-establishment level.

Collective bargaining. Collective bargaining coverage shows the real extent to which salaried workers are subject to union-negotiated terms and conditions. The bargaining coverage data presented in Table 2 show that Poland is in the middle of our sample and the Czech Republic is at the low end, so this seems not to be a factor that explains wage efficiency in the transition economies.

There are two dimensions to collective bargaining: centralization and coordination. Centralization reflects the level where collective contracts are negotiated and formally set. In Poland, collective agreements covering a single employer entity continue to be the main form of collective bargaining; and sectoral, inter-sectoral or multi-level agreements remain rare. In 1995-2002, the authorities registered 12,094 single-establishment agreements and only 157 multi-establishment agreements (EIRO, 2006, p. 5). Table 2 shows the centralization indicators for our sample for the 1995-2000 interval. According to OECD (2004, p.150), Canada and the United States have historically bargained at the company and plant level, the United Kingdom and some Central and Eastern European countries, including Poland and the Czech Republic have joined this group more recently. At the other extreme, inter-industry bargaining at national level is a feature historically characteristic of the Scandinavian countries. Most continental European countries traditionally favor "intermediate" forms of wage negotiation, mainly at the branch or sectoral level. Coordination of bargaining reflects the extent to which pay negotiations are coordinated across the economy. In Table 2, the Czech Republic and Poland are characterized by the lowest level of coordination, that is, company/plant bargaining with little or no coordination by upper-level associations.

Minimum wage. The ratio of the minimum wage relative to the median wage of full-time employees for the Czech Republic and Poland did not differ from those of the other countries in our sample (see Table 2). Moreover, there does not seem to be a strong relationship between this ratio and wage efficiency.

Overall, wage setting institutions do not seem to provide an explanation for the greater wage efficiency of the two transition economies. In part this is because the two transition economies do not differ systematically for the other countries in the sample and in part because the relationships between indicators of wage setting mechanisms and wage efficiency are not very robust or opposite to what theory predicts.

5. Conclusions

In this paper we have used our own and others' estimates of wage setting efficiency in a sample of developed market and transition economies. We find that wage setting efficiency in the transition economies, the Czech Republic and Poland, is higher. We also find that this is largely due to socio-economic and environmental factors. In these two countries, the labor force is dominated by married males in their prime working years. There are few foreign workers, and there is little in-country labor mobility. Moreover, strong social bonds lead workers to use informal means of searching for new or higher paying jobs. Labor market institutions and policy instruments such as the minimum wage or unemployment benefits do not seem to play a major role in wage efficiency.

While these results seem to suggest that there are some important efficiency benefits to the sort of traditional male-dominated and family-oriented societies that the Czech Republic and, especially, Poland represent, two important points should be kept in mind. The first is that, if our findings are correct, then wage efficiency in the Czech Republic and Poland comes at some cost, such as the exclusion of old and young workers and women from the labor force, at least to some extent, as well as the relative absence of part-time and other flexible working arrangements. The second point is that the socio-economic features that appear to bestow such high efficiency in wage setting on the Czech Republic and Poland are unlikely to last. Their populations are ageing, which means that immigrants will account for a larger share of the labor force, and flexible arrangements for young and old workers and women will have to be provided. Moreover, as production shifts from industry to services, women can also be expected to play a larger role. Last, but not least, rising incomes and influences from the more advanced countries are likely to produce social changes in the Czech Republic and Poland that will move society away from sort of traditional nuclear families, lack of mobility, and strong local social ties that characterize the two post-communist countries now and that seem to contribute so strongly to their wage efficiency.

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The Joint Behavior of Sovereign CDS Spreads and Country Equity Risk: an Empirical Analysis

Patrizia Stucchi

Abstract Starting from the Merton [14] structural model it is possible to show that an inverse relationship holds between firms CDS spreads and their equity premium (Friewald et al. [7]). My work investigates empirically if the relation holds also for countries. To this aim, I have considered the daily CDS spreads on the 5 years government bonds of a set of countries (Brazil, China, Greece, Italy, Russia and US) and compared year by year their behavior with that of the countries daily equity premium defined in terms of Conditional Value at Risk (CVaR) over the period 2006-2012. The results confirm a strong inverse relationship between CDS spreads and equity risk premium.

Keywords Country Risk Country Equity Conditional Value at Risk Sovereign Credit Default Swap Risk Measures

JEL G32 JEL G01 JEL F30 JEL C63

1. Introduction

Friewald et al. [7] show that risk premia in equity and credit markets are strongly related. They start from the Merton [14] structural model and obtain an inverse relationship between firms CDS spreads and their equity premium. The main purpose of my work is to investigate empirically if there is an analogous relation between sovereign risk and country equity risk premium. Sovereign risk may be measured in terms of credit default swaps on government bonds, while country equity risk in terms of Conditional Value at Risk (CVaR) of equity market indices. In my paper there is the analysis of the joint behavior of sovereign Credit Default Swaps (CDS) spreads and of risk premium on countries' equity indices. The basic idea is that sovereign CDS spreads represent the insurance cost against country's default for bondholders, that is

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spreads may be intended as a negative risk premium. On the other hand, equity market investors require a positive equity risk premium. In a simplified market with two asset classes only, sovereign bonds and equities, if country risk rises, investors should sell sovereign bonds and invest on stocks and *vice versa*. Equivalently, increasing sovereign risk requires higher insurance cost, that is higher CDS spreads: investors aiming to reduce their risks or insurance costs should shift to equity markets and this implies equity premium reduction. This means that an inverse relationship between CDS spreads and equity risk premium should hold, as for firms in the theoretical structural framework due to Merton [14].

In the empirical investigation, the daily CDS spreads on the 5 years government bonds of a set of countries (Brazil, China, Greece, Italy, Russia and US) have been considered. Their year by year behavior have been compared with that of the countries daily equity premium defined in terms of Conditional Value at Risk (CVaR) over the period 2006-2012. The results of the linear regression of country equity premium over CDS spreads differ from one country to another, but in some years they confirm a very strong inverse relationship between CDS spreads and risk equity premium.

The paper is organized as follows. In Section 2 there is a short overview of the theoretical insights about the links between market and credit risk. Section 3 describes the structural model by Merton [14] and its application to sovereign credit risk modeling analyzed by Friewald et al. [7]. Section 4 is concerned with the methodology of the empirical analysis. In Section 5 the results obtained have been shown and analyzed. Section 6 contains the conclusions.

2. Theoretical framework

In 2000 Jarrow and Turnbull [11] observed that practitioners and regulators often calculate credit risk and market risk separately and then simply add their values to obtain a global risk measure. They claim that this unsatisfactory practice is based on the difficulty to estimate the correlation between market and credit risk and that this is equivalent to assume perfect positive correlation. Many authors have considered this problem, but it remains unsolved and regulators themselves are well aware of the “puzzle”; in fact, they say in 2009 that “*for many reasons, both historical and practical, market and credit risks have often been treated as if they are unrelated sources of risk: the risk types have been measured separately, managed separately, and economic capital against each risk type has been assessed separately.*” (Basel Committee [2]).

Credit and market risk are strictly related and their global influence cannot be evaluated by simple addition. In particular, considering a single firm in the stylized Merton model [14] (structural form approach), the equity is a call option on the firm value (assets) with the entire debt as strike price. In this theoretical framework, it is possible to show that the equity premium is exactly the opposite of the spread of a single name CDS written on the debt (Friewald et al. [7]). This result may be derived substantially from the put-call parity relationship, thinking to the CDS spread in terms of a long position in a put option on the assets with the debt as exercise price.

Implementing the structural approach implies significant practical difficulties due to the lack of observable market data on the firms value and these difficulties become greater dealing with sovereign data. Merton et al. [6] applied the structural model to sovereign risk with a CCA (Contingent Claim Analysis) approach based on the structural model, but their method requires the estimation of sovereign balance sheet data. In an older paper, Jarrow and Turnbull [9,10] overcome these difficulties, suggesting a reduced form approach and inferring the conditional martingale probabilities of default from the term structure of credit spreads.

3 The structural approach and credit risk premia

This section describes the Black, Scholes [5] and Merton [14] structural approach. Merton considers a firm with a simple capital structure, that is the value of the firms' assets $V(t)$ is given by the value of equity $E(t)$ and the value of risky debt $v(t, T)$ corresponding to the present value of a zero-coupon bond with a face value D and maturity T subject to the firm's risk of default:

$$V(t) = E(t) + v(t, T) \tag{1}$$

At maturity, if the value of the firm's assets $V(T)$ is greater than the amount owed to the debt holders (the face amount D) then the equity holders repay the bondholders and retain the firm. If the value of the firm's assets is less than the face value, the firm goes bankruptcy. In this case, if there are no costs associated with default, bondholders take over the firm and the value of equity becomes zero, assuming limited liability. In this simple framework, if $V(t)$ and $E(t)$ follow a geometric brownian motion, using Black and Scholes [5] arguments in presence of a risk free rate r , Merton [14] shows that the value of equity is the value of a European call option on the firm value $V(t)$ with strike price the face value of debt D :

$$E(t) = c[V(t), D, t, T, r] = c_t \tag{2}$$

Therefore, the value of risky debt $v(t, T)$ may be rewritten from condition 1 in the following way:

$$v(t, T) = V(t) - c_t$$

that is, the risky debt value is the firm's asset value less the value of the described call. On the other hand, using put-call parity, it is:

$$v(t, T) = D \cdot e^{-r \cdot (T-t)} - p_t \tag{3}$$

again, obviously:

$$D \cdot e^{-r \cdot (T-t)} = v(t, T) + p_t \tag{4}$$

The last condition means that bondholders could protect themselves from firm's default risk entering into a long position in the put option (Friewald et al. [7]). This also means that a long put on the firm's asset value with strike D represents a credit protection contract. Hence, the value of the put option is linked to that of a single-name Credit Default Swap (CDS) written on the firm's defaultable bond. The CDS contract offers credit insurance to the protection buyer (the bondholder) by paying off the loss given default (that is the unrecoverable amount of the face value of the bond). Usually, the protection buyer has to make periodic payments (the CDS spread) to the protection seller until default occurs or until the contract expires; in this case the spread s can be found from the condition:

$$\begin{aligned} \text{Premium Leg (or Protection Leg)} &= s \cdot D \cdot \sum_{t=1}^T PS_{0,t} e^{-rt} \\ &= \text{Default Leg} \equiv (1 - R) \cdot D \cdot \sum_{t=1}^T PD_{t-1,t} e^{-rt} \end{aligned}$$

where $PS_{0,t}$ is the probability of survival until time t ; $PD_{t-1,t} e^{-rt}$ is the probability of default between time $t-1$ and t ; R is the recovery rate (and $(1-R)$ is the unrecoverable part of debt). Assuming that $R = 0$; that is all debt is unrecoverable, since default can only occur at time T in the Merton framework, the CDS contract has the same present value as the put option, therefore, it is:

$$s \cdot D \cdot \left(\sum_{t=1}^{T-1} e^{-rt} + PS_{0,T} e^{-rT} \right) = p_t$$

With continuous payments, the CDS spread is:

$$s = \frac{r}{1 - e^{-r(T-t)}} p_t \quad (5)$$

Putting together the fundamental equations 2 and 5, it is possible to say that the firm's equity value is equal to the value of a call option while the CDS spread covering risk on the firm's debt is equal to a positive constant time the value of the corresponding put option.

In the Black, Scholes [5] and Merton [14] framework, the assumptions imply the existence of a well defined market price of risk for the call and put options. Denoting with λ_c the call premium and with λ_p the corresponding put premium, it is possible to show that (see Appendix A and Friewald et al. [7]) that:

$$\lambda_c = \lambda_p$$

The last condition together with equation 5 mean that the equity premium and the CDS premium are linearly and inversely related.

4. Numerical analysis

Starting from the theoretical relationship between firms' equity and CDS premium, I investigate empirically if it holds also for countries. The idea is that financial institutions may invest in countries equity indices or government bonds. The risk premium on equities should be inversely related with CDS premium if the theoretical relationship holds for countries as for firms.

4.1 The data

The data set consists in the historical daily prices (source: Bloomberg [4]) of the stock indices, risk free rates indices and CDS spreads reported in Table 1:

Country	Stock Index	Risk free rate Index	CDS SR 5Y	Period
Brazil	IBOV	BZAC2000 (Brazil CETIP)	Brazil CDS USD	2006-2012
China	SHCOMP	SHIF1Y (Shibor 1Y)	ChinaGov CDS USD	2006-2012
Greece	ASE	EURO12M (Euribor 1Y)	Greece CDS USD	2002-2012
Italy	FTSE Mib	EURO12M (Euribor 1Y)	Italy CDS USD	2003-2012
Russia	RTSIS	RRDR1 (Russia Interbank 1Y)	Russia CDS USD	2006-2012
US	SPX	US0012M (Libor USD 12M)	ZTCO CDS EUR	2008-2012

Table 1

The choice of CDS on 5Y government bonds is due to the liquidity of these instruments. With regard to US data, unfortunately, the USD SR 5Y Corp CDS data set started from 2009 and ZTCO CDS EUR SR 5Y (used here) started from 2008 only. On the other hand, Greece and Italy CDS spread were quoted, respectively, from 2002 and 2003, therefore a larger time horizon has been considered for these two countries.

4.2 The countries equity premium and CDS spread

A roll-over mechanism has been adopted in order to obtain daily values for the annual equity premium. Usually, in the literature the equity premium is a reward to risk ratio. The pionieristic reward to risk ratio is the famous Sharpe ratio, that is the expected excess return over the return standard deviation. The evolution of risk measurement theory and the development of coherent risk measures (see Artzner et al. [1], Embrechts et al. [8]) have important implication on risk premium evaluation. Here, I have used a modern reward-risk ratio adopting the return *Conditional Value at Risk (CVaR)* as risk measure. This makes it possible to take into account for the non-normality of returns (for a survey on risk adjusted performance measure see e.g. [16]). In the numerical analysis, formally, the empirical countries equity premium e is measured as follows:

$$\lambda_{c_t}^e = \frac{\mu_t^e - r_t}{CVaR_t}$$

- μ_t^e is the stock index return annualized mean of the 250 daily observations preceding t ;
- r_t is the annualized risk free rate index mean of the 250 daily observations preceding t ;
- $CVaR_t$ is the Conditional Value at Risk evaluated at time t with the Johnson [12, 13] approach using the data set of 250 observations preceding t . The next Section 4.3 is devoted to *CVaR* and the Johnson Systems (for further details see Stucchi, Dominese [17]).

Last, the CDS empirical premium is measured exactly by the value of the observed CDS spread at time t .

4.3 Johnson Systems and Conditional Value at Risk

The Johnson [12] [13] framework is based on the idea that mean, variance, skewness and kurtosis may characterize sufficiently well the distributions of a wide set of random ariables X with unknown distribution. Johnson claims that any X in this set may be well approximated in terms of a standard normal variable N by a function of the following kind:

$$X = A + B \cdot h\left(\frac{N - C}{D}\right)$$

where A, B, C, D are parameters obtained in terms of the four characterizing indices of X . The function $h(\cdot)$ is a non-decreasing monotonic function independent by the variable's moments (with positive B and D). The choice of the type of function $h(\cdot)$ is linked to the values of the skewness and kurtosis indices.

The functional form $h(\cdot)$ suggested by Johnson are summarized in the next Table 2:

<i>Johnson transformation</i>	$h(\cdot)$
Log-normal S_L	$exp\left(\frac{N-C}{D}\right)$
Bounded S_B	$\left[1+exp\left(-\frac{N-C}{D}\right)\right]^{-1}$
Unbounded S_U	$sinh\left(\frac{N-C}{D}\right)$

Table 2

Following the Johnson approach, it is possible to find closed or quasi-closed formulas for Value at Risk (VaR) and $CVaR$ once found the kind of transformation and the parameters in the Johnson framework (see Simonato [15]).

VaR may be fidened as the opposite of the α - quantile of the return distribution with a fixed probability α , that is (e.g. see Embrechts et al. [8]):

$$VaR = inf \{x \in \mathfrak{R} | F(x) \geq \alpha\} \quad 0 < \alpha < 1$$

and $CVaR$, with reference to the random return X , is the opposite of the expected mean of the return restricted to returns value below $-VaR$, that is:

$$CVaR = -E(X/X < -VaR)$$

Both VaR and $CVaR$ can be expressed in the Johnson framework in terms of the α - quantile of a standard normal variable, that is in terms of:

$$z = N^{-1}(\alpha)$$

where $N^{-1}(\cdot)$ is the inverse of the cumulative distribution function of the standard normal variable. In all numerical applications, coherently with the main guidelines provided by regulators (see Basel Committee [2]), I have set to 1% the probability and this gives $z = -2.33$.

The next Table 3 summarizes the formulas obtained using Johnson Systems:

	VaR	$CVaR$
S_L	$exp\left(\frac{z-C}{D}\right)$	$\frac{\mu}{\alpha} N(z-s)$
S_B	$A + \frac{B}{1+Exp\left(-\frac{z-C}{D}\right)}$	$A + \frac{B}{\alpha} \left\{ \frac{1}{\sqrt{2\pi}} \left[\int_{-\infty}^z \frac{exp(-\frac{u^2}{2})}{1+Exp\left(-\frac{z-C}{D}\right)} du \right] \right\}$
S_U	$A+Bsinh\left(\frac{N-C}{D}\right)$	$A + \frac{B}{2\alpha} \left[e^{\frac{1-zC/D}{2D^2}} N\left(z-\frac{1}{D}\right) - e^{-\frac{1+zC/D}{2D^2}} N\left(z+\frac{1}{D}\right) \right]$

Table 3

In the log-normal Johnson transformation SL the parameter A value is zero and that of B is 1 and $V aR$ may be expressed in terms of the estimated parameters $\mu = E(X)$ and s , standard deviation of the normal variable corresponding to $\ln(X)$. The log-normal $CV aR$ depends on the estimated mean of X , on the fixed level of probability and on the above cited parameter s . In the bounded transformation $V aR$ is given by a closed formula while $CV aR$ must be evaluated using numerical procedures, while in the unbounded system there are closed formulas for both $V aR$ and $CV aR$.

4.4 Main statistics

The evaluation of daily $CV aR$ requires daily estimation of the parameters involved in the Johnson Systems, that is mean, variance, skewness and kurtosis of the market stock indices log-returns. The estimation of historical return parameters has been made using the basic standard definitions, that is:

$$Mean = \bar{x} = \frac{1}{N} \sum_{i=1}^N x_i$$

$$Variance = \bar{\sigma}^2 = \frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{x})^2$$

$$Skewness = \frac{N}{(N-1)(N-2)\bar{\sigma}^3} \sum_{i=1}^N (x_i - \bar{x})^3$$

$$Kurtosis = \frac{N(N-1)}{(N-2)(N-3)\bar{\sigma}^4} \sum_{i=1}^N (x_i - \bar{x})^4$$

Daily $CV aR$ values have been obtained with a fixed probability level $\alpha = 1\%$ and with a roll-over mechanism over the period 2002-2012 for Greece, 2003-2012 for Italy, 2008-2012 for US and 2006-2012 for the other countries.

5. Results

The comparison of countries equity risk premium and CDS spreads over the whole period does not give in general satisfactory results. The next Tables 4-9 summarize the result of the linear regression of country equity premium over the CDS spread.

Nevertheless, considering the premia year by year gives very interesting results in many years (different years for different countries), confirming the negative linear relationship with strong values of R^2 . The next Tables 4-9 summarize the main results. At the end there are two graphical meaningful examples relative to the behavior of the Chinese equity premium and CDS spread in 2009 and of the Italian equity premium and CDS spread in 2011.

Brazil			China	
	Equation	R ²	Equation	R ²
2007	$y = -0.0317x + 0.0097$	3.14%	$y = -0.0409x + 0.0045$	56.98%
2008	$y = -0.4623x + 0.0195$	61.36%	$y = -0.1246x + 0.0062$	39.67%
2009	$y = -0.3189x + 0.022$	61.35%	$y = -0.1893x + 0.0117$	72.41%
2010	$y = 0.0332x + 0.0117$	16.82%	$y = -0.0163x + 0.0073$	4.94%
2011	$y = -0.1776x + 0.0109$	34.64%	$y = -0.2068x + 0.0079$	70.33%
2012	$y = -0.1744x + 0.0121$	20.86%	$y = 0.051x + 0.0132$	3.32%
2007-2012	$y = -0.2005x + 0.0154$	28.25%	$y = -0.1149x + 0.0084$	43.57%

Table 4

Table 5

Greece			Italy	
	Equation	R ²	Equation	R ²
2003	$y = -0.165x + 0.0246$	85.09%	=	=
2004	$y = -0.0195x + 0.0212$	1.18%	$y = 0.002x + 0.0008$	6.32%
2005	$y = -0.1657x + 0.0161$	50.12%	$y = 0.0065x + 0.0008$	16.91%
2006	$y = -0.0007x + 0.0057$	0.03%	$y = -0.0067x + 0.0011$	17.69%
2007	$y = -0.0401x + 0.0069$	4.08%	$y = -0.015x + 0.0009$	51.59%
2008	$y = -1.2295x - 0.0105$	57.73%	$y = -0.3597x - 0.0061$	27.09%
2009	$y = -0.6737x + 0.0246$	69.94%	$y = -0.1647x + 0.0082$	61.86%
2010	$y = 0.0047x + 0.0163$	0.16%	$y = -0.2273x + 0.017$	61.31%
2011	$y = -0.3064x + 0.0082$	77.00%	$y = -1.012x + 0.02$	76.42%
2012	$y = -0.1451x + 0.015$	78.12%	$y = -0.5439x + 0.0347$	44.51%
2003-2012	$y = -0.2358x + 0.0179$	29.89%	$y = -0.3296x + 0.0121$	20.84%

Table 6

Table 7

The Joint Behavior of Sovereign CDS and Country Equity Risk 9

Russia			US	
	Equation	R ²	Equation	R ²
2007	$y = 0.1309x + 0.00422$	43%	=	=
2008	$y = -1.2061x + 0.0229$	66.63%	=	=
2009	$y = -2.4768x - 0.0157$	95.53%	$y = -0.0972x + 0.0038$	47.52%
2010	$y = -0.0361x + 0.017$	9.78%	$y = -0.0016x + 0.0044$	0.18%
2011	$y = -0.2783x + 0.0205$	73.18%	$y = -0.0005x + 0.0051$	0.02%
2012	$y = -0.4554x + 0.0134$	71.18%	$y = -0.0221x + 0.0044$	11.77%
2007-2012	$y = -0.5532x + 0.0221$	44.08%	$y = -0.0304x + 0.0049$	15.05%

Table 8

Table 9

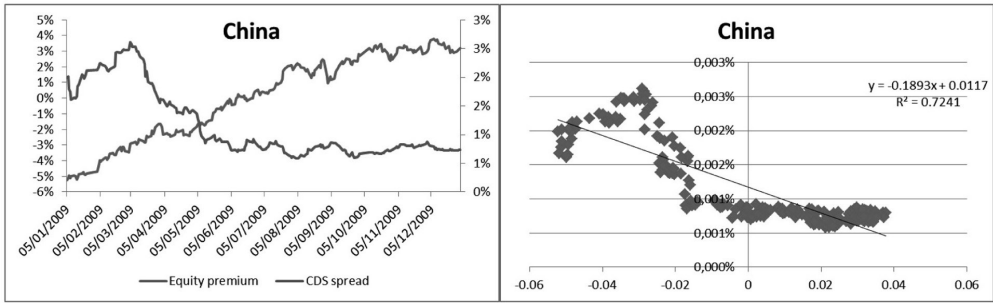


Fig. 1 Chinese equity premium vs CDS spread - 2009.

Fig. 2 Linear regression - 2009.

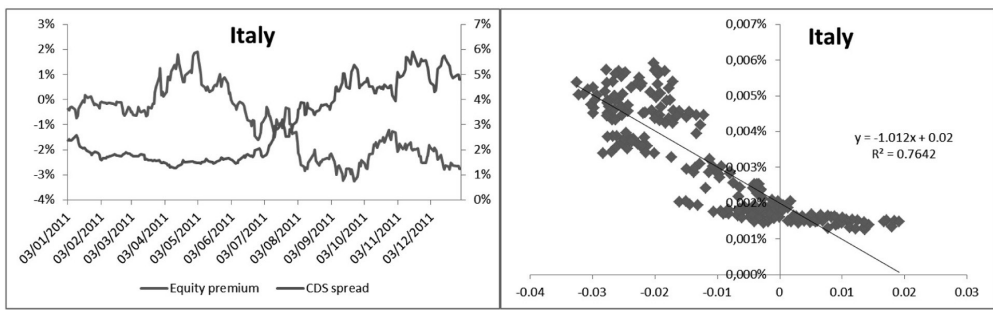


Fig. 3 Italian equity premium vs CDS spread - 2011.

Fig. 4 Linear regression - 2011.

6. Conclusions

Friewald et al. [7] show that equity risk premium and credit default swaps (CDS) spreads are strongly related. Their analysis starts from the Merton [14] structural model: in this framework they show that an inverse relationship between CDS spreads and equity premium holds for a specific firm.

The idea here is that this kind of relation holds also for countries. Considering a simple market with two asset classes only, that is sovereign bonds and domestic equities, if country risk rises, domestic investors should sell sovereign bonds and invest on stocks and *vice versa*. As a consequence, with regard to premia, this means that increasing sovereign risk requires higher insurance cost, that is higher CDS spreads: investors aiming to reduce their risks or insurance costs should shift to equity markets and this implies equity premium reduction. Again, in other words, sovereign CDS spreads represent the insurance cost against country's default for bondholders, that is spreads may be intended as a negative risk premium; on the other hand, equity market investors require a positive equity risk premium. All these considerations imply that an inverse relationship between CDS spreads and equity risk premium should hold for countries, as for firms in the theoretical structural framework due to Merton [14].

The main purpose of my work is to investigate empirically if the theoretical ideas above described can be confirmed observing the historical realized premia. With this aim, I have measured sovereign risk directly in terms of CDS spreads on government bonds, while country equity

risk in terms of a suitable reward to risk ratio, that is the excess return of equity market indices over their Conditional Value at Risk (*CVaR*).

In my paper there is the analysis of the joint behavior of sovereign CDS spreads and of risk premium on countries' equity indices.

More in detail, I have considered the daily CDS spreads on the 5 years government bonds of a set of countries (Brazil, China, Greece, Italy, Russia and US). Their year by year behavior have been compared with that of the countries daily equity premium defined in terms of Conditional Value at Risk (*CVaR*) over the period 2002-2012 for Greece, 2003-2012 for Italy, 2008-2012 for US and 2006-2012 for the other countries.

The results of the linear regression of country equity premium over CDS spreads differ from one country to another, but in some years they confirm a very strong inverse relationship between credit spreads and risk equity premium. The negative linear relationship is almost perfect in some of the considered years, e.g. the linear regression equation for Russia in 2009 has a coefficient of determination of 95.53% and that for

Greece in 2003 displays a value of 85.09%. In many years and for many countries the R2 index has values greater than 50%. Indeed, there are also many years in which the index has very low values, but I strongly believe that further analysis with more sophisticated statistic instruments should confirm the idea that equity markets and sovereign bonds are strictly linked and that their premia are inversely related: obviously, many factors influence these two markets and some of the simplifications here adopted should be adjusted. These are the guidelines for further developments of the present work.

Last, one of the main implications of this analysis is that equity and credit risk cannot be considered separately as they seem to be strongly negatively correlated: this rules out the possibility of adding together market and credit risk values in order to estimate a global risk measure. This kind of global risk measure should take into account of an important diversification effect.

7. Appendix A

Black and Scholes [5] assume that the given short-term interest rate r is constant through time and that it is possible to borrow and lend money at the rate r , that the underlying asset does not pay dividends, that short selling is possible, that there are no transaction costs with continuous trading and that financial markets are arbitrage free. Moreover, they assume that the underlying price, here $V(t)$, follows a geometric brownian motion under the (real world) measure \mathbb{P} , that is:

$$dV(t) = V(t) \cdot (\mu dt + \sigma dW^{\mathbb{P}}(t)) \quad (6)$$

Consider now the price $X(t; V(t))$ of a financial instrument depending on t and $V(t)$. Using Ito's lemma (e.g. see Bingham, Kiesel [3]) it is possible to show that X satisfies the following stochastic differential equation:

$$dX(t, V(t)) = X(t, V(t)) \cdot (\mu_X^{\mathbb{P}} dt + \sigma_X^{\mathbb{P}} dW(t))$$

where the parameters of the process $\mu_X^{\mathbb{P}} X$ and $\sigma_X^{\mathbb{P}}$ are, respectively, the mean and standard deviation of dX/X (that is the local return of $X(t, V(t))$) under the risk measure \mathbb{P} . It can be shown by Ito's lemma that:

$$\mu_X^{\mathbb{P}} = X_t + \mu X_V + \frac{1}{2}\sigma^2 X_{VV} = E^{\mathbb{P}}\left(\frac{dX}{X}\right); \sigma_X^{\mathbb{P}} = \sigma X_V \quad (7)$$

where the subscripts denote partial derivatives.

Under the risk neutral measure \mathbb{Q} , the price $V(t)$ satisfies the following process instead of that ruled by equation 6:

$$dV(t) = V(t) \cdot (r dt + \sigma dW^{\mathbb{Q}}(t)) \quad (8)$$

and the price $X(t; V(t))$:

$$dX(t, V(t)) = X(t, V(t)) \cdot (\mu_X^{\mathbb{Q}} dt + \sigma_X^{\mathbb{Q}} dW(t))$$

Applying again Ito's lemma, the risk neutral drift and volatility of the return dX/X under the neutral measure \mathbb{Q} are given by:

$$\mu_X^{\mathbb{Q}} = X_t + r X_V + \frac{1}{2}\sigma^2 X_{VV} = E^{\mathbb{Q}}\left(\frac{dX}{X}\right); \sigma_X^{\mathbb{Q}} = \sigma X_V \quad (9)$$

Denying the market price of risk of $X(t, V(t))$ as:

$$\lambda_X = \frac{\mu_X^{\mathbb{P}} - r}{\sigma_X^{\mathbb{P}}}$$

that is:

$$\lambda_X = \frac{E^{\mathbb{P}}\left(\frac{dX}{X}\right) - E^{\mathbb{Q}}\left(\frac{dX}{X}\right)}{\sigma_X^{\mathbb{P}}}$$

or, again:

$$\lambda_X = \frac{\mu - r}{\sigma} \frac{X_V}{|X_V|} \quad (10)$$

Both the call and the put option are instruments on the firm's value $V(t)$ and the above considerations hold for them.

The call and the put option Black and Scholes prices are:

$$\begin{aligned} c &= V(t)N(d_1) - D \cdot e^{-r \cdot (T-t)}N(d_2) \\ p &= D \cdot e^{-r \cdot (T-t)}N(-d_2) - V(t)N(-d_1) \end{aligned}$$

with $N(\cdot)$ the cumulative normal distribution function and d_1 and d_2 given by the following conditions:

$$d_1 = \frac{\ln(V(t)/D) + (r + \sigma^2/2)(T-t)}{\sigma\sqrt{T-t}}$$

$$d_2 = d_1 - \sigma\sqrt{T-t}$$

The partial derivatives with respect to the underlying (the so called delta) involved in equations 10 are:

$$c_V = N(d_1); p_V = -N(-d_1)$$

Hence, c_V has values in the interval $(0, 1)$ while p_V in $(-1, 0)$ and this implies:

$$\lambda_c = \frac{\mu - r}{\sigma} = -\lambda_p \blacksquare$$

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R&D Spillovers and Total Factor Productivity in South Korea with ARDL Approach

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Abstract This study aims to examine the impact of R&D spillovers on the South Korean total factor productivity (TFP) using the Autoregressive Distributed Lag (ARDL) estimation technique. Using data from the period 1985-2005, the results show that the domestic research and development (R&D) expenditure and foreign direct investment (FDI) have positive impact on the productivity growth in South Korea, in the long run. However, in the short run, the domestic R&D and the imports of goods and services have significant positive impact on the country's TFP.

Keywords R&D spillovers - Total Factor Productivity - Research & Development - South Korea - ARDL

JEL Classification O31 - D24 - F21 - F19

1. Introduction

Productivity is widely accepted as one of the key determinants of growth performance. It improves production capacity, which could boost economic growth of a country. Technology is said to be one of the main determinants of productivity and its changes have a permanent long-term effect on economic growth (Easterly and Levine, 2001). A substantial number of studies show that the major source of technological change leading to productivity growth comes from the research and development (R&D). R&D is defined as a project to resolve scientific or technological uncertainty in order to achieve an advance in science and technology. In

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general, R&D plays an important role in the innovation process which is vital for current and future production. Together with the innovation process, R&D speeds up the advancement of technology and assists in the creation of new products and the improvement of existing products.

In general, technological changes that contribute to productivity growth can come from both domestic and international R&D investment. There are two channels of technology transmission for international spillovers. The first channel is trade (Eaton and Kortum, 2002) where technological knowledge is transmitted through imports. The second channel of technology transmission is foreign direct investment (FDI), where the inflow of FDI is assumed to be accompanied by potential external effect on domestic-owned firms and foreign-owned firms. Although both domestic & international R&D investments encourage productivity growth, many FDI host countries benefit hugely from the later (Keller, 2004). Interaction with the R&D leader countries may also help the less developed countries to increase their productivity.

The aim of this study is to examine the most important source of R&D spillovers for productivity growth of South Korea. Three sources considered in the analysis are the domestic R&D investment, the imports and FDI. For the international spillovers, this study estimates the impact of R&D spillovers from the G-5 countries on South Korean productivity growth during the period of 1985 to 2005.¹ The choice of South Korea is based on the fact that it is one of the most innovative countries with huge investment in R&D activities. According to the OECD Science, Technology and Industry Scoreboard 2013, South Korea was placed second after Israel with R&D spending of 4.03 percent (over GDP). The importance of R&D as an important ingredient for growth has long been recognized. Recently, the South Korean government launched its Science and Technology (S&T) Basic Plan for 2008-2012 with the objective to increase domestic investment in R&D, which in return, will improve the country's productivity. South Korea spent more of its gross domestic expenditure on R&D and entrust KRW66.5 trillion over a five-year period since 2008, which is higher than KRW26 trillion spent by the previous budget. In order to stimulate private spending on R&D, the government also introduced an R&D investment tax incentive by increasing the tax deduction rate from seven percent to 10 percent on investment for R&D facilities. The measures taken by South Korea indicate that the country is highly focused on promoting domestic expenditure of R&D towards enhancing its technology and boosting the economic growth.

This study differs from previous similar studies as it focuses on the aggregate level of the economy. Previous studies such as Kim and Park (2003), Kwon (2005) and Singh (2004) focused on the link between R&D spillovers and productivity at the firm level. The studies highlighted the importance of foreign capital stock towards improving productivity growth in South Korean manufacturing firms. Kim and Park (2003) and Singh (2004) examined the relationship between R&D spillovers and productivity for 28 South Korean manufacturing sectors by using level-industry data and panel data, respectively. Meanwhile, Kwon (2005) investigated the R&D spillovers from Japan in South Korean manufacturing industries.

The following Section 2 provides a review of the literature. Section 3 highlights the study's model specification, econometric estimation methodology and description of variables. Section 4 discusses the empirical findings and Section 5 concludes.

¹ The G5 countries are France, Germany, United States, United Kingdom and Japan.

2. Literature review

Domestic and foreign transmission channels of technology are recognized as a fundamental factor of long-run growth (Singh, 2004). Previous studies that examined the importance of each channel on the productivity have shown mixed results. Most studies discovered a positive relationship between R&D capital stock and total factor productivity. For instance, Coe and Helpman (1995), Coe et al. (1995), Singh (2004) and Kim and Lee (2006) concluded that increasing investment in R&D may enhance productivity growth. Coe and Helpman (1995) studied 21 OECD countries including Israel during 1971 to 1991, Coe et al. (1995) examined 77 developing countries during 1971 to 1990, while Singh (2004) and Kim and Lee (2006) investigated productivity growth in 28 manufacturing industries in South Korea during 1970 to 2000 and 14 OECD countries during 1982 to 1993, respectively.

Several other studies such as Savvides and Zachariadis (2005), Kim and Park (2003; 2006), Kwon (2005) and Lee (2005), found that both domestic and foreign R&Ds are important determinants on productivity growth. However, these studies discovered that the foreign R&D has a greater impact on domestic productivity. The impact of the foreign R&D on domestic productivity could be seen especially in sectors with large share of imports or intra-industry trade (Kim and Park, 2003; 2006). For example, an increase of productivity growth in South Korean manufacturing industries during the period 1985 to 1996 is mainly due to the R&D spillovers from the Japanese industries.

Pottelsberghe and Lichtenberg (2001) and Kuo and Yang (2008) concluded that R&D spillovers as the most important channel to transmit technology or knowledge across countries. These studies identified trade and FDI as two significant channels in the R&D spillovers. In the context of trade, Keller (2004), Lee (2005), Singh (2004), Kim et al. (2009) and Azman-Saini (2009) identified that the imports embodied in foreign R&D capital stock are more important than FDI in distributing technology across countries. However, few empirical studies such as Braconier and Sjöholm (1998), Luh and Shih (2006) and Bitzer and Kerekes (2008), proved that FDI is more important than the imports in transmitting the positive impact of foreign R&D.

3. Methodology and data

3.1 Model Specification

This study adopts a basic model formed by Coe and Helpman (1995), which was adapted by Lichtenberg and Pottelsberghe (1998) and Pottelsberghe and Lichtenberg (2001). The basic formation of the model is:

$$TFP_t = \beta_0 + \beta_1 S_t^d + \beta_2 S_t^f + \varepsilon_t \quad (1)$$

where TFP is total factor productivity, S^d is domestic R&D capital stock, S^f is foreign R&D capital stock and ε is an error term.

Following Pottelsberghe and Lichtenberg (2001), the import-weighted R&D capital stock, S^{fm} is computed as follows:

$$S^{fm} = \sum_{j \neq i} \frac{m_j S_j^d}{y_j} \quad (2)$$

where j is an index for the G-5 countries namely France, Germany, Japan, United Kingdom and United States, m_j indicates the flow of imports of goods and services by South Korea from country j , S_j^d refers to the gross domestic expenditure on R&D for country j and y_j is the GDP for country j .

The inward FDI-weighted foreign R&D capital stock, S^{ff} is computed as follows:

$$S^{ff} = \sum \frac{f_j}{k_j} S_j^d \quad (3)$$

where f_j indicates the flow of FDI from country j into South Korea, and k_j refers to the gross fixed capital formation of country j , both are expressed in constant dollars.

3.2 Estimation Procedure

The empirical analysis involves several stages. The first stage determines the stationarity properties of the variables (TFP , S^d , S^{fm} and S^{ff}). The second stage utilizes the F -test to analyze the long-run cointegration relationship between the variables. The third stage estimates the elasticity of the long-run relationships. Finally, the fourth stage determines the short-run elasticity.

Unit Root Tests

Two widely used methods of unit root tests; Augmented Dickey Fuller (ADF) test is employed to test the stationarity of variables. The unit root tests are performed at level and first difference. The reason focusing two methods of unit root tests is to increase the confidence in the results with supporting evidence.

Autoregressive Distributed Lag (ARDL) Bounds Test Approach to Cointegration

The Autoregressive Distributed Lag (ARDL) bound test approach by Pesaran et al. (2001) is adopted to determine the existence of long-run relationships and the estimation of the long-run and short-run coefficients. In general, the ARDL bounds test approach is based on the Ordinary Least Squares (OLS) estimation of a conditional Error Correction (EC) model for cointegration analysis. In this study, the method is used to determine the existence of long-run relationships and to estimate the long-run and short-run coefficients of the R&D spillovers. This method is selected based on its ability to efficiently estimate the cointegration in small sample cases. Moreover, it can be applied irrespective whether the regressors are I(1) or I(0) or mutually cointegrated (Pesaran et al., 2001).

For this study, the ARDL model for the relationship between South Korean TFP and R&D capital stock is written as follows:

$$\begin{aligned} \Delta LTFP_t = & \alpha_0 + \beta_1 LTFP_{t-1} + \beta_2 LS_{t-1}^d + \beta_3 LS_{t-1}^{fm} + \beta_4 LS_{t-1}^{ff} \\ & + \sum_{i=1}^p \delta_i \Delta LTFP_{t-i} + \sum_{i=0}^q \theta_i \Delta LS_{t-i}^d + \sum_{i=0}^r \varphi_i \Delta LS_{t-i}^{fm} + \sum_{i=0}^s \gamma_i \Delta LS_{t-i}^{ff} + \varepsilon_t \end{aligned} \quad (4)$$

where $LTFP$ is total factor productivity, LS^d is domestic R&D stock, LS^{fm} is foreign R&D stock embodied in imports and LS^f is the foreign R&D stock embodied in FDI. All variables are in natural logarithm forms. The p, q, r, s are the optimal lag lengths for each variable while Δ is the first difference operator.

The F-test is used to test the existence of long-run relationship among the variables in the equation. A joint significance test is performed in order to test the null hypothesis of no cointegration by setting the coefficients of all one lagged level variables to be equal to zero against the alternative hypothesis that the coefficients of all one lagged level variables are not equal to zero. The calculated F-statistics are compared to the respective critical values for small sample size cases, as tabulated by Narayan (2004, 2005)². These critical values contain upper and lower bands covering all possible classification of the variables into I(1), I(0) and mutually cointegrated. If the F-test statistic is greater than the upper bound, then the null hypothesis of no cointegration is rejected, which implies that the variables in the model are cointegrated. If the test statistic is smaller than the lower bound, then the null hypothesis of no cointegration cannot be rejected, which suggests that the variables are not cointegrated. However, if the F-test statistic lies between the bounds, the conclusion can only be made through the order of integration of the variables. In this situation, the variables are suggested to be cointegrated if the variables are I(0) on the basis of lower bound and not cointegrated if the variables are I(1) on the basis of upper bound.

Once cointegration is established, the conditional ARDL (p, q, r, s) long-run model for LTFP can be estimated using the following model:

$$\Delta LTFP_t = \alpha_1 + \sum_{i=1}^p \delta_i \Delta LTFP_{t-i} + \sum_{i=0}^q \theta_i \Delta LS_{t-i}^d + \sum_{i=0}^r \varphi_i \Delta LS_{t-i}^{fm} + \sum_{i=0}^s \gamma_i \Delta LS_{t-i}^f + \varepsilon_t \quad (5)$$

The order of lags in the ARDL model is selected using the Schwarz Bayesian Criterion (SBC). In the final stage, this study estimates the short-run dynamic parameters using an error correction model associated with the long-run estimates. This is specified as follows:

$$\Delta LTFP_t = \alpha_1 + \sum_{i=1}^p \delta_{2i} \Delta LTFP_{t-i} + \sum_{i=0}^q \theta_{2i} \Delta LS_{t-i}^d + \sum_{i=0}^r \varphi_{2i} \Delta LS_{t-i}^{fm} + \sum_{i=0}^s \gamma_{2i} \Delta LS_{t-i}^f + \psi ECT_{t-1} + \vartheta_t \quad (6)$$

where all coefficients for the short-run equation are short-run dynamic coefficients of the model's convergence, ψ represents the speed of adjustment and ECT_{t-1} is the error correction term.

² The critical values provided by Pesaran et al. (2001) are calculated on the basis of large sample size of 500 and 1000 observations and 2000 and 4000 replications respectively.

3.3 Data

This study examines the R&D spillovers from the G-5 countries (France, Germany, Japan, United Kingdom and United States) into South Korea for the period 1985-2005. Data for the G-5 countries are obtained from the OECD Main Science and Technology Indicators while data for South Korea are taken from the World Development Indicators (WDI) and the OECD Statistics. Bilateral data on imports and FDI inflows are taken from the OECD statistics and the IMF Direction of Trade databases, respectively.

The TFP series for South Korea are computed using the following formula:

$$TFP = Y / K^\beta L^{1-\beta} \quad (7)$$

where Y represents total production, TFP refers to the total factor productivity while K and L denote stock of physical capital and total labor force, respectively. β is the share of capital income in GDP, which is set to 0.4, following Chenery et al. (1986).

The benchmark for R&D capital stock is calculated using the following formula:

$$S_0 = \frac{R_0}{(g - \delta)} \quad (8)$$

where S_0 is the benchmark for R&D capital stock, R_0 is the R&D expenditure at the beginning of the sample period, g is the average growth rate of R&D expenditure which and δ is the depreciation rate.

The R&D capital stock is computed by using the perpetual inventory method as follows:

$$S_t = (1 - \delta)S_{t-1} + R_t \quad (14)$$

where δ is the depreciation rate, which is assumed to be five percent (Coe and Helpman, 1995; Keller, 2002) and R denotes the R&D expenditure.

4. RESULTS AND DISCUSSION

4.1 Unit Root & Bounds Tests

Results of the Augmented Dickey-Fuller (ADF) unit root test in Table 1 indicate that all the variables are either stationary at level, I(0); or at first difference, I(1). Therefore, the bound test which requires the independent variables to be I(0) or I(1), can be adopted in estimating the relationship of the variables.

Table 1 The Augmented Dickey-Fuller (ADF) Test

Variable	Level	First Difference
TFP	-2.430 (0.356)	-4.415 (0.012)**
S^d	-0.582 (0.968)	-3.680 (0.049)**
S^m	-3.129 (0.127)	-4.414 (0.012)**
S^p	-2.601 (0.108)	-2.890 (0.064)*

** and * denote significance levels at, 5% and 10% respectively.
The figures in parentheses is the p-value..

Prior to the bounds test, the maximum lag length of the model is determined using the Schwarz Bayesian Criterion (*SBC*) and the results suggest that the maximum lag length of the model is 1. Subsequently, the Wald test is performed to determine the long-run cointegration among the variables. The F-test statistic obtained from this test is compared with Table III (unrestricted intercept; no trends) in Narayan (2005). The results, as shown in Table 3, indicate that the value is above the upper bound critical value which implies that the South Korean TFP is cointegrated with the independent variables of domestic R&D (S^d), foreign R&D stock embodied in imports (S^m), and inward FDI (S^f). This result suggests that there is a long run cointegration relationship among the variables.

Table 2 Wald F-statistics

Model	F-statistic	
Model: $TFP = f[(S^d), (S^m), (S^f)]$	9.536**	
Narayan (2005)	k=3	n=30
Critical Values	Lower Bound	Upper Bound
1%	5.333	7.063
5%	3.710	5.018
10%	3.008	4.150

** and * denote significance levels at, 5% and 10% respectively.
 Critical values are cited from Narayan (2005) (Table case III: Unrestricted intercept and no trend).

4.2 Autoregressive Distributed Lag (ARDL) Approach

4.2.1 Long-run Relationship

The ARDL technique is used to estimate both of the short-run and long-run coefficients of the variables. The estimation of the long-run relationships requires the determination of optimum lag lengths which maximum is capped at two due to the small sample size. According to Pesaran et al. (2001), the best technique to determine the optimum lag lengths is by using the SBC as its results are more precise than other techniques. Results of the SBC show that the optimum lag lengths for Equation (10) are (1, 2, 1, 1) as values for (p, q, r, s) to construct the ARDL Bounds test. Using the result of the optimum lag lengths, the long-run elasticity for each variable is computed using the Wald test. According to Pesaran et al. (2001), the long run elasticity can be determined using the following formula:

$$\frac{\sum \beta_{i,t}}{1 - \sum \beta_{j,t}} \tag{13}$$

where β_i denotes the coefficients for each independent variable and the constant term while β_j refers to the coefficients of the dependent variable.

Table 3 Estimation of Long-run Coefficients

Variable	Coefficient	Standard Error	t-statistics	p-values
S^d	0.218488	0.083397	2.619850	0.0256**
S^{im}	-0.049057	0.024332	-2.016132	0.0714*
S^{if}	0.061356	0.027482	2.232558	0.0496**
Constant	2.158381	0.641313	3.365565	0.0072**

** and * denote significance levels 5% and 10% respectively.

Table 4 shows the results of long-run coefficients for the domestic R&D and the foreign R&D (the imports and the inward FDI). The positive significant result for S^d suggests that the domestic R&D is an important determinant of the South Korean productivity growth. Meanwhile, the negative significant result for the import-weighted foreign R&D capital stock suggests that there is an inverse relationship between the imports and the domestic productivity in the long run. These results are consistent with Kim and Kim (1997) and Coe et al. (1995). For the foreign R&D capital stock embodied in inward FDI (S^{if}), the result shows that the variable is positive and significant which indicates that the inflow of FDI is beneficial to the South Korean long-run productivity.

The coefficient for S^d has a higher value than the coefficient for S^{if} , suggesting that the domestic R&D has a greater impact on the country's productivity compared to foreign R&D embodied in the inward FDI. A study by Coe and Helpman (1995) showed that the impact of the domestic R&D on productivity is greater in high-income OECD countries compared to low-income countries. However, among the foreign R&D spillovers, the inward FDI are found to be a more important channel compared to the imports, in improving the domestic productivity in the long run. Our finding is consistent with Braconier and Sjöholm (1998) who estimated that the inward FDI is an effective channel to transmit technology across countries.

4.2.2 Short-run Relationship

The Error Correction Model (ECM) is adopted to estimate the short-run determinant of South Korean productivity. Table 8 shows the regression results of the short-run relationships using ARDL model. The negative coefficient value for $ECT(-1)$ indicates that the variable converge in the long run and the convergence to equilibrium of South Korean TFP in one year is corrected by approximately 31.65 per cent in the following year. Meanwhile, the p-value of $ECT(-1)$ shows that there is evidence of short-run cointegration relationships among variables. The results show that the domestic R&D and the imports have a positive and significant impact on the growth of domestic productivity in the short run. This indicates that an increase in both activities may boost the productivity in South Korea. Interestingly, the results also show that the improvement in the FDI inflow may reduce domestic productivity in the short run.

Table 4 Error Correction Representation of ARDL Model (Short-run Coefficients)

Variables	Coefficients	Standard Error	t-statistic	p-values
S^d	0.141	0.030	4.676	0.000**
S^{im}	0.018	0.010	1.871	0.082*
S^{if}	-0.038	0.007	-5.321	0.000**
$ECT(-1)$	-0.316	0.034	-9.262	0.000**
Constant	0.681	0.072	9.436	0.000

** and * denote significance levels 5% and 10% respectively.

4.3 Discussion

In general, the overall empirical result shows that both domestic and foreign R&D have a positive impact on South Korean domestic productivity growth in the short run and in the long run. Nonetheless, the result suggests that the impact of the domestic R&D on productivity is greater than the impact of the foreign R&D. This finding is consistent with Azman-Saini (2009) who mentioned that South Korea relies more on the domestic R&D to enhance productivity by upgrading domestic technology. In fact, most previous studies found that developed countries get larger benefit from their domestic R&D while developing countries gain greater positive impact from foreign R&D (Coe et al., 1995)

The result also reveals that South Korean TFP enjoys the positive impact of the foreign R&D spillovers from the G-5 countries. However, the significant channel of spillovers differs between the short run and the long run. In the short run, the imports of goods and services have been identified as the major spillover channel to transmit technology across border. This result is consistent with Keller (2004), Lee (2005), Singh (2004) and Azman-Saini (2009). According to Kim et al. (2009), imports from the G-5 countries are more likely to embody advanced technology spillovers compared to imports from other countries.

In the long run, the result suggests that the inward FDI is more important in transmitting knowledge or technology across countries. The imports are no longer an important channel for technology diffusion. One possible explanation is that the increasing imports of goods and services encourage domestic import-substituting firms to become more competitive by adopting more efficient production techniques and engage in innovation to compete with foreign firms. Eventually, the imports can no longer enhance productive efficiency in the long run. This result is consistent with Braconier and Sjöholm (1998), Luh and Shih (2006) and Bitzer and Kerekes (2008). The inward FDI received by South Korea from the G-5 countries induces significant technological transfer, which often leaks out to domestic firms. Thus, South Korea can exploit and take advantage of potential technology diffusion to upgrade its own technological innovations and the R&D spillovers will increase its domestic productivity.

5. Conclusion

The importance of technology as a determinant of the level of productivity has been well acknowledged in the literature. The improvement in technology can be influenced by several factors including the R&D expenditure. Meanwhile, investment in R&D can come from both domestic and foreign sources. Realizing the importance of R&D spillovers, this study examines several important channels of R&D in the productivity growth of South Korea, a country which experiences a massive growth in technology and productivity. Our estimation results suggest that the domestic R&D has a greater impact on South Korean productivity growth, both in the short run and the long run. The results also suggest that the foreign R&D spillovers are also important to South Korean productivity growth. However, in the short run, only the imports of goods and services are significant to the changes in productivity growth while the inward FDI plays a bigger role in the long run.

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A Study on NGO's Participation in Public Service Care-Service-at-Home for Aged in Pudong Shanghai

Lu Yingchun

Abstract This paper is the presentation of the study conducted in Pudong District of Shanghai where Care-Service-at-Home is taken as a new way to meet the increased needs for care services for the elderly in the Ageing Society, and the implementation of Care-Service-at-Home greatly promoted the emerging and developing of NGOs as well as their participation in this field. The purpose of this paper is to offer some new empirical evidences for arguments on NGO's role in public service and their relationship with government which have long been the academic focuses. The findings show that the NGOs are jointly providing Care-Service-at-Home for the elderly with the government, and they are greatly supported as well as totally controlled by the government.

Keywords Public Service-NGO's role – NGO-Government Relationship - Care Service for the Aged

Introduction

NGO's participation in public service has been a common fact all over the world and has caught obvious attention from scholars. One of the most famous assertions was given by Salamon (1994) that "A striking upsurge is under way around the globe in organized voluntary activity and the creation of private, nonprofit or non-governmental organizations. From the developed countries of North America, Europe and Asia to the developing societies of Africa, Latin America and the former Soviet bloc, people are forming associations, foundation and similar institutions to deliver human services", and it is paraded as a global "associational revolution". The prevailing theories on NGOs to be public service provider are "Market Failure/Government Failure" theory and "Contract Failure" theory. It's asserted that the existence of the voluntary sector is the combined product of what economists termed as "market failure" and "government failure", namely, the inherent limitations in both the private market and government as providers of "collective goods"(Salamon 1987). The second broad theory of the voluntary sector attributes the existence of voluntary organizations to a different kind of market failure, what once theorist termed as "contract failure". The central notion here is that

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for some goods and services, the normal mechanisms of the market, which involve consumer choice on the basis of adequate information, do not obtain (Henry B. Hansmann, 1980). As pointed out by Margit and Kinyik (2009), the scientific approach and discourse on the nonprofit sector was dominated by the nonprofit paradigm in the last few decades, which had based on the increasing service provider role of the nonprofit organization.

Practically indeed, NGOs have been playing an important role in delivering public service either in America (Salamon 1986; Salamon 1993), in Europe (Stefan Toepler et al. 2003), in China (Zhang Qing 2005; Tian Lan 2006; Li Maoping 2007; Li Genglun et al. 2011) or in many other developing countries such as Bangladesh, India and Pakistan (Santosh Mehrotra et al. 2002; Richard Batley et al. 2011; Iram Ejaz et al. 2011;), also in Africa (Kenneth L Leonard 2002; Mary Kay Gugerty 2008;), while there are great diversity of the actual roles of NGOs playing in different countries or districts. Directly related to the quick increase of NGOs' participation in public service is the issue of relationship between NGOs and the government who used to be the granted provider of public services which also caught broad attention from scholars. Also, the relationship between NGOs and the government has been diversified according to different researchers based on their empirical evidences they collected. Salamon (1987) assert that cooperation between government and the voluntary sector has become the backbone of the country's human-service delivery system, and the central financial fact-of-life of the country's private nonprofit sector, basing on his study at America; while an earlier study also conducted at America by the American Enterprise Institute ever showed a critical attitude towards the cooperation between NGOs and the government (Peter et al. 1977). If we trace much earlier, we can even find the relationship between the government and NGOs in United States was featured as conflicting which is stem from the conception of the welfare state (Nisbet 1962; Salamon 1987). In China, the relationship between the government and NGOs are mainly reflected on government's attitudes towards them, and there are controversial relation types in different empirical studies (Yan Wei 2004; Kang Xiaoguang et al. 2005; Cui Kaiyun 2009). Some scholars have tried to show a comprehensive reflection on the relationship between NGOs and the government, such as the Four-C's, namely, Cooperation, Confrontation, Complementarity and Co-optation given by Adil Najam (2000) and the Three Models- *Complementary, Supplementary, or Adversarial*-illustrated by Young Dennis R (2006).

In Shanghai, within the last decade, a set of NGOs mainly contributing to providing Care-Service-at-Home for the Aged emerged quickly: Since the first one came into being at 2001, the number of NGOs contribution to providing Care-Service-at-Home for the Aged reached 341. Here I'd like to give an empirical definition on both NGOs and Care-Service-at-Home for the Aged in this study. NGOs are supposed to be well known as the broad range of social institutions that operate outside the market and the state virtually. There is a great diversity of terms related to those organizations: nonprofit organizations, civil society, philanthropic sector, tax-exempt organizations, charities, voluntary associations, civic sector organizations, third sector organizations, independent sector organizations, and social sector organizations (Elizabeth T Boris 2006). What they have in common is that they are voluntary and self-governing, may not distribute profits, and serve public purposes as well as the common goals of their members (Salamon 1994). In this paper, NGOs refer to those specific organizations contributing to providing Care-Service-at-Home for the aged in Pudong District of Shanghai. And, they have their name in China, which is "Civilian-Run Non-Enterprise Organization (民办非企业单位)". Care-Service-

at-Home for the aged is a relatively new concept distinguished from the two traditional concepts in the field of service for the aged: Family-Supported-Care-Service (FSCS) and Nursing-Home-Care-Service (NHCS). They are distinguished by three main elements: Who deliver the services? Who provide the financial cost? And, where does the aged reside? In the case of Care-Service-at-Home, the services are delivered by service attendants from NGOs, the family or the government will pay for the cost, and the aged stay at their own home. In more details, Care-Service-at-Home is a series of services distributed to the elderly (over 60 years old) who are living at home and are disabled or partly disabled, including daily care rehabilitation aids and spiritual solace.

The quick increasing of NGOs in the field of Care-Service-at-Home for the Aged offered new empirical opportunity for us to know more about the role of NGOs in delivering public service and their relationship with the government. So the purpose of this study is to find out the answer to the following two questions: 1) what's the role of the NGOs in delivering Care-Service-at-Home for the Aged in Pudong District of Shanghai? 2) What is the relationship between the NGOs and the government?

In order to find answer to those two questions, the data in this study is collected by a combination of classical and basic qualitative data-collecting methods-interviews, observations and documents analysis (Patton 1990). Conducted in Pudong District, which is the district facing the most intense ageing process and has most of the NGOs contributing to providing Care-Service-at-Home for the Aged and it's also the first district to promote Care-Service-at-Home for the Aged in Shanghai, interviews are organized in two different ways: one is having meeting with the government officers in the street level, actually I visited 4 sub-district-offices (Huamu Street, Yangjing Street, Lujiazui Street and Weifang Street), namely, the agency of government at the street level, where I had meeting with the officers who are in charge of services for the aged; the other is to visit NGOs, I have interviewed the Legal Representative (the manager of the director) and other members of 12 NGOs. Also, I visited 18 homes of the elderly with service attendants who provides service for the aged at their home to observe what was really happened in the old people's home. What's more, related documents are collected during my visit at the sub-district-offices and NGOs or from internet.

I. The Implementation of Care-Service-at-Home for the Aged

1. The shortage of care services provided by traditional ways leads the promotion of Care-Service-at-Home for the Aged

From the year of 2000, the proportion of population over 60 years old in Shanghai is much higher than the standard set by United Nations asserting the Ageing Society, which is 10 percents. What's more, the proportion of elderly is growing at an increasingly faster speed (See Table 1).

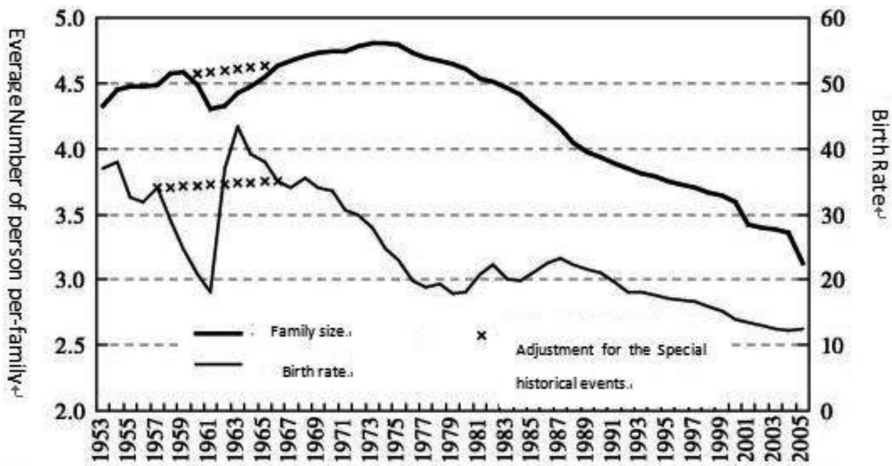
Table 1 The fast increasing proportion of person over 60 years old

Year	Number of Elderly over 60 (Ten Thousand)	Growth Rate of Elderly over 60 (%)	Proportion of Elderly over 60 (%)	Growth Rate of the Proportion (%)
2000	241.76	-	18.3	-
2001	246.61	2.01	18.6	0.3
2002	249.49	1.17	18.7	0.1
2003	254.67	2.08	19.0	0.3
2004	260.78	2.40	19.3	0.3
2005	266.37	2.14	19.6	0.3
2006	275.62	3.47	20.1	0.5
2007	286.83	4.07	20.8	0.7
2008	300.57	4.79	21.6	0.8
2009	315.70	5.03	22.5	0.9
2010	331.02	4.85	23.4	0.9

Data Source: < Monitoring Statistics on Shanghai's Elderly Population and the Cause for Aging >, Shanghai Civil Affairs Bureau, 2000-2010. On website: <http://www.shmzj.gov.cn>

The quickly increased population of elderly directly calls for enlarging the provision of care services for the aged. Traditionally speaking, care services for the elderly are provided in two ways: one is the services and supports from family members and the other is the services from Nursing Homes which are mainly operated by the government. However, the family's capacity of providing care services are greatly weakened by the transition of family structures, which is mainly featured as: smaller size of family (See Diagram 1); more elderly within one family (See Table 2); and more and more elderly are living alone (See Table 3). The sharply weakened family's capacity of providing care services for the aged intensified the shortage of services provided by Nursing Homes. The number of beds offered by Nursing Homes is too trivial to be mentioned compared to the number of elderly (See Table 4). Of course, not all the elderly over 60 years need services from Nursing Homes. A municipal level survey conducted in 2008, calculating the service needs as: Care service need = (Proportion of definitely disabled elderly + Proportion of partly disabled elderly) * Proportion of the elderly who are willing to enter Nursing Homes, told that only 24% of the needs are met (Tian Guodong et al. 2008). It's the growing needs of care services and the limitation of provision from both family and Nursing Home that leads Care-Service-at-Home for the Aged come into being.

Diagram 1 The change tendency of family size



Data Source: China's Population Statistics Yearbook (1995&2001); Common Data of Population and Family planning manual (2006);

Table 2 The average age - distribution within family

Age [↕]	Average number in per-family [↕]			
	1982 [↕]	1990 [↕]	2000 [↕]	2005 [↕]
Totally [↕]	4.41 [↕]	3.96 [↕]	3.44 [↕]	3.13 [↕]
0~14 [↕]	1.48 [↕]	1.10 [↕]	0.79 [↕]	0.61 [↕]
15~64 [↕]	2.71 [↕]	2.64 [↕]	2.41 [↕]	2.23 [↕]
Over 65 [↕]	0.22 [↕]	0.22 [↕]	0.24 [↕]	0.28 [↕]

Data Source: Guo Zhigang (2008). Study on Change of China Family Households in Recent Years. *Journal of Population Science*, 3,2-10.

Table 3 The proportion of elderly who is living alone

Year [↕]	Living with two or more generation			Living alone		
	Male	Female	Totally	Male	Female	Totally
1982	71.62	74.24	73.06	26.83	24.57	25.58
1990	69.45	75.01	72.49	29.78	24.44	26.86
2000	61.57	69.55	65.78	37.42	29.85	33.43
2005	53.88	59.51	56.73	44.09	38.89	41.46

Data Source: Guo Zhigang (2008). Study on Change of China Family Households in Recent Years. *Journal of Population Science*, 3,2-10.

Table 4 The Supply of Beds in Nursing Homes in Shanghai

Year	2005	2008	2009
Number of Nursing Homes	474	582	615
Number of Beds	49529	80554	89859
The proportion of Beds for the old over 60 years old (%)	1.9	2.7	2.8

Data Source: <http://www.stats-sh.gov.cn/sjfb/201103/84387.html>

2. The policy process of implementing Care-Service-at-Home for the Aged

The implementation of Care-Service-at-Home for the Aged is originally promoted by the issuing of *<Views on Socialization of Social Welfare>* by General Office of the State Council in year 2000, which clearly aimed that China should build the welfare system with Care-service-at-home for the aged as the main part. Impelled by the national policy, Shanghai is the first one who makes endeavor to implementing Care-Service-at-Home for the Aged, and published the related policies (See Table 5).

Table 5 The main Care-Service-at-Home for the Aged related policies in Shanghai

Issuing Time (Year)	Title of the policy	The publisher
2000	Piloting of Care-Service-at-Home for the Aged (关于开展居家养老试点工作的决定)	Civil Affairs Bureau of Shanghai
2001	Widely Promoting of Care-Service-at-Home for the Aged (关于全面开展居家养老服务的意见)	Civil Affairs Bureau of Shanghai
2003	Regulation on the Financial Support for Care-Service-at-Home for the Aged (关于进一步规范居家养老服务补贴经费管理和使用的通知)	Civil Affairs Bureau of Shanghai
2004	Further Promoting of Care-service-at-home for the Aged (关于进一步推进居家养老服务的通知)	Civil Affairs Bureau of Shanghai
2005	Further Promoting of Service for the aged (关于全面落实2005年市政府养老服务实事项目进一步推进本市养老服务工作的意见)	Civil Affairs Bureau of Shanghai
2006	Further Development of Service for the aged (关于进一步促进本市养老服务事业发展的意见); Needs Assessment Guidance for Care-Service-at-Home for the Age (居家养老服务需求评估)	Civil Affairs Bureau of Shanghai
2008	Further Promoting of Service for the Aged (关于全面落实2008年市政府养老服务实事项目进一步推进本市养老服务工作的意见)	Civil Affairs Bureau of Shanghai
2009	Further Regulation on Care-Service-at-Home for the Aged (上海市民政局关于进一步规范本市社区居家养老服务工作的通知)	Civil Affairs Bureau of Shanghai

Based on analyzing all those related policies, this part is going to present the promotion of Care-Service-at-Home for the Aged by 1) figure out the policy goal, 2) frame out the organizational system, and 3) find out the financial flow during the process of implementation.

1) The policy goal

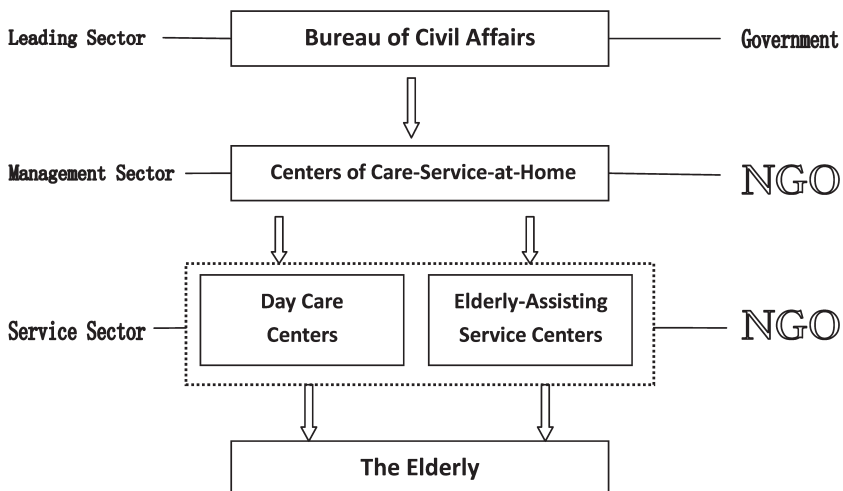
The policy goal of implementing Care-Service-at-Home for the Aged is clearly declared that “China should explore a new road in promoting the development of social welfare by widely absorbing resources from civil society, the future picture of social welfare will be one with Care-Service-at-home for the Aged as the main part” in *<Views on Socialization of Social Wel-*

fare> issued by General Office of the State Council in year 2000. And this goal is re-emphasized by the following several policies, such as <Socialization of the Service for the Aged> issued by Ministry of Civil Affairs in 2005, <Accelerating the Development of Service for the Aged> by General Office of the State Council in 2006, and <Comprehensive Promoting of Care-service-at-home for the Aged> by Ministry of Civil Affairs in 2008. In consistent with the national policy goal, Shanghai advocated that “basing on Care-Service-at-Home, supplemented by the Nursing Homes” is the development direction of social welfare in <Widely Promoting of Care-service-at-home for the Aged> (Civil Affairs Bureau of Shanghai, 2001), <Further Promoting of Care-service-at-home for the Aged> (Civil Affairs Bureau of Shanghai,2004) and <Further Development of Service for the Aged>(Civil Affairs Bureau of Shanghai, 2006).

2) The organizational system

The organizational system for implementing of Care-Service-at-Home for the Aged is firstly set in <Widely Promoting of Care-service-at-home for the Aged> (Civil Affairs Bureau of Shanghai, 2001) which advocated that “The Bureau of Civil Affairs in each district should organize a leading group, consisting of members from department of Social Welfare, Social Relief, Community-Building and Committee for Old Population, to promote the development of Care-service-at-home for the aged. The agency in street should also set up leading group to take responsibility of promoting Care-Service-at-Home for the Aged. There should be Center of Care-service-at-home for the aged, registered as Minban-Feiqiye-Danwei (NGO) at each street, commissioned by government departments, take real charge of the implementation of providing Care-Service-at-Home for the Aged.” <Further Promoting of Care-service-at-home for the Aged> published by Civil Affair Bureau of Shanghai in 2004 framed out a more detailed organizational system, which is briefly showed in Diagram 2. The Bureau of Civil Affairs is the leading sector, whose main functions are publishing policies and taking responsibility of disbursing the funds. Center of Care-Service-at-Home, one kind of the NGOs, commissioned by government department, is the management sector, the main functions of which comprise of developing the requirements and procedures of services, conducting assessment on services, monitoring the quality of services, allocating service vouchers and so on. Day Care Centers and Elderly-Assisting Service Centers, both of them are NGOs, directly deliver services for the elderly.

Diagram 2 The organizational system for Implementation of Care-service-at-home for the aged



3) The financial flow: source of funds and their usage

The financial flow in the process of implementation of Care-Service-at-Home can be divided into three parts: (1) The subsidies to the elderly, (2) The subsidies to the service attendants, and (3) The operational overheads of NGOs.

(1) The allowances to the elderly

The allowances to the elderly start with the implementation of *<Widely Promoting of Care-Service-at-Home for the Aged>* (Civil Affairs Bureau of Shanghai, 2001) which states that the “three nos”- those with no family, no source of income and no working ability- who need care services should be subsidized by government finance. Later, the scope of elderly who can get subsidies are expanded, and the standard is renewed in the following policies --- *<Regulation on the Financial Support for Care-service-at-home for the aged>* (Civil Affairs Bureau of Shanghai, 2003) and *<Further Promoting of Care-service-at-home for the Aged>* (Civil Affairs Bureau of Shanghai, 2004). The guidance for subsidizing changed again since the releasing of *<Needs assessment guidance for Care-service-at-home for the age>* (Civil Affairs Bureau of Shanghai, 2006), which categorized the needs of elderly into “Severe Dependence”, “Mild Dependence” and “Light Dependence” according to their self-care capacity. The newest guidance is the one offered by *<Further Regulation on Care-service-at-home>* (Civil Affairs Bureau of Shanghai,2009) which took the result of need assessment into account and made a more detail arrangement on both allowance for general care service as well as for special care (see Table 6).

Table 6 Subsidy for the elderly

Scope of Subsidy	Self-care capacity Standards (Yuan)	Light Dependence	Mild Dependence	Sever Dependence
Those who are over 60 years old and are unable or partly unable to take care of themselves among the following lists:	Daily care cost	300 per-month	300 per-month	300 per-month
(1)Those who are living below the minimum living standard; (2)Those with special vocational disability, provincial and municipal-level model worker, and returned overseas Chinese	Special care cost	0	100 per-month	200 per-month
Those who are over 80 years old and are unable or partly unable to take care of themselves, but is not concluded in the former two lists	Daily care cost	150 per-month	150 per-month	150 per-month
	Special care cost	0	50 per-month	150 per-month

The source for allowance to the elderly was firstly set by *<Regulation on the Financial Support for Care-Service-at-Home for the Aged>* (Civil Affairs Bureau of Shanghai, 2003) as public finances of municipal government and district government at an equal proportion. *<Further Promoting of Care-service-at-home for the Aged>* (Civil Affairs Bureau of Shanghai, 2004) then arranged more clear that “municipal finance would subsidize those over 100 years old with 100 Yuan per-month, subsidize the elderly with special contribution to the soci-

ety with 150 Yuan per-month. And the Social-Welfare-Lottery-Fund¹ would invest 10 million Yuan each year.” <*Further Regulation on Care-service-at-home*> (Civil Affairs Bureau of Shanghai, 2009) enhanced the financial support for the subsidies to the elderly by doubling the investment from Social-Welfare-Lottery-Fund and added Special-Care Subsidy to the elderly.

(2) The subsidies to the service attendants

<*Further Promoting of Care-service-at-home for the Aged*> (Civil Affairs Bureau of Shanghai, 2004) listed the component of subsidy for the service attendants as three parts: 800 Yuan per-month as basic wage; 300 Yuan per-year for labor protection; 420 Yuan for per-attendant who is from unemployment or surplus rural labor. And the subsidies for the service attendants are provided equally by both municipal and district public finance.

(3) The operational overheads of NGOs

<*Regulation on the Financial Support for Care-service-at-home for the aged*> (Civil Affairs Bureau of Shanghai, 2003) categorized the operational overheads NGOs as follows: the initial cost; subsidies for the members of the organization; cost of service training the attendants; cost of investigation of the service needs; and some other cost. It also request that the street finance should invest no less than 50 thousand Yuan as operational overheads of NGOs. According to <*Further Promoting of Care-service-at-home for the Aged*>, (Civil Affairs Bureau of Shanghai, 2004), the municipal and district finance should equally share the investment of 60 thousand Yuan as the starting funds for each Center of Care-service-at-home and Day Care Centers (DCC), and Elderly-Assisting Service Center (EASC). The Employment Promotion Funds of Shanghai Municipal will pay for the training fees of care service attendants. Municipal and district finance and Social-Welfare-Lottery-Fund will jointly provide funds for all the other operational overheads of the NGOs.

3. The specific procedure and implementing: Cases in Pudong District

Analysis on all the policies published by Civil Affairs Bureau of Shanghai showed us a comprehensive impression of implementing Care-service-at-home for the aged. Interviews and observations conducted at Pudong District will tell more details of it in this part, which is organized as: 1) The provider of care services; 2) The object of care services; 3) The contents of care services; and 4) The procedure of delivering services.

1) The contents and the price of care services

Though the contents and price of care service in different street is not totally the same for the Center of Care-Service-at-Home for the Aged in each street will list their own service contents and prices based on the specific conditions of needs and the skills of the service attendants, they are basically in consistence with the standard given by the leading group of Bureau of Civil Affairs in Pudong District which is listed in Table 7.

¹ Social-Welfare-Lottery-Fund is one of the forms of government non-tax revenue. It's achieved by sales lottery under regulation of government.

Table 7 The contents and price of the Care-Service -at-Home in Pudong District

Service Category	Service Contents	Service Price
Basic Life Care	Cooking; Washing Cloth; Cleaning the room etc.	15 Yuan per hour
Dinning Assistance	Delivering Food	1.5 Yuan per time
	Offering food at Elderly Dining Service Center	1.5 Yuan per time
Cleaning Assistance	Feeding	10 Yuan per time
	Hairdressing	10 Yuan per time
	Trimming the nails	10 Yuan per time
Special cares	Pedicure	20 Yuan per time
	Morning Care (Washing face, tooth brushing, and Defecating)	15 Yuan per time
	Night Care (Washing face, tooth brushing, and Defecating)	15 Yuan per time
	Bathing Assistance	Washing body	25 Yuan per time
Travel Assistance	Companying for a walk	15 Yuan per hour
Assistance for Emergency	Occasional need in urgent	20-50 Yuan per time
Assistance for Visiting Doctor	Companying for visiting doctor	15 Yuan per hour
Rehabilitation aids	Offering massage	25 Yuan per hour
Spiritual solacing	Professional psychological counseling	30 Yuan per hour
	Visiting and Talking	15 Yuan per hour

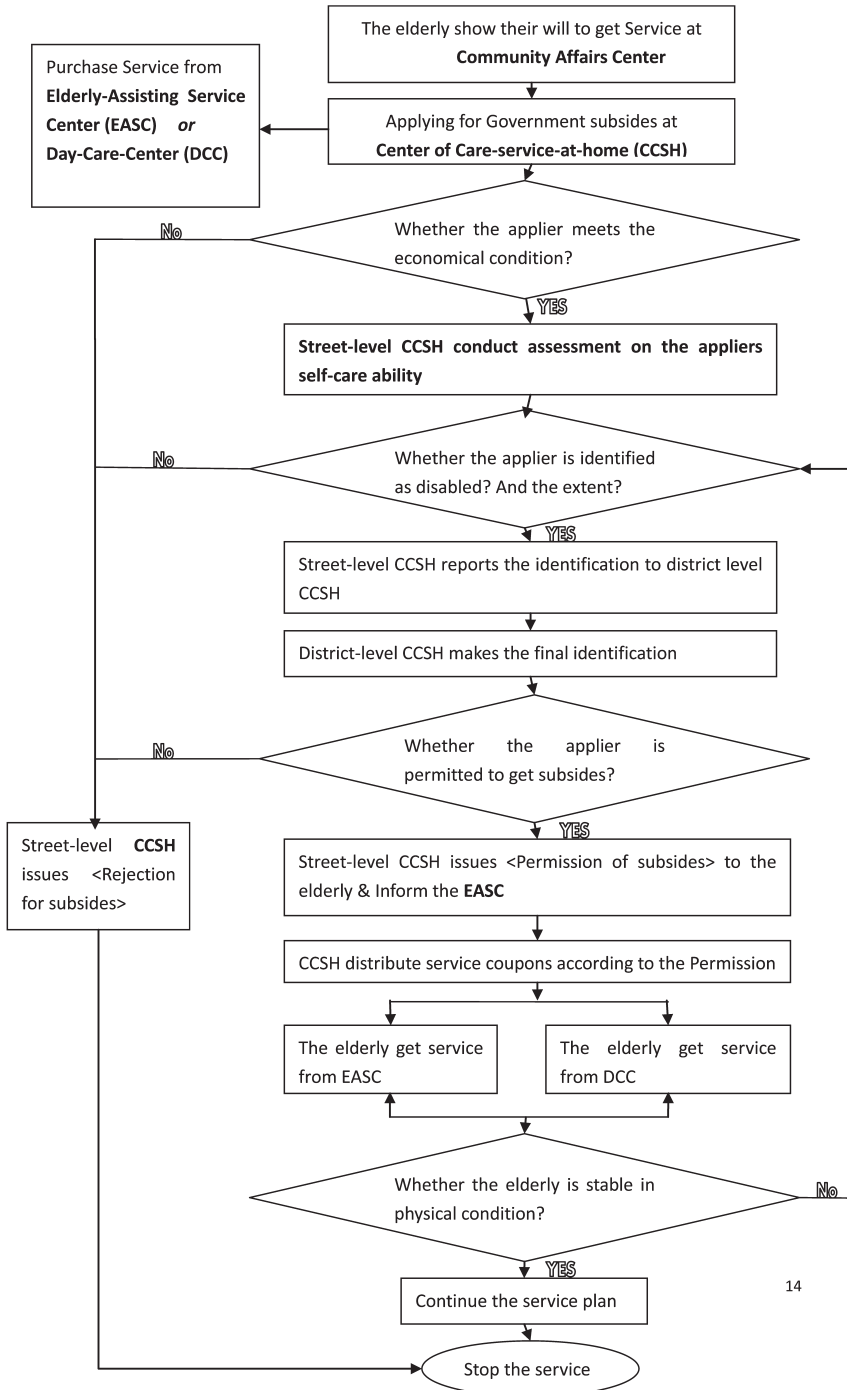
2) The procedure of delivering services

The delivering of service begins with the application of the elderly, who will follow two different procedures according to whether they'll apply for government allowances. Those who'll pay for all the cost by themselves is on a very simple one that he/she just applied for the care service at Center of Care-Service-at-Home or Elderly-Assisting Service Center and pay for it at the time receiving it. Currently, the most majority of applier for care service at home is those who are subsidized by government, Diagram 3 shows the procedure they should follow to get allowance as well as get the services.

The street level Center of Care-Service-at-Home (CCSH) is located at the building of Community Affairs Center which is a comprehensive civic affairs center. Those who come to apply for Care-Service-at-Home will be guided to CCSH by the front desk of Community Affairs Center. CCSH will keep records on the needs of the appliers and transfer the applications of those purchasing service all at their own cost to Elderly-Assisting Service Center (EASC) or Day-Care-Center (DCC) who will provide the service responsively. To those who want to apply for government allowance, street level CCSH will firstly take assessment on the economical condition and then assess on the self-capacity of the applier as to decide whether and how much the applier could be subsidized. Only those who meet both the economic condition and self-capacity limitation could get the allowance, and the result of assessment of those who are supposed to get allowance will be reported to the District level CCSH who will make the final identification. Then street level CCSH will issue <Permission of subsidies> or <Rejection for subsidies> to the appliers responsively according to the identification by District level CCSH, and distribute service coupons to those have get permission of subsidies. Those elderly who get service coupons in different value will get different amount of service according to the price of services by visiting the Day Care Center, or the EASC will send service attendant to the home of the elderly to give the service applied by the elderly. Each time, at the end of service, the time and the content of service will be recorded on a note card with the satisfaction evaluation

by the elderly. The note card is made and distributed to the elderly by EASC and it is acting as one of the approaches of supervision on the service quality.

Diagram 3 The Procedure of Delivering Care-service-at-home

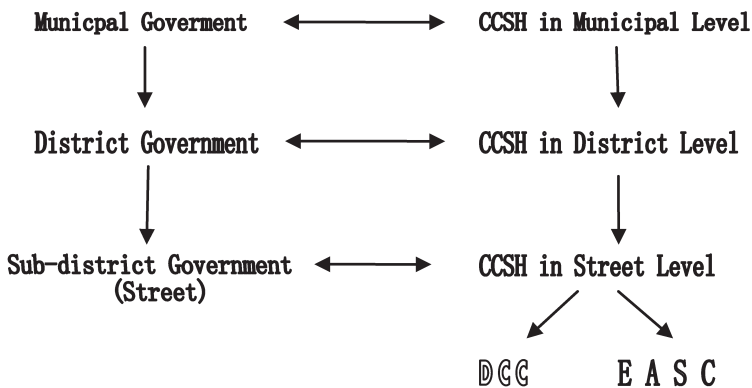


II. NGO’s Participation in Care-Service-at-Home

The number of NGOs contributing to providing Care-Service-at-Home for the Aged increased quickly with the administrative orders and financial encouragement from Civil Affairs Bureau of Shanghai directly promoted the emerging of NGOs, which was formally stated in *<Further Promoting of Care-service-at-home for the Aged>* (Civil Affairs Bureau of Shanghai, 2004) that there should be at least one Center of Care-service-at-home (CCSH) and one Elderly-Assisting Service Center (EASC) in each street offering care services for the aged. Also each street should create Day-Care-Centers as supplementation to CCSH. As an encouragement, there would be 60,000 thousands Yuan as starting fund and continuous financial support from municipal and district finance for each organization. The sub-district government (the street) will offer the NGOs with office premises and also some financial support. The fact is that only the NGOs created following the administrative order are actually permitted to operate in the field of Care-Service-at-Home for the aged. And the names of organizations, namely, Center of Care-service-at-home, Elderly-Assisting Service Center and Center Day-Care-Centers used in the policy text are commonly used by all the NGOs. Thus, the NGOs in the field of Care-Service-at-Home can be easily grouped into three kinds according to their names and we can see different function between differently titled NGOs. Since all the NGOs greatly followed the guidance offered by the policies from government, the NGOs with the same title in different streets showed great common in their functions and operational style.

In Pudong district, the first Center of Care-service-at-home (CCSH) is set up in year 2001, and till the end of 2011, there was 38 CCSH all over the district, with distribution in each street. Day Care Centers (DCC) increased to the total of 44 since the first one started in year 2006. The total number of Elderly-Assisting Service Centers (EASC) reached 40 till the end of 2012. Those three kinds of NGOs are working jointly under the policy framework developed by government. Diagram 4 shows the network among them: Centers of Care-service-at-home in street level is directed by Centers of Care-service-at-home in district level and municipal level. Hierarchically organized government purchase care service for the aged from hierarchically organized CCSH, CCSH is working as the bridge between government and the other two kinds of NGOs. Within the network, each kind of NGOs has their own roles.

Diagram 4 The network among the NGOs



1. The role of Center of Care-Service-at-Home (CCSH)

It is from CCSH that government purchases service for the aged, and the CCSH is in charge of the funds from government finance. Specifically, the municipal level CCSH takes control on the funds from municipal finance; the district level CCSH takes control on the funds from district finance. The municipal level CCSH will distribute the funds to different district level CCSH, and then the district CCSH will distribute the funds to different street level CCSH.

Besides the control and management on funds, municipal level CCSH and district level CCSH are jointly working on standardization of Care-Service-at-Home for the Aged. The *<Standard of Care-Service-at-Home for the Aged in Shanghai>* was written and published under organization of municipal level CCSH, with participation of members from district level CCSH, officers from Bureau of Civil Affairs and professors from Universities. The Standard is working as the guidance for both the organizations (CCSH, DCC and EASC) and the service attendants. Another contributor to the standardization of Care-Service-at-Home for the Aged is the *<Guidance of needs assessment for Care-service-at-home>*, which is also written under the organization of municipal level CCSH with participation of members from district level CCSH and scholars from universities. It provided an assessment system focusing on the following aspects:

- a) The daily care abilities which basically concerns to what extent could the elderly finish eating, cleaning, and clothing, excreting and walking.
- b) The cognitive abilities which mainly care about the memory, the directional capacity and some common sense.
- c) The emotional stability which pays attention to how do the elderly response to the environments.
- d) The sense of sight which is focused on whether the elderly could catch sight of the objections around he/she so that he/she can pay enough attention to the obstacles.

Each aspect is identified as “Light Dependence”, “Mild Dependence” or “Sever Dependence” and is concluded in the final comprehensive identification, which acts as the one of the determinations of standards of subsidizing, in different proportion. Also, municipal level CCSH and district level CCSH jointly worked on developing the textbook for training the service attendants and conducting training programs for the service attendants.

What the street level CCSH is working on is much more near to the elderly. Firstly, it's working as a reception center for the elderly or their family member either for inquiring about or applying for the services. It would provide the information related to subsidy application and service contents, service price, and something others as detailed as possible to the visitors, and it will keep records on the needs of the applier. Secondly, it will conduct assessment on the applier's self-care ability and economic condition, in order to meet the service needs as well as to determine whether and how much could the applier be subsidized by government. Then it will send up the result of the assessment to the district level CCSH for approval of the subsidies. The CCSH will distribute the permitted allowance to the elderly by service coupons after it got the final approval from the district level CCSH. Also, the street level CCSH will visit the elderly regularly to investigate whether there is unmet needs among them with jointly participation of members from DCC and EASC. The result of investigation will give advices on both the service contents developing and the design of training program for service attendants.

2. The role of Day Care Center (DCC)

The DCC is set up to provide day care for the aged who come at morning and return home at evening. Functionally speaking, it's complementing with the services conducted at home of the aged. It's opened and only opened to those who are over 60 years old and living below the minimum living standard, and the self-care capacity is identified as Light-Dependence or Mild-Dependence. The cost for the elderly is very low (Between 300 to 500 Yuan); the elderly can pay for it in cash or by service coupons. At the center, there are service attendants offering daily cares for the aged, but the most important attraction of DCC for the elderly is that they can be accompanied to each other and the attendants.

3. The role of Elderly-Assisting Service Center (EASC)

EASC is the organizer of service attendants and direct deliverer of services. One of the main works of EASC is recruiting service attendants following the general procedure: Firstly, applier showed their will to be an attendant will be registered at EASC. Then, the appliers will get trained in the training programs organized by the district level Center for Care-Service-at-Home. Thirdly, the applier will take theory and practical exams organized by Shanghai Social Welfare Trade Association who will issue those who successfully past the exams with "Qualification for Nurse Attendant for the Aged". Finally, the qualified applier will be employed by the EASC. The employed service attendants will then be sent to the home of elderly who have applied for certain services by EASC who will also take supervision on their service quality.

III. The Relationship between the government and the NGOs

When talking about the relationship between government and NGOs in China, one of the most obvious focus is the government's attitude towards NGOs, which is variously reflected by scholars of China and some foreign scholars. As Kang and Han (2008) said, conditions in China are so complex that you can find enough evidences for any model of relationship between government and NGOs. As true as the controversy, the government's attitude toward NGOs can ever and never be expressed in a universal description.

To the government, the NGOs usually have dual characters: at one hand, it is one of the most powerful vehicles for collective action which could be a threaten power to the authority of government. At another hand, it can be a great contributor to delivering public service which is one of the most important government responsibilities, on this aspect it can be an auxiliary to the authority of government. While either the extent to which NGOs threaten to the government or the capacity of NGOs delivering public service is different from organization to organization, and it is the differences that lead the government has "Differential Controls" on them(Kang and Han 2005). Indeed, Kang and Han (2005) had built out a systematical framework of viewing on the relationship between government and NGOs (See Table 8) basing on those differences which will be the guidance of analysis in this part.

In the field of Care-Service-at-Home for the Aged, it's clear that the NGOs are offering the public services which are severely needed by government, as government have duty to response to the increasing needs of care services for the aged with the process of aging. So it's definitely that government will strongly encourage and support the development of NGOs in this field. But at another hand, government will never give up controlling on the emerging NGOs as to be alert to the potential threaten from any kind of NGOs. The strong support and strong control jointly shaped the relationship between the government and NGOs which will be illustrated as the following aspects: 1) different roles of the government and NGOs; 2) the

strong supports from the government to NGOs; 3) the highly dependence of NGOs on government; 4). the strong control from the government to NGOs.

Table 8 Index of Viewing the Relationship between Government and Social Organizations

A: Attitudes and control on the creation of social organizations		<p>a1: Created by government</p> <p>a2: Set up under the encouragement of government</p> <p>a3: Created by grass-roots but is then absorbed by government</p> <p>a4: Created by grass-roots</p> <p>a5: Unallowed to be registered as Non-enterprise, but can be existing as enterprise</p> <p>a6: Formation of organization is definitely prohibited</p>
B: Management setting for social organization’s operational activities		<p>b1: Government determine the department as the professional management sector for the organization’s operational activity</p> <p>b2: Management sector is determined basing on discussion between government and the organization</p> <p>b3: No management sector for the organization, but controlled it as enterprise</p> <p>b4: No management from government</p>
C: Autonomy of social organization	C1: Major decision	<p>c11: Major decision is made by the management sector</p> <p>c12: Major decision is made by the organization, but have to apply for approval from the management sector</p> <p>c13: Major decision is made by the organization</p>
	C2: Appointment of principle charger	<p>c21: Pricipal charger is determined by management sector</p> <p>c22: Pricipal charger is determined basing on the discussion of the organization and the management sector</p> <p>c23: Pricipal charger is determined by the organization</p>
D: Resource for social organization	D1: Financial resource	<p>d12: Government limit the organization getting financial resource</p> <p>d12: Government financially support the organization</p> <p>d13: Government neither limit nor support the organization in getting financial support, but the organization should report to the government about their financial resource</p> <p>d14: Government has no concern on organization’s financial resource</p>
	D2: Human resource	<p>d21: Determined by the management sector</p> <p>d22: Determined by the organization but have to report to the management sector</p> <p>d23: Determined by the organization independently</p>
E: Daily activities		<p>e1: The organization is mainly fulfilling the task arranged by the management sector</p> <p>e2: The activities is designed by the organization but have to get approval from the management sector before acting</p> <p>e3: The activities is designed by the organization but have to get approval from the management sector after acting</p> <p>e4: The activities is determined by the organization independently from government</p>

1. Different roles of the government and the NGOs

The relationship between government and NGO’s is basically determined by the different roles of them. Generally speaking, the government is the organizer of service and the NGOs is the direct producer of service. Government has the duty to provide social service for their people, which is the basement of their authority, and that’s why government concern on promoting Care-Service-at-Home for Aged. The creation of NGOs in this field is the main approach that government took to reach its goal of meeting people’s social needs. Here the model of Four-C’s (See Diagram 5) rose by Adil Najam (2000) is used to illustrate the relationship between

government and NGOs. In the field of Care-Service-at-Home, the government and the NGOs are pursuing the same goal, which is meeting the increased service needs of elderly in Ageing Society. However, they are acting in different ways, namely, the government promote Care-Service-at-Home by policy guiding and financial supports, while the NGOs by organizing and training service attendants and directly serving to the aged. So in a whole, the NGOs are complementarity to the government.

Diagram 5 The Four-C's of NGO–Government Relations

		Goals (Ends)	
		Similar	Dissimilar
Preferred Strategies (Means)	Similar	Cooperation	Co-optation
	Dissimilar	Complementarity	Confrontation

Resource: Adil Najam, *The Four-C's of Third Sector–Government Relations: Cooperation, Confrontation, Complementarity, and Co-optation*. *Nonprofit Management and Development*, vol. 10, no. 4, Summer 2000.

2. Strong supports from the government to the NGOs

Based on the complementary relationship with NGOs, the government showed great support for NGOs' development: the creation of NGOs is directly motivated and greatly encouraged by the government. It is clearly stated in the policies issued by the government department in charge of implementing Care-Service-at-Home, namely, Civil Affairs Bureau of Shanghai, that each NGOs can get 60 thousand Yuan as starting fund from municipal and district finance and other financial support from street finance and some funds(such as Social-Welfare-Lottery-Fund and Employment Promotion Funds). Indeed, besides the financial supports, the NGOs can also get some other supports from government (often the street agency), such as office premises, office equipment and so on. In fact, the office of Center of Care-Service-at-Home and the office of Elderly-Assisting Service Center are usually freely located at the building of Community Affairs Center which is owned by the sub-district government (street agency), and the building of Day Care Center is also offered by street Agency. What's more, the salary of the members of the NGOs is also supported by public finance. It's the fact that NGOs in the field of Care-Service-at-Home almost get all the resources from the government.

3. High resource dependence of the NGOs on the government

The strong supports from the government directly lead the high resource dependence of the NGOs on the government: either the starting funds and the operational cost or the office premise and the office equipment. Indeed, the NGOs have no other resource for their operation and development.

4. Strong control from the government on the NGOs

The totally resource dependence greatly shaped the relationship between government and the NGOs that government has an obvious power over the NGOs while the NGOs almost have no power over NGOs. Thus there is a strong control from government on the NGOs, which is not only obviously showed in the policies of implementing Care-Service-at-Home but also

can be easily seen in the operational activities of the NGOs. The creation of the NGOs is the result of administrative order of the Civil Affairs of Shanghai expressed by issuing one of the main policies of implementing Care-Service-at-Home, namely, *<Further Promoting of are-service-at-home for the Aged>* (Civil Affairs Bureau of Shanghai, 2004) which has set down the main functions of the NGOs, and has arranged the sub-district government as the management sector for them. So the daily activities of NGO are under the leading and supervision of street agency, the NGOs are asked to report their activities to street agency regularly. Also the charger of the NGO is appointed by the government; usually they are used to be officers in street agency contributing on work related to the elderly. Even the recruiting of service attendants is greatly affected by government that the NGOs are encouraged even asked to employ those who are included in "4050 Project"² and "Re-employment projects"³. Though there is no formal and direct administrative order to NGOs to recruit the people covered by those two projects, the NGOs are affected informally by the street agency who was administratively ordered to offering a certain amount of jobs to those who are in those two project, since they are working in the same building and sharing some office equipments.

IV. Conclusion

The findings in this study showed that in the field of Care-Service-at-Home, the government and the NGOs are working jointly with distinguished roles, namely, the government is working as the organizer and the NGOs are working as the producer of public services.

The role of the NGOs and their relationship with the government is basically determined by the government strategy on management of NGOs, which is well known as "Differential Controls". It's the incapacity of government as well as the advantages of NGOs in the field of Care-Service-at-Home that leads the government created and supported the NGOs. The government's incapacity is caused by both the intensive labor consuming of Care-Service-at-Home and the limitation on government's scale and cost. Thus, the government turns to market or NGOs, and NGOs are more likely to provide better services at lower cost compared to the market. Generally speaking, the average price of services provided by the NGOs is much cheaper than that provided by market. The advantages of the NGOs mainly stem from the voluntary spirit of them with the following aspects: the voluntary spirit of the organizers of the NGOs and the voluntary spirit of the service attendants. The voluntary spirit of the organizers of the NGOs mainly stem from the fact that the organizers of the NGOs are usually those who retired from the government and used to in charge of social welfare for the aged. Their occupational experience enhanced their sympathy for the elderly as well as their enthusiasm on serving for the aged. What's also important is that they has little economic pursuing for they have a good amount of retirement pension. The voluntary spirit of the service attendants mainly stem from their belief that they are serving for the future of themselves. Another factor which may not be the major but should not be ignored is that they are usually unemployment in their 50 years old or so, usually with little competitive power in the labor market.

² "4050 Project" is organized by Municipal Government of Shanghai from year 2001, intending to help those who are at their 40s (women) and 50s (men) to get employed. Those people the unemployment left by the industrial restructuring of state-owned business in Shanghai, who are difficult to find a new job because their lack of new skills.

³ "Re-employment projects" is started at year 2004 by Municipal Government of Shanghai, which is supposed to promote the unemployment to be employed at the field of social service. Government financially support the development of programs contributing to some kind of social service, such as environment protecting assistance, community security assistance, fire protection assistance, traffic management assistance.

By issuing administrative order and providing operational resources, government has successfully attracted all the NGOs into the government-controlled system. The totally support from government provides enough resource for the NGOs' creation and operation, thus NGOs have no driven power to search for resources from other objectors, which keeps the NGOs stay in a very simple resource network as well as in a very simple inter-dependence relationship. And the inter-relationship between the government and the NGOs provides basements for the government's strong control over the NGOs. The strongly control from the government shaped the scope of the NGO's functions and activities, which keeps the NGOs pursuing the goals definitely in consistence with the government.

The empirical facts from the field of Care-Service-at-Home for the Aged in Pudong District of Shanghai also provides evidence for the argument that in China, the government has a strong will as well as a strong power of controlling the society. It's also the fact that the supply of Care-Service-at-Home for the aged in Pudong District of Shanghai is still in shortage, which hints that the field of Care-Service-at-Home will be open to more and more kinds of NGOs and even be open to for-profit actors. As a consequence, the role of NGOs as well as their relationship with government will be much more complex than that of nowadays, which will be challenge to the research result of this study as well as promotion for further studies in this domain.

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Comparing the EU and China Wind Energy Policies

Ho-Ching Lee • Pei-Fei Chang

Abstract This paper examines the driving forces of the EU and China's wind energy policies change as well as critical problems in practice. Germany is used as a major case study representing the EU. However, this paper emphasizes less on Germany and more on China's wind energy policy changes. This is because China's wind energy policy appears to be less mature than that of Germany, and that the former seems to be changing more often than the latter. A contribution of this paper is that the data on China's wind energy policy is mainly collected from interviews with Chinese central government officials, state-owned enterprises, and scholars. By comparing Germany and China's wind energy policies, this paper uses a set of analytical factors. They are institutional framework, policy objectives, national government intervention, market and advanced technology. This paper concludes that it is not possible for both countries neglect concerns of both energy security and climate change in wind energy policy-making. Even though Germany is advanced than China in wind power development, both countries seem to face a common future problem in expanding grid connection for off-grid wind. For both countries, grid connection plays a crucial role in ensuring stable wind energy supply for the future.

Keywords Wind energy policy - China - Germany - EU

JEL Classification Q48

1. Introduction

The EU is aware that 80% of its greenhouse gas emission comes from energy consumption, from which 28% is of economic and industrial development, 33% of transportation, and 39% of household use and service industry (European Council, 2011). Apart from the use of coal, the EU uses 22% solid combustion fuel, 30% nuclear power, 20% natural gas, 14% petroleum and 14% renewable energy. Over the last decade, the internal energy production within the EU

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seemed to be short of energy demand; in 2006, energy import took up 54% of the EU's total energy supply. It is estimated that by 2030 the EU will import up to 70% of petroleum and natural gas, and that the energy price will rise as well (European Council, 2011.)¹

In the 1970s and 1980s, renewable energy development in the EU was mainly on research and development (R&D) and less on actual implementation. The largest contributor at that period was Germany, followed by Italy, the Netherlands, Spain, Sweden and United Kingdom. Research on wind energy technology took up nearly one quarter in the EU. In the 1990s the emphasis of the EU on renewable energy development shifted to market expansion; Germany, Denmark and Spain were the leading roles in expanding wind energy markets (Guest editorial, 2006: 251)

Throughout the last decade, the EU has made efforts by developing renewable energy on a large scale through institutional regulatory framework. For example, the Lisbon Strategy in 2000 focused on green economy. The "Treaty of the Functioning of the European Union (TFEU)" in 2009 advocated solidarity of an internal (renewable) energy market. To address climate change, the EU also established the DG Energy and the DG Climate Action in 2010. The Energy 2020 Communication (also called 20-20-20 plan) aims to increase the share of renewable energy in the EU energy mix to 20%. These policy changes are made with specific goals and they indicate the EU's determination to address climate change through renewable energy development.

China has been experiencing changing patterns of production and consumption in many areas of the economy since the economic reform of 1979 (Bruyninckx 2008: 165-166; Mol and Carter 2006: 150). Industrial production has increased, and standards of living have risen, requiring a greater energy supply, and raising issues of energy security.

Energy supply is subject to external pressure. For example, oil supply has been falling short due to instability in the Middle East or foreseeable shortages of oil in later years. Pressure on energy supply can lead to an increase of energy prices. China's large reserve of coal is available at a low price. Therefore, it has been chosen as a major source of energy supply.

Energy security was first mentioned in 1994 by China Economic News, a database of Chinese periodicals (Guy C. K. Leung 2011: 1330), and later in relevant literature, such as the China Modernization Report, which incorporated the environmental factor in China's overall national development (CAS 2007: 8). Scholars have defined energy security as "the consistency of energy supply at affordable prices" (Rosen and Houser 2007: 40). Another definition is "to assure adequate, reliable supplies of energy at reasonable prices and in ways that do not jeopardize major national values and objectives" (Alhajji, 2007). Both definitions are considered as suitable for the case of China regarding its dependence mainly on coal and oil (Guy C. K. Leung 2011: 1335).

China's reliance on coal and oil to meet a rapidly increasing energy demand explains why, in 2006, the country surpassed the US as the biggest carbon dioxide (CO₂) emitter in the world (the Netherlands Environmental Assessment Agency 2007).² Industrial waste gas is the largest contributor to air pollution in China. This problem is not only an energy issue but also has severe environmental implications. Excessive CO₂ and other harmful gas particles from the

¹The EU imports petroleum mainly from OPEC countries (Organization of the Petroleum Exporting Countries) of 38%, 33% from Russia, 16% from Norway, 5% from Kazakhstan. The EU imports natural gas from Norway of 26%, 21% from Russia, 17% from Algeria and 5% from Nigeria.) Because the use of fossil fuels such as coal, petroleum and natural gas does lead to greenhouse gas (GHG) emission problem, the EU needs to increase the use of renewable energy to achieve a low carbon society.

² It concerns emissions by country, not per capita.

industrial use of coal and oil, has triggered the global debate on greenhouse gas emissions and China's role in this issue. The international community has invited emerging industrial countries, like China, to share the responsibility, together with developed countries, for the reduction of greenhouse gas emissions. Internally, the Chinese government sees the need to address the emission problem, which has led to environmental deterioration, problems of public health and social unrest. But China is especially challenged on how to balance economic development and environmental protection. China seems to be willing to participate in beneficial environmental changes, but it also wants to make sure that these measures are 'economically sound.'

The central government has placed a priority on cleaner production to address both of these challenges: increasing environmental protection and preserving economic growth. Chinese national policy has responded to excessive emissions of greenhouse gases and increasing energy demand by promoting renewable energy, including wind and solar energy. Renewable energy is receiving more attention as a sustainable solution to reduce China's emissions problems and it can contribute to a significant reduction in greenhouse gas emissions.

This paper aims to investigate wind energy policies of both Germany and China and intends to answer the questions: why do both Germany and China's energy policy change from fossil fuel use to increase use of renewable energy? What are the common problems in practice for both Germany and China in developing wind energy?

This paper examines mainly onshore wind power policy and development, not on offshore wind power development, because research of the latter requires investigation on various dimensions, such as military and public sea dispute, which are beyond the scope of this paper.

The analysis of wind energy policy and development, as a contemporary and on-going issue, requires interviews with policy-makers and other stakeholders in order to conduct an in-depth and detailed study. Therefore, this paper focuses on interviews as an essential method of data collection for this research. The added value of emphasizing interviews is that some interviewees can provide updated documents, which serve later as an input to document analysis.

The groups of interviewees are initially in three categories. The first category consists of officials from the Joint Research Center (JRC), the European Commission, the International Energy Agency (IEA), as well as Chinese central government officials. They provide an overview of renewable energy-related regulatory framework. The second category is multinational corporations or state-owned enterprises of China; they give insights on crucial problems in the actual development of renewable energy. The third category is academics from Europe and China, as well as non-governmental organizations (NGO); they offer critical analysis on policy-making and practice. The number of interviewees is in total 35 (Table 1)

Table 1 Number of interviewees

EU and Chinese officials	8
Multinational corporations and Chinese state-owned enterprises	20
Academics and NGOs	7
Total	35

2. The EU Wind Energy Policy

Renewable energy development appears to be an ongoing process, and policy changes (i.e. objectives, market incentives) often take place more than energy conservation, energy effi-

ciency and GHG emission reduction. That is why it is important to examine the energy-related regulatory framework (here refers to institutional change, treaties and their related directives, rules or regulations). The following section will examine the EU's recent (renewable) energy policy reform in three stages.

First energy package

The initiation of renewable energy law in the EU can be traced back to 1996 and 1997 when the EU passed electricity and gas directives, which formed the first energy package (Hornig 2013: 3). A specific policy paper was in 1997 with the introduction of the "White paper for a Community Strategy and Action Plan, Energy for the Future: Renewable Sources of Energy." (European Commission 1997). The objective was to increase renewable energy resources from 7% in 1997 to 12% of the EU gross inland energy use in 2010. Being a landmark for the take-off of renewable energy development within the EU, this White Paper was considered merely as a policy objective due to a lack of concrete operation measures. It was not until 1999 did the Commission formulated an implementation strategy for the White Paper (Guest editorial, 2006: 253). In addition, the 2001 Directive on the promotion of electricity from renewable energy sources was introduced, which all member states had to implement accordingly. (European Commission 2001; Harmelink et al. 2006: 34; Reiche and Bechberger: 844)

Second period of energy legislation

The second period of energy legislation was shown by the Lisbon Treaty in 2000 advocated highly on green economy and energy law reform, which took effect in 2003. Art. 13 of the EU Treaty under the Lisbon Treaty incorporated the European Council into a single EU institutional framework. This indicates that the European Council has power to function as the EU constitution; any decision made by the Council has high political implication and high degree of policy change. For example, the European Council introduced the Lisbon Strategy in March 2000 with four major targets: improve R&D, create dynamic economic environment, invest in human resource, and develop green economy, which is the essence of the Lisbon Strategy (European Council 2000). The "EU Directive for the promotion of renewable energy sources (RES) electricity production" came into force in September 2001, which required all member states to implement by Oct. 2003 (Reiche and Bechberger 2004: 844).

In 2001 the EU was trying to include the US to play a leading role in reducing carbon emissions, which the Bush administration did not seem to be enthusiastic, because the priority of the US at that time was mainly about the war against Iraq. Without the partnership of the US, the EU assumed that it must take on the leadership in carbon emission reduction. After rounds of negotiation with the member states, the EU introduced the first carbon market, the EU Emission Trade System (EU ETS) (Skjaereth and Wettestad 2009: 118).

The establishment of the EU ETS in 2003 was based on the 2003/87/EC Emission Trading Directive by the European Parliament and the European Council. The 2004/101/EC directive linked the Emission Trading Directive and three flexible mechanisms (Joint Implementation, International Emission Trading, and the Clean Development Mechanism) of the Kyoto Protocol, thus making the EU ETS compatible with the Kyoto Protocol (Blanco and Rodrigues, 2008: 1510). The operation of the EU ETS took effect in 2005; it was the largest carbon emission trade market in the world (Point Carbon 2010).

A special feature of the linkage between the EU ETS and the Kyoto Protocol was that the use of the Clean Development Mechanism (CDM) allowed non-industrialized countries (also called non-Annex I) cooperate with industrialized countries in reducing GHG emissions. During the period of 2008-2012, the greenhouse gas emission of the emerging economies such as Brazil, China, Russia became rather serious, the emission problems was mostly related to energy use, therefore, the CDM registered projects were mainly energy-related ones, of which wind energy took up the most amount. According to UNEP, China issued the largest share (63%) of certified emission reduction (CERs) in 2012. This revealed that China had become the largest seller of carbon credits in the world. The EU was then the largest buyer of CERs in this period, with 77% carbon credits bought from China, of which wind energy projects took up over 30% (1510 projects) (UNEP, RISO Center 2013).

More elaboration on China's wind energy policy will be given later.

The European Council in 2007 emphasized energy efficiency and set up the Energy 2020 Communication "20-20-20", which was a mid-term plan to increase energy efficiency, establish internal energy market, strengthen EU external position on energy; that it, to take a leading role in energy technology and innovation. Specific objectives included to increase 20%renewable energy share in the energy mix; improve energy saving by 20%; reduce carbon emission by 20%. (European Council, 2007)

Third period of energy law reform

The third period of energy law reform was in 2009 with the renaming of the Treaty of the European Community into the "Treaty of the Functioning of the European Union (TFEU)." The reform the EU treaties reveals the intention to balance development and the environment with emphasis on green economy. For example, after the Lisbon treaty took effect on Dec. 1 2009, the so-called three pillars were merged into the single European Union. The Treaty of the European Community was renamed as "Treaty of the Functioning of the European Union (TFEU)"(Treaty of the Functioning of the European Union, OJ 2010, C83/47).

Art. 194 of the TFEU emphasizes the importance of the functioning of an internal energy market, including energy efficiency and conservation, development of renewable energy, interconnection of energy network, and security of energy supply.

There are three major principles of the Art. 194: first, the establishment of the internal energy market and operation; second, the need to preserve the environment, esp. in addressing climate change. Third, solidarity with the internal energy market (Horng, 2013: 5). These three principles aim to ensure sustainable energy supply, large scale development of RE as well as energy efficiency and conservation .

A special feature of the Art 194 (1) is that it gives authority of the EU to establish legal measures to ensure the above mentioned three principles and aims are fulfilled. In other words, the laws or measures based on Art. 194 are not symbolic declarations but *legally binding* to the member states (Horng 2013: 5).

In 2006 came the "Green paper on a European Strategy for Sustainable, Competitive and Secure Energy." The purpose was to create an internal energy market and ensure its solidarity, create diverse energy supply structure, and eventually unify a single external position on EU energy policy.

In 2008, the EU Commission introduced the "Climate action-Energy for a Changing World", which was a strategic plan for low-carbon energy technology (grid, carbon capture). In 2009, the European Council passed the "Climate and Energy Package," which touched upon renew-

able energy, carbon trade, carbon capture and storage; car emission, member states sharing carbon emission reduction targets.

The EU also conducted institutional changes in 2010 as demonstrated by the creation of the DG Energy and the DG for Climate Action. Both institutes are to ensure operation of a common energy market, sustainable energy supply, energy efficiency, renewable energy development and, in the long run, a Pan-Europe energy network.

The DG Energy is responsible for general and specific tasks. General tasks include promoting a single internal energy market and energy security, which means securing lasting energy supply. In addition, the DG Energy supervises the construction of public grid network as well as the EU energy research budget. A specific task of the DG Energy is to promoting renewable energy development to reach the objective that 20% of the EU energy consumption comes from renewable energy in 2020. DG for Climate Action presents the EU in global environmental negotiations, and assists the EU in achieving the above-mentioned targets for 2020.

The European Council in Feb. 2011 set a goal in creating an internal pan-Europe energy market by 2014. The purpose is to construct a well-structured grid network so that the member states can transport electricity and natural gas to neighboring countries. In the same year, the “2050 Energy Road Map” was proposed, aiming to reduce 80% to 95% GHG by 2050 relative to emission in 1990.

In 2013, the EU introduced a green paper on the “2030 Climate and Energy Policy Framework.” This green paper would be based on the implementation of the 20-20-20 targets (proposed to reduce 40% GHG by 2030.) (European Commission. 2014).

Policy analysis

Based on the above renewable energy-related regulatory framework, this section will analyze the internal, external driving force of the EU (renewable) energy policy change and remaining problems.

The above renewable energy-related regulatory framework reveals an evolving trend in the EU energy development. That is, the EU intends to build a pan-European energy community with shifting focus from the reliance of fossil fuels to large scale production of renewable energy, which is essential in going towards a green economy by balancing economic development and the environment, as demonstrated by the Lisbon Strategy in 2000, which promotes a green economy as a major guidance for the future development of the EU. The environmental factor, in respect to the increasing public awareness of the climate change problem, appears to be an *external* driving force of the EU energy policy change. This is demonstrated by the “Climate action-Energy or a Changing World” in 2008, the introduction of the “Climate and Energy Package” in 2009, the establishment of the DG Energy and the DG Climate Action in 2010. Both the first and second principles of Art. 194 TFEU indicate that a balance between (economic) development and the environment is a crucial concern of the EU energy policy-making. The EU’s intention to initiate “a high level of environmental protection” as a prevailing goal of its energy policy-making further supports the assumption that environmental concern is an important concern in the process of the EU policy-making.

The above mentioned policies reveal an *internal* driving force for institutional or policy change is the concern of energy security, as demonstrated by the third principle of Art. 194 of the TFEU emphasizes “solidarity with the internal energy market” mainly refers to “mechanism for rapid solidarity,” That is, a total back up support system among the member states

when any of a member state is in energy crisis, such as breaking down of its energy infrastructure. This again shows that energy security is an important driving force for the EU (renewable) energy policy change. On a long term basis, the EU aims to consolidate an internal energy market by advancing its technology in establishing an operational public or pan-European grid so that some member states can transport additional electricity to support their neighboring countries in case of energy shortage. This goal is not just a wishful thinking, but it is set and approved by the European Council, which has high political implication but also high degree of power to conduct policy change.

The development of (renewable) energy has been institutionalized by the EU treaties. Lisbon treaty, which took effect on Dec. 1 2009, promoted a common energy policy and a single energy market. Art. 14 of the TFEU elevated again the importance of energy in the EU policy-making; it is also legally binding to the member states to implement an internal energy market.

As the implementation of the Energy 2020 Communication continues, the EU needs to increase the share of renewable energy in order to reach the 20% share of renewable energy in its total energy mix (Jacobsson and Lauber 2006: 256).

These indications reveals all the more that the EU has a definite goal of moving towards increasing use of renewable energy and that this goal is driven by policy support to make it feasible to practice. The EU appears to be moving towards rethinking the change energy structure and the energy market, increasing dialogues with citizens and international-level cooperation on renewable energy development, as proposed by the Energy Roadmap 2050 Communication.

There are general problems of the EU energy policy. First, the EU energy policy is still under national control (Brown 2013: 1). Each member state has different concerns in its national energy policy-making and this depends on their natural energy reserves or imports. For example, the UK relies mainly on petroleum and natural gas due to its oil reserves in the North Sea. France relies on nuclear power, while Germany has coal, natural gas and oil as conventional energy, although its policy is moving towards increasing the use of renewable energy.

Difficulty remains in changing the energy structure of each member state. Until 2010, some countries like France, Germany, Spain and the UK were continuing subsidizing their national coal industry, which made it difficult for renewable energy to compete with coal (Reiche and Bechberger 2004:844).

Second, the collapse of the EU ETS, an instrument to tackle global warming, seems to reflect the ineffectiveness of the EU energy policy. The divided position of the member states shows that coordination needs to be strengthened. For example, Britain sees that carbon price is too low as up to 2013 the price was 3 euros per ton. The European Parliament did not have intention to raise the carbon price, and this indicates the continuity of energy *market weakness*. Germany is facing internal division over the subsidies for renewable energy and carbon. These different voices reveal that the EU lacks of a unified (renewable) energy policy, because most member states are developing renewable energy according to their national policies. (Lewis and Barbara 2013). Before 2013, the EU ETS were compatible with the CDM, which consisted of mostly registered wind energy projects, partly because the member states agree mostly on developing wind energy as a major alternative energy. After 2013 the EU ETS will not be compatible with the CDM, which will be replaced by a new market mechanism.

To sum up for this section, we conclude that the internal and external driving forces for the EU (renewable) energy policy change are the concerns of climate change and energy security. The problems of the EU energy policy are that most member states have different energy structure, energy policy is under national control, and that strong coordination is needed, as demonstrated by the EU ETS.

As mentioned in the introduction, the early development of renewable energy in the EU was mainly on research and development (R&D), the EU did not emphasize technology implementation until 1990s. The focus on creating a renewable energy market in the EU from 1990-2000 saw a high growth rate particularly on wind energy, with an average 40% annual growth; 80% of the OECD wind energy production comes from the EU, such rapid annual growth also leads to a soaring wind turbine industry, which took up 90% of the global market share (EWEA 2004; Guest editorial, 2006: 253).

Wind power has the largest growth (33%) of all renewable energy development in the EU. Until 2010, wind energy development hit the largest growth (55GW) of the renewable energy development within the EU. Up to 2013³, the total wind power installed capacity in the EU reached 117.3 GW. The electricity produced from onshore wind energy was enough to cover almost 8% of the EU's total electricity consumption (EWEA 2014:12)

Literature review shows that the rapid growth of the EU wind energy market is mainly initiated by policy initiatives and central government intervention of the member states (Blok, 2006: 251; Lauber and Mez 2006: 105; Lewis 2013; Guest editorial, 2006: 253; Lewis and Wiser. 2007; Arantegui 2014: 31.). For example, the national government intervention in Germany by pushing national policies has led to market growth in wind energy development (Blok, 2006: 251). Literature review shows that Germany has been playing a major role in the EU wind energy development (Reiche and Bechberger 2004: 848; Saidur et al. 2010: 1749-1750; Jacobsson and Lauber 2006:257; EWEA 2014). Over the past 13 years, wind power installation has grown from 3.2 GW in 2000 to 11.2 GW in 2013 (EWEA 2013:3) with an average annual growth rate of 10%.

In 2013, Germany represented the largest market share of wind energy for total installed capacity (34.3 GW; 29%), followed by the Spanish market (23 GW; 23%) and the UK market (11%) (EWEA 2014: 12) (Table 2).

Table 2: EU member state market shares for total installed capacity (total 118GW)

Germany	29%
Spain	23%
UK	11%
Italy	9%
France	8%
Denmark	4%
Portugal	4%
Sweden	4%
Poland	3%
Netherlands	2%
Others (13)	11%

EWEA 2014: 12

³ In 2013 alone, the total wind installed capacity across the EU in 2013 was 11159 MW, which was 8% less than 2012. The 8% decrease was due to negative impact of wind market, uncertainty of the regulatory framework, which discouraged investment and thus led to concentrated growth in certain countries, such as Germany, Spain and the UK (EWEA 2013:3). This was different from the market scenario that Germany, Spain and Denmark altogether represented 58% of annual installation from 2007 to 2012 (EWEA 2013:5).

3. Germany wind energy policy under the EU framework

This section will use Germany as a representative case of the EU wind energy policy, which has undergone mainly four time periods (Jacobsson and Lauber 2006). From 1974 to 1988 wind power development was about to take formation, partly due to the energy shortage in the 1970s, which raised public concern on the future of energy supply. The Chernobyl accident in 1986 also triggered debate and controversy on the safety of nuclear power. From 1988 to 1998 was the early formation of wind market; various instruments were deployed to form a market in 1988 for wind energy development, such as subsidies, tax exemption and low-interest loans (Jacobsson and Lauber 2006:266; Saidur et al. 2010: 1750). But in mid-1990s there were oppositions from coal and nuclear industry against renewable energy. The Ministry of Economic Affairs saw that renewable energy was developed to support or complement conventional energy and could never replace coal and nuclear power production (Jacobsson and Lauber 2006: 264); this worry partly led to slow down of the wind market. From 1998 to 2003 wind power was revived, thanks to the national government (Red-Green coalition) in office at that time, which was highly supportive to renewable energy development. From 2000 to 2013 wind power in Germany continued to grow, thanks to a strong national policy.

The following section will further investigate German wind energy policy impact on wind sector with the application of a set of analysing factors. They are institutional framework/energy structure, national government intervention, policy objective, policy instruments, market and advanced technology. The policy impact on wind power development in Germany can be considered as effective (Saidur et al. 2010: 1751; Jacobsson and Lauber 2006: 258). Elaboration is as follows.

Institutional framework/energy structure

The concept of ‘energy transition’ (energiewende) can be traced back in 1970s which elevated the negative impact of nuclear power and that economic development should go hand in hand with reducing emissions through renewable energy development and energy efficiency through less energy consumption (Stiftung 2012).

The Chernobyl accident in 1986 led to increasing public opposition to nuclear power, and such opposition strengthens pressure to the German federal government, which agreed that renewable energy development should be expanded and later adopted the Feed-in Law to attract investors. The impact of this change of institutional framework was that it stimulated the growth of the domestic market from 20 MW in 1989 to almost 490 MW in 1995 (Jacobsson and Lauber 2006: 264).

Germany’s energy concept adopted in 2010 mainly promoted renewable energy development, by which the power sector aimed to increase the share of renewable energy in electricity use to 80% by 2050. The 2011 nuclear accident in Fukushima, Japan, triggered strong determination of Germany’s national policy to completely phase out nuclear power by 2022. (Brown 2013: 18).

The energy policy seems to be consistent in opposing nuclear power as demonstrated by its major anti-nuclear concern from the 1980s to 2022. This is driven by external forces such as the Chernobyl and the climate change concern (Jacobsson and Lauber 2006: 266), which led to public acceptance of alternative energy.

National government intervention

In the early period (1989) of wind power development when large electricity industry was hesitate in absorbing wind energy, the federal government targeted local and rural communities to launch initial wind power development, most of the wind farms were owned by private individuals. Increase participation of local/ rural communities or private individuals was the strategy of the federal government versus resistance from the large electricity industry (Wong 2005: 136).

The EU regulation to liberalize energy market coerced Germany to open its market in 1998, allowing consumers to choose their power suppliers, this helped stop monopoly and provided access to developers to transmission and distribution networks. As a consequence, general electricity price went down (Wong 2005: 137).

The renewable energy policy in Germany was considered lukewarm until the Red-Green coalition took office from 1998 to 2005. To ensure wind power developed at large scale, the Schroder government in 1998 restructured the energy sector by establishing a new Ministry of Economics and Technology, partly aimed to strengthen energy research in technology (Wong 2005: 138) to ensure wind power to be developed at larger scale.

Even though at this period, there was no direct funding to wind developers, yet soft loans and special tax were available. To ensure profits for investors, the federal government introduced a wind energy conversion system, by which investors could calculate profit before a project was initiated. At the end of the 1990s, the number of wind farms increased at a steady rate and in 1997 Germany replaced the US as the world's largest wind power producer, and was able to supply 18% wind turbine manufacture in the global market. In this period, the accumulated capacity of wind turbines was six times larger than that in the UK (Wong 2005: 137).

During the reign of the Red-Green coalition, Germany achieved the first rank installed capacity of wind energy in the EU. The Red-Green coalition also aimed for a long-term policy objective that over 50% electricity generated by renewable energy sources by 2050. This shows that national government intervention can be a driving force for wind energy growth (Lauber and Mez 2006: 105). The intervention from the federal government as illustrated by the Red-Green coalition is a driving force for effective wind power development. Later, the Conservative-Social Democratic Coalition, which took office at the end of 2005, expressed intention to continue the policy course of increasing renewable energy electricity. In 2010, Germany witnessed that over 12% of its gross energy consumption came from renewable energy; among which wind energy had the largest amount of electricity generated (Saidur et al. 2010: 1750).

Germany does not seem to have much public resistance to wind power development. Literature reveals that state power will be deployed for regulation if disputes happen (Wong 2005: 135-136). Strong federal government intervention throughout 1990s witnessed steady growth of wind energy market, and coordination between the federal government and large industry continued from 2000 onwards to motivate the latter in purchasing more wind energy (Reiche and Bechberger 2004: 848).

Policy objective

In 2010 the government published a National Renewable Energy Action Plan (NREAP). (Federal Republic of Germany. 2010). A future goal at the federal level is to increase wind capacity to 45GW by 2020; 30% of electricity to be generated from renewable energy, and that 50%

by 2050 (Saidur et al. 2010: 1750; Arantegui 2014: 31; Brown 2013: 6-7), this is the same objective previously set by the Red-Green coalition. With strong government policy and public support, the above targets are likely to be achieved (Arantegui 2014: 31).

Germany has plans to gradually phase out its nuclear power plants by 2030 and, instead, replace them with large-scale wind and other renewable energies (i.e. solar, biomass). Other countries will probably follow suit, they are Belgium, the Netherlands and Sweden (Reiche and Bechberger 2004: 844).

Policy instrument

At the initial stage of wind power development (1974-1988), various market instruments were deployed, such as subsidies, tax exemption or low-interest loans.

An example of policy/institutional change was the Feed-in Law in 1991 operated at the federal and local levels. This law led to more investors for market participation, because it was based on a concept to cover cost payment to ensure profits for investors. Wind market soared from 20MW in 1989 to nearly 490 MW in 1995, making the German wind turbine industry the second largest in the world (Jacobsson and Lauber 2006: 263-264).

But mid-1990s Feed-in Law suffered a setback as there were oppositions from coal and nuclear industry, and the Ministry of Economic Affairs was not enthusiastic in further developing renewable energy. The ministry considered Feed-in Law a burden to national budget and called a reduction in supporting renewable energy sector, including wind energy (Jacobsson and Lauber 2006: 261-264).

Nevertheless, a survey conducted in 1993 in 24 countries shown that Germany had the greatest concern over global warming, and such concern was reflected at the later stage of policy-making. The Red-Green coalition reversed the earlier concern of the Ministry of Economic Affairs and revived wind power development in Germany.

The Feed-in Law was reformed into the Renewable Energy Sources Act of 2000, which introduced four major differences from the Feed-in Law.

First, the Renewable Energy Sources Act continued the concept of the Feed-in Law by taking external costs into consideration. This means that polluters must pay for the external cost to recover the environment back to how it was before pollution occurred, and such cost should not be paid by taxpayers or future generations. Second, conventional energy benefit much from government subsidies than renewable energy, which was in disadvantage position to compete, and this situation should be reformed. Third, there should be less disparity between the high production costs of renewable energy and low amount of actual energy production (Jacobsson and Lauber 2006: 268). Fourth, the Renewable Energy Sources Act offered 20 years of guarantee to subsidize wind investors. But the amount varies according to the quality factor on site (e.g. from 0.091euro /per kWh to 0.062 euro/ per kWh for offshore wind) (Reiche et al. 2004: 868). Price-setting results from coordination between the federal government and centralized electricity industry (Wong 2005: 138). Such guarantee policy greatly boosted the wind sector (Jacobsson and Lauber 2006: 268).

Gradually, fixed feed-in tariff (FIT) has been used as primary subsidies to support wind energy electricity transported to a public grid. In other words, such tariff targets on subsidizing technology in renewable energy electricity generation; FIT for onshore wind power development is different based on project size and location (Brown 2013: 8).

FIT is granted at two stages of a wind project operation (Table 3). Firstly, an investor receives initial tariff for the first five years of a project based on the estimate power generation

cost. Secondly, at the end of five years, the actual amount of electricity generated is compared to the revenue as a reference if the same amount of tariff can be extended or reduced in the remaining period (Brown 2013: 8). After the initial period ends, the basic tariff is paid for each kilowatt-hour of electricity produced (Brown 2013: 9).

In 2012, Germany witnessed a shift from FIT to market premium or some other market-integration incentives, the purpose is to encourage more investment in renewable energy (Brown 2013: 8). For example, a bonus subsidy was introduced to encourage the industry strengthen technical solutions for quality service and maintenance (Brown 2013: 8).

The difference shown by market premium is that renewable energy projects must participate in the wholesale power market. That is, a project owner must sell electricity to electricity exchange or to a buyer through power purchase agreement (Brown 2013: 8). In 2013, the Germany Federal government (the Federal Environment Ministry and the Federal Economics Ministry) proposed FIT to be gradually replaced by market premium for projects larger than 150 kW (Bloomberg New Energy Finance. 2013).

The revised Renewable Energy Sources Act extended subsidy period from 9 to 20 years, assuring more investment security to the market actors (Reiche et al. 2004: 847).

Table 3 Feed-in-tariff for onshore wind power development

Year	Initial tariff Euro cent/kWh	Basic tariff Euro cent/kWh	System service bonus
2012	8.93	4.87	0.48
2013	8.80	4.80	0.47
2014	8.66	4.72	0.47
2015	8.53	4.65	--
2016	8.41	4.58	--
2017	8.28	4.52	--
2018	8.16	4.45	--
2019	8.03	4.38	--
2020	7.91	4.32	--
2021	7.79	4.25	--

Brown 2013: 9

Market

The German wind market was not coming into formation until 1991. From 1974 to 1988 R&D was funded for developing off-grid technology for exports to the Third World, not for the domestic market (Jacobsson and Lauber 2006: 261).

Renewable energy technology was at the early developing stage and there was weak link between research projects and market competitive products (Jacobsson and Lauber 2006: 261). In the 1980s, more R&D programs in universities, institutes and firms began to expand; some of these programs were integrated into national policy for renewable energy technology. Consequently, more funding was granted to the wind turbine industry from 1983 to 1991, and thus a small national market began to take shape.

Changes of institutional framework and policy instruments can lead to market opening. The EU council of energy ministries liberalized the EU electricity market in 2002 (Reiche and Bechberger 2004: 846). Unbundling the EU electricity market resulted in more competition⁴. Liberalization of the EU energy market also led to six mergers in the German electricity industry, but this did not solve the structural problem. These six large industries did not have

⁴ Interview with a grid expert from VTT, IEA in Beijing, Oct 16, 2013.

clear task division in power generation, transmission and distribution. In order to conform to the federal government's obligation to purchase more expensive wind energy, the six large enterprises charged additional costs from residential consumers (Wong 2005: 139). The federal government since 2000 has been trying to expand wind power development by minimizing the cost of energy production (i.e. minimizing capital, operation, maintenance costs), while maximizing reliability and energy production (Arantegui 2014: 16). A major approach is to initiate new rounds of wind power funding to motivate the unwilling enterprises absorb more wind energy, and such coordination between the federal government and large industry still remains.

Advanced technology

Changes of policy instruments can influence technology development. For example, the considerable amount of financial incentives from the Feed-in Law boosted the improvement of technology (Jacobsson and Lauber 2006: 264).

Germany is the leader in Europe to shift from conventional energy to renewable energy. The country made efforts in combining renewable energy into national electricity grid; such integration requires rather advanced technology to be successful (Jacobsson and Lauber 2006: 256); any problem can easily cause instability of electricity transmission and lead to investment loss.

Although advanced technology is essential in developing wind power, the German market is able to tone down the production cost. German scholars point out that the total cost (all costs considered) of wind energy technology is reasonable to strike a balance between technology and market operation. (Jacobsson and Lauber, 2006: 261). An example is batteries used for wind electricity storage. Without quality batteries, it is not easy to store excessive wind electricity in a national grid, let alone to dispatch to neighboring countries in case of energy shortage.

In addition, wind energy production is dependent on the weather factor. On a less windy day, a wind turbine is not able to produce a certain amount of electricity, but quality batteries with excessive electricity storage from earlier time periods can secure the supply of wind electricity and ensures market operation.⁵

Apart from onshore wind power development, advanced technology in Germany is also pushing for offshore wind power, which is expected to increase to 7GW in 2015 and 30GW in 2030. The contribution of multinational wind companies cannot be ignored. For example, Siemens from Germany is one of the leading investors in global wind development (Martinot 2008:3). But a major problem of expanding offshore wind is that grid connection from offshore to national grid is not catching up with the speed of development. There is not enough grid extension to the North Sea, and has caused excessive electricity being wasted. To address this problem, the federal government in 2013 introduced the "Third Act Revising the Legislation Government the Energy Sector" which included proposal for controlling electricity waste and risk control (Li, 2013: 16).

To sum up, Germany wind power policy is considered effective, because of government intervention; clear policy objective for medium and long term development; public support for renewable energy; advanced technology; affordable market price, FIT shift to market premium, integrating renewable energy with broader power sector and wholesale power markets.

⁵ Ibid.

4. China's Wind Energy Development

Interviews⁶ and literature review reveal that, China's wind policy has been described as "crossing a river by feeling rocks," which indicates that trial-and-error is an integral part of its renewable energy development (Lema and Ruby 2007: 3880). China's wind policy development has gone through three stages: the early stage (from 1986 to 1993), when wind power development was mostly in *ad hoc* fashion; a progression stage (from 1994 to 2002), marked by a transition from *ad hoc* installation to a more programmatic approach; and a recent stage (from 2003 to 2013), characterized by a shift from programs to a national strategic policy.

This section will further investigate China's wind energy policy impact on wind sector with the application of the same set of analyzing factors applied to the case of Germany.

Institutional framework/energy structure

In recent years, international scrutiny forced China to seriously take into account environmental issues. Examples such as the Harbin incident in 2005 (water became polluted by industrial toxic waste), the Taihu Lake incident in 2007 (the third largest freshwater lake in China, which was polluted by a severe algae outbreak) and the controversial Three Gorges Dam project (which caused pollution to the local environment) drew much international attention (Chen et al. 2008:10). These environmental incidents triggered both social discontent and protests in China. Pressures from environmental groups and the international community forced the Chinese government to respond to these problems, at least by taking some measures. In order to pursue a "harmonious society" with less social discontent, the Chinese government gradually realized that "institutional changes and balanced policies were vital to better governance and social harmony" (Chen et al. 2008: 12).

Hu Jintao, who took office from 2002 to 2012, was probably the first political leader who stated that environmental problems should be taken seriously. His ideology of "harmony between man and nature" appears to have influenced China's national policy-making, as demonstrated by the Renewable Energy Law (REL), which took effect in 2006. The REL indicates a major energy policy from fossil fuels to increased use of renewable energy.

Despite the influence of the REL, a senior official from the NDRC⁷ emphasizes that China's energy structure is still a major obstacle to wind power development and needs to be transformed. He points out that China's energy structure stays mostly the same as thirty years ago, and that there is still room for renewable energy development. In recent years, China has been suffering from serious air pollution, which is caused by PM2.5 substance, which is a kind of compound factor attached to other air pollution substance and cannot be released when absorbed into human lungs. In November 2013, the accumulation of PM 2.5 in Beijing reached to 380; this was much higher than the average amount of 20 set by the World Health Organization (WHO). The accumulation increased to 900 in winter time, due to intensive use of burning coal. The geographic shape of Beijing is surrounded by mountains, together with air pollution from mass traffic and factories, caused more difficulty in releasing the PM 2.5 substance, and thus posed negative impact on local economy. The serious air pollution has driven the Chinese government to push for a change. The local governments are asked to alleviate air pollution

⁶ Interviews were all in Beijing, with ERI, on May 26, 2009, CBD (a MNC) on May 27, 2009, Energy Foundation (NGO) on May 30, 2009 and Baoding SOE on June 5, 2009.

⁷ Interview with the NDRC, in Beijing, Oct. 18, 2013

as top priority; negligence to this problem can affect their further advancement in their career. This senior official from the NDRC pointed out that the air pollution problem caused by PM 2.5 substance is a current driving force for China's energy policy change. China's air pollution, especially, in Beijing, has posed negative impact on the national economy, and has caused social anger (CNN Oct22, 2013) it's a problem that has to be tackled without delay. The Chinese government has allocated 5 billion RMB in October 2013 to tackle air pollution; this amount is twice the amount of China's annual national defense budget.

National government intervention

There is no institution more powerful than the National Development and Reform Commission (NDRC). The NDRC approves large-scale projects and budgets, sets energy prices, plans energy policies and interprets detail provisions. Even though offices of the National Energy Bureau and National Energy Administration are located inside the NDRC, implying that the NDRC is the actual institution assisting the National Energy Commission.

Policy objective

The changes of the policy objective can be traced back to the initial two periods (from 1979 to 1993 and from 1993 to 2001) when the government stimulated oil, electricity and coal production without concerns about environmental pollution, to a shift from the supply to the demand side, integrating the environmental factor into national energy policy (from 2001 to 2005), to striking a balance in increasing renewable energy output, reducing energy intensity and mitigating climate change (from 2005 to present). The REL obliges state grid companies, in the long run, to distribute 5 to 7% of the electricity generated by renewable energy. That compulsory regulation is considered a driving force for the development of renewable energy.

Policy instrument

The major subsidy is the Renewable Energy Development Fund (REDF). Established in 2006, the Renewable Energy Development Fund was based on the cost-sharing concept in the REL. From 2006 to 2009, every electricity end-user paid an additional 0.001 Yuan/kWh to this national fund. The amount collected was used to cover the difference between renewable energy power price and that of conventional power. This fund was seen as a budget source for the feed-in tariff, which the Chinese government could use to compensate state grid companies in buying renewable energy electricity. Following the REL amendment in 2009, each person paid 0.004 Yuan/kWh, helping this fund increase from 2 billion Yuan, in 2006, to almost 5 billion Yuan,⁸ in 2009 (NDRC 2009). The Renewable Energy Development Fund is considered a big incentive for the renewable energy industry, especially for wind and solar PV power. This is because half of the fund is reserved for wind power development.

In 2013, a reform took place for central subsidies that each user must pay more to support wind power development. Each end user including SOEs/ industry (different from Germany that industry is exempted) has to pay additional 0.015 Yuan/kwh from

2013(0.004→0.008-→0.015 Yuan/kwh). Late payment is the problem, but there is *no* pen-

⁸ Conversion to USD is 750 million dollars. Exchange rate calculated at www.xe.com on December 27, 2014.

ality system from the Chinese government. A main reason is that electricity dispatch is from a unified central system to all places nationwide.

If a penalty (e.g. electricity cut) is imposed to a certain industry or individual end user, other users or industry will also be affected. This is a problem in operation.⁹

In short, China's wind market is stimulated by government subsidies. The central government is thinking to gradually reduce subsidies, because the market seems to be mature with many wind equipment manufacturers participating in the market. Giving more subsidies to a mature market can distort competition and the industry.¹⁰ However, SOEs argue that in practice national subsidies are insufficient, and that the application process is complicated.¹¹

Market

China's wind market is mainly for state-owned enterprises, which are the major actors in national bidding rounds. To avoid bidding in low price in low quality, the NDRC was planning to gradually replace the existing bidding system with a fixed electricity price by region.¹² In other words, the central government would pay wind electricity producers an additional amount, which was higher than production cost, to ensure that wind electricity could be connected to the state grid system. This reform was eventually conducted on August 1, 2009, the Chinese government introduced price-based feed-in tariffs applicable to different regions with rich wind resource capacity: 0.51 Yuan, 0.54 Yuan, 0.58 Yuan and 0.61 Yuan per kWh (Table 4).

Table 4 Wind price evolution from 1985-2013

Development periods	Price
1985-1993	Less than 0.3 Yuan/kWh ¹³
1994-2002	Between 0.38 and 1.2 Yuan/kWh ¹⁴
2003-2013	Prices by regions: 0.51, 0.54, 0.58, 0.61 Yuan/kWh ¹⁵

Source: CREIA 2013^{13 14 15}

Up to 2013, China's wind installed capacity has been rising higher than expected (84GW). The outlook of further development is positive, with the future potential to reach over one million GW by 2020 and possibly 450 GW in the long run¹⁶

⁹ Interview with Prof. Chang in Tsinghua University, Beijing, Oct. 18, 2013

¹⁰ Interview with ERI, in Beijing, May 26, 2009.

¹¹ This is because a central government subsidy is given to a fixed number of projects annually, it seems to be not enough to support the increasing number of wind projects. Another reason can be that there are various local wind electricity prices in different regions; in some provinces, average subsidy to grid-connection (usually no more than 0.25 Yuan/kWh) and can be lower than production cost. Interviews with local government officials in Baoding city and regional NDRC (Inner Mongolia), in Beijing, June 5 and May 21, 2009.

¹² Interview with a research fellow of ERI, in Beijing, May 20, 2009.

¹³ Conversion to USD is 0.045 USD/kWh. Exchange rate calculated at www.xe.com on October 12, 2010.

¹⁴ Conversion to USD is 0.057 USD/kWh and 0.181 USD/kWh. Exchange rate calculated at www.xe.com on October 12, 2010.

¹⁵ Conversion to USD is 0.074 USD/kWh, 0.079 USD/kWh, 0.085 USD/kWh, 0.089 USD/kWh. Exchange rate calculated at www.xe.com on October 12, 2010. According to the ERI, the purpose of introducing a fixed-in tariff per kWh is to replace the existing bidding process, which focuses on low power tariffs as a winning criterion. 0.51 Yuan/kWh applies to the Xinjiang Uyghur Autonomous Region, the Inner Mongolia Autonomous Region. 0.54 Yuan/kWh applies to Hebei Province and Gansu Province. 0.58 Yuan/kWh applies to Jilin Province and Heilongjiang Province, Gansu Province, the Xinjiang Uyghur Autonomous Region and Ningxia Autonomous Region. 0.61 Yuan/kWh applies to other regions which are not mentioned above. (China Renewable Energy Scale-up Program (RESP) 2009).

¹⁶ Interview with International Director of Research Center, National Energy Administration DG of Dept. of Renewable Energy, Beijing, Oct 16, 2013.

A recent crucial problem has been that large scale wind projects are challenged by wind electricity curtailment. This problem is related to energy market mechanism, which is still bound by conventional coal-fire power contract, known as “take or pay” contract. This traditional contract obliges a government to dispatch coal-fire as priority than renewable energy, including wind power; violation can result in penalty to cover the loss to coal-fire developers. Due to observation of the take or pay contract, national grid company would ask wind farms produce less energy, and thus leads to curtailment, which means wind energy can be overproduced and without being consumed, because of the inflexible market mechanism which needs to be reformed.

Advanced technology

The Secretary General of the Global Wind Energy Council (presenting the industry) points out that China lacks of advanced technology especially in grid connection and wind electricity curtailment.

Grid

In principle, the government reviews the proportion/percentage of the renewable energy in the state grid Every year. This is a form of control and kind of coercion to impose power plants to include renewable energy in their power output. For example, if the wind power grid does not reach the required percentage in a project, the central government will not approve similar related projects from a power plant. This controls and enforces the use of wind energy in the state grid. This principle is in line with the RPS/MMS (must produce) system. However, these quota systems are still disputable in reality. So far, there are no specific regulations requiring state grid companies to conform to those systems. Therefore, state grid companies are not obliged to reach a certain quota of wind power output, nor is there empirical evidence on how a sanction is applied in cases of violations.¹⁷

In practice, the annual operation hour/rate of wind (around 2000 hours) can be much lower than other energy resources (i.e. hydro power). There are technical problems to keep the grid system from being stable. As a backup to support the system, the grid must have the same capacity as either a coal or a nuclear power grid. If the share of wind power is too large or unstable, the grid system can break down and cause severe problems. This is a major concern that makes state grid companies reluctant to purchase wind electricity.¹⁸

Advanced grid modification technology and very powerful backup energy mechanisms are necessary to ensure a maximum volume of power and stability. On the other hand, grid modification can enhance the implementation of RPS/MMS(‘must produce’) and PPA (‘must buy’) mechanisms, which need to be pushed by a strong national policy.¹⁹ Unless the central government intervenes, state grid companies will not be interested in buying unstable wind electricity. Before that happens, grid-connections must first be modified. Only with stable grid-connections can wind project developers and state grid companies implement produc-

¹⁷ Interviews with Datang SOE, in Beijing, June 4, 2009.

¹⁸ In reality, grid instability and the quality of output can be a cause of conflict of interests among SOEs, local governments and state grid companies. Interview with Datang SOE, in Beijing, June 4, 2009.

¹⁹ Interview with ERI, in Beijing, May 26, 2009.

ing (RPS/MMS) and buying (PPA) a fixed percentage of wind electricity output, as required by the REL. If the grid problem is not solved, the wind industry and market will probably come to a standstill.²⁰

Grid modification will be the key determining factor, and a future trend, if China wants to reach the goal of 150 GW installed capacity by 2020.²¹ The industry suggests that, in the future, a flexible system, which has quick response to power needs, has to be introduced in grid network to share excessive wind electricity among different provinces.²²

Abandonment of excessive electricity

The prevailing problem of grid connection also led to wind electricity curtailment, which became rather serious and was the core issue in the Wind Power Conference held in Beijing in October 16-18, 2013.

Wind resource is mainly concentrated in the northwest while electricity consumption is in the southeast, the distance of electricity transmission is too long, thus it is not feasible to supply wind electricity alone due to the concern on collecting and consumption. China's wind power resource is concentrated in the northern region (the Three North: Northeast, Northwest and North China) and the eastern coastal area. The North regions mainly dependent on the fire electricity, and the need of wind electricity is around 10%, if large scale wind electricity produced is larger than the need of local market, this leads to collecting and consumption problem. At this stage, the central government has started to build two large grid cables for electricity dispatching, which are due to be functional in the near future.²³

A recent crucial problem has been that large scale wind projects are challenged by wind electricity being produced and wasted in 2012. This problem is related to energy market mechanism, which is still bound by conventional coal-fire power contract, known as "take or pay" contract. This traditional contract obliges a state grid to dispatch coal-fire as priority than renewable energy, including wind power; violation can result in penalty to cover the loss to coal-fire developers. Due to observation of the take or pay contract, Chinese state grid company would ask wind farms produce less energy, and thus leads to curtailment, which means wind energy can be overproduced and without being consumed. The energy market also lacks of prediction/estimation mechanisms on how much electricity need to be collected or consumed, and thus results in a large amount of wind electricity being wasted.²⁴

5. Lessons learned from Germany and China Wind Energy Policies

This paper has listed the following differences and critical problems in comparing wind energy development between Germany and China (Table 5)

²⁰ Interview with a wind energy-related foreign corporation, in Beijing, June 3, 2009.

²¹ Interview with Datang and Baoding SOEs and a wind energy-related foreign corporation, all in Beijing, June 3, 4, 5, 2009.

²² Ibid.

²³ Interview with a Chinese state-owned enterprise in Beijing, Oct. 16, 2013.

²⁴ Interview with Global Wind Energy Corporation (GWEC) in Beijing, Oct. 18, 2013

Climate change as common concern

The EU aims to be free of carbon dioxide as an ultimate goal, which requires a large percentage of renewable energy to make this goal feasible. Germany is obliged by the EU in GHG emission reduction and, like most of the member states, Germany opts for wind power in order to achieve its own emission reduction targets. Climate change concern is evident as a driving force that both Germany and China are aiming for large expansion of wind power.

Being the largest carbon dioxide emitter in the world, China has external and internal pressure in addressing its emission problem. This is very much in line with the EU, despite that China does not have obligation from the Kyoto Protocol.

Climate change concern (external force) and energy security (internal force), lead to a major energy policy change from overreliance of fossil fuels to increased use and production of renewable energy. The exclusion of large hydro as renewable energy by the REL and rich wind resources in the Northern China lead to China's targeting wind as a major option for expanding renewable energy.

Both Germany and China share the same concept that a balance is needed between economic development and environmental protection. This is demonstrated by the energy transition (energiewende) concept of Germany and China's harmony between men and nature.

There are different international obligations in the Kyoto Protocol. The EU has to reduce its GHG emissions by 8% of 1990 levels during 2008-2012. Germany has high reduction target (20%) (Reiche and Bechberger 2004:845). By contrast, China does not have obligations in emission reduction, but only voluntary targets.

Institutional framework

The institutional framework of the two countries reveals that policy change is a common pattern in promoting wind power development.

The EU energy 20-20-20 communication appears to be a driving force to the increased production of renewable energy (CNREC 2012: 140). In respond to this policy, Germany has proposed a National Renewable Energy Action Plan (NREAP). A future goal at the federal level is to increase wind capacity to 45GW by 2020; 30% of electricity to be generated from renewable energy, and that 50% by 2050.

While in China, renewable energy was not elevated until the REL took effect in 2006. The REL is considered by the industry as a driving force to the increase use and production of wind power. Without the REL, Chinese enterprise would not have been motivated to develop large scale renewable energy development, in particular wind power. However, due to a lack of detailed operational measures, this law was reformed in 2009, and later several relative policies based on this law were introduced. China's wind energy policy change seems to be a trial and error, reactive approach.

In Germany, opposition to nuclear power seems to be a major concern, which leads to its energy restructure by developing renewable energy; such concept was already developed in 1970s. Germany has a long-term plan to gradually phase out nuclear power plants by 2030 and replace them with large-scale wind and other renewable energies. By contrast, China's approach is to take the pattern of energy mix, which means that renewable energy together with conventional energy (fossil fuels and nuclear) combined. Because wind electricity storage can sometimes be unstable, and China's national grid still needs support from conventional

energies. Apart from climate change concern, the severe problem of China's air pollution (PM 2.5) in recent years will possibly be an additional driving force for its energy structural change in the coming years. As emphasized by a senior officer in the NDRC, China's energy structure needs transformation from coal-fired electricity to wind electricity, meaning wind should replace coal-fired electricity rather than being simply complementary source of energy. In the long run, China must change its energy structure fundamentally from the dependence of burning coals to increase use of renewable energy, especially wind power is of great potential in the case of China.

National government intervention

Both Germany and China have strong national government intervention in wind power development. This is demonstrated by the Red-Green coalition in Germany and the ideology of Hu Jintao in China.

The German federal government will intervene in disputes if local residents protest against a nearby wind farm. In China, citizens are required to collaborate with the instructions from the central government when a wind turbine is set up in a certain area (Wong 2005: 136).

In order to oblige large industry absorb wind energy, the German federal government has been coordinating with large industry by initiating funding. Chinese central government is conducting the same approach, but in practice, funding application is time consuming and complex. This again demonstrates that national government intervention is crucial in boosting wind power development.

Policy objectives

Germany and China have common objective to expand renewable energy development, and these three countries focus on wind power as a major source of renewable energy production. But Germany and China emphasize more onshore than offshore wind.

The EU set a specific goal that wind energy will cover 7% of the entire EU electricity demand. Germany aims to achieve 35% electricity consumption from renewable energy (wind takes half of this percentage) by 2050. The ultimate goal for Germany is to be nuclear free by 2030. According to the "Burden-Sharing Agreement" in June 1998, Germany (together with Denmark and Luxembourg) are obliged to reduce GHG emissions in order to reach the overall target of emission reduction by 8% of 1990 levels during 2008-2012 (Reiche and Bechberger 2004: 845). An external force of the Kyoto Protocol, together with the internal force of the Lisbon Treaty, the TFEU and the "EU Directive for the promotion of renewable energy sources (RES) electricity production" push the member states, especially Germany, to speed up renewable energy development (Reiche and Bechberger 2004: 845).

China's revised REL after 2009 obliges industry to distribute 5% to 7% of electricity generated by renewable energy in the long run. Whether this objective is reachable remains to be seen.

Policy instrument

Germany and China rely on subsidies from the national government as a major support to promote wind power development. The practice of policy instruments of the three countries appears different from one another.

Germany has reformed FIT and deployed additional market premium to support large scale wind projects, in order to integrate wind electricity to the wholesale electricity market. Overall, Chinese wind industry relies mainly in the Renewable Energy Development Fund (REDF), half of this fund is used to support wind projects. China also has fixed feed-in-tariff in four regions, but these prices are seen as guidance yet in reality are not operational, because grid companies do not purchase wind electricity by the fixed price and there are no sanctions against violations. From 2013 onwards, China has obliged each electricity user must pay more to support national wind power development. The SOEs/ industry are included. This is different from Germany that industry is exempted from paying additional costs.

Market

German wind market appears to be restricted and regulated by the federal government. Wind electricity prices of Germany are decided by the federal governments through heavy coordination among centralized without participation of independent power producers (Wong 2005: 138).

China's wind market competition is dominated by state-owned enterprises, which have good relationship with the central government. It is not easy for foreign or private investors to participate in large-scale projects (i.e. national bidding projects), so the market appears to be restricted as well.

National electricity industry of both Germany and China countries act as both transmission and generators (Wong 2005: 139).

There is also a difference in price setting and quality. China does not have fixed price to be practiced in reality, and investors compete with low bidding price as possible. This problem often leads to a lack of quality production or unstable electricity supply. For example, a wind turbine made by a Chinese company can run less than ten years, while a turbine made by an European company can last over 10 years. The time span of a turbine operation is crucial for profits, this shows that China is in need of advanced technology transfer even though Chinese SOEs have ability to produce turbines on their own. By contrast German wind industry considers total cost and quality in market competition. The wind prices can be a bit higher than those in China, but the quality of turbines or a wind farm can guarantee profit return.

There is also a difference in terms of other stakeholders' participation in wind markets. In China, the will to develop renewable energy is mainly dominated by political leaders or the central government (NDRC), and that the voice of civil society plays a small role.

By contrast, there is local level participation in Germany. Apart from the German government, there seems to be a supportive civil society (bottom-up) to phase out nuclear and expand renewable energy development. For example, local residents can have shares of a nearby wind projects (Lal and Von Malmberg, 2006: 11). This is because of resistance from centralized power sectors against high cost wind power in the early period, the federal government then allowed private individuals or local/rural community to own small scale wind farms since 1989 (Wong 2005: 136).

Advanced technology

In terms of grid connection, on long term basis, it is also important to establish flexible electricity support systems among the Chinese provinces. The EU has constructed a cross boarder grid system, yet China is still falling short of a similar mechanism.

Onshore wind

In 1997 Germany (overtook the US) became the world leader in wind power production, most of the global wind turbine manufactures were from Germany.

In the following decades, China’s policy focus on expanding wind power and large amount of national subsidies boosted the market. Thanks to low production cost and labor, in 2013, China overtook Germany as the largest wind turbine producer in the world due to mass production and low cost labor. But a crucial problem for China is that there is a lack of advanced grid network in collecting and consuming wind electricity, which was overproduced and wasted. The root cause of this problem is mainly related technology (lack of flexible support system among provinces) and market (difficulty in collection and consumption, lack of estimated mechanism/correct statistics on how much electricity has been dispatched). In comparison, the EU is building an internal back up grid network, and Germany has advanced technology integrating wind electricity into a wholesale market.

Offshore wind

Germany needs to strengthen offshore electricity storage capacity, a possibility is to develop high quality batteries. Up to 2013, there was not sufficient flexible grid connection in both countries to catch up with the scale of onshore wind development. This requires more dedication and investment in R&D for state-of-the-art technology to be developed.

In terms of China, there are a couple of SOEs starting to explore offshore wind (i.e. Gold-wind). However, due to a lack of experience, China is still at the initial phase of capacity-building in offshore wind, and is in need of technology transfer and consultation of operating a project from European enterprises. Other than technology transfer, China needs more experience or policy reform in addressing military or marine disputes.

Table 5 Comparing Germany and China wind power policies and development

Analytical factors		Countries	Germany	China
		Institutional framework		R&D and market mechanisms
Policy objectives	Forces of change		Climate change Energy security	REL 2006 Climate change Energy security
	Different objectives		EU obligation EU obligation	Expanding wind power production Voluntary obligation
National government intervention			Federal government regulation	National government NDRC regulation
Market			State regulation	Competition based on central government regulations
Advanced technology	onshore		More than offshore projects	Technology transfer needed
	offshore		--Not enough grid connection	Initial phase of capacity building

6. Conclusion

This paper examines wind power development of Germany and China by looking at their own institutional framework, policy objective, national government intervention, market, advanced technology. A further investigation by comparing the policies of the three shows that there are similarities and differences in policy making and practice.

The two countries share similarities in the following aspects. Climate change appears to be a common driving force for both countries as well as the EU to consider the environmental factor in policy making process. It seems that large scale wind power development will not be prosperous without policy change nor national government intervention. This is especially evident in China. The national government involves in wind power development through allocating subsidies and different market instruments to encourage investment. The two countries have the same common objective of expanding wind power development and use market instruments (i.e. FIT, national subsidies) as a major support to encourage their wind markets.

These two countries have different energy institutional framework and emission reduction targets. Among the EU member states, Germany is one of the countries which are obliged to reduce the highest amount of GHG emissions during 2008-2012. Germany also has ambition to establish a nuclear free homeland as an ultimate goal, and this is in line with the goal of the EU.

China chooses a framework of energy mix, because it needs tremendous energy supply for its economic development. Even though China is not obliged by any international agreements, the serious air pollution problem such as haze is driving for fundamental energy structural change. China's NDRC officials believe that renewable energy should ultimately replace fossil fuels rather than complementary to conventional energy. The Chinese central government should push harder for such fundamental change; otherwise, the pollution problems will remain.

The operation of policy instruments is different. Investors in Germany are guaranteed for certain percentage of profit in selling wind electricity, as seen in the FIT premium. By contrast, China has intention to guaranteed profit, but in reality, grid companies sometimes purchase wind electricity at a much lower price and investors are often taking risks.

Advanced technology development capacity of Germany and China are different from each other. Germany started earlier than China in technology R&D, most of the world-leading turbine manufactures are from Germany and they possess the key patent technology. Even though China in 2013 became the world's largest turbine producer, thanks to low production cost and labor, China still needed cooperation with Germany for advanced technology transfer to strengthen the quality of production.

Afterthought

As China's production in wind generators and relevant facilities has increased in recent years, it is possible that these products are exported and sold in lower prices than those produced in Germany. In 2012, China exported wind related products to Third World countries such as Bolivia and some countries in Africa,²⁵ where in the past, used to import wind products from the EU. As the EU-China solar panel dispute came to an end in August 2013, one is likely to hypothesize if there would be a similar situation happening to wind related products. China's export policy seems to be less strict compared to that of the EU, together with the Chinese

²⁵ Interview with a Chinese state-owned enterprise in Beijing, Oct. 16, 2013.

central government using half of the REDF supporting wind power production, what will the EU member states think of this situation that more Chinese wind products are possibly substituting EU- made products in the global market? Could China’s increased exports lead to a global market distortion? If a trade dispute happens in the future, such problem would possibly be resolved either through trade negotiations between the EU and China or through the trade dispute settlement mechanism of the WTO. Nevertheless, both the EU and China would possibly try to find a win-win situation to remain bilateral cooperation, which is helpful to EU’s export business and China’s sustainable development.

It is not possible to combat climate change without either the EU or China. Both the EU and China are interrelated and interdependent to each other in the climate relations. For example, China and the EU are the largest seller and buyer in the global emission trade market. China needs advanced technology transfer from the EU, and to make china’s climate targets feasible (i.e. 11.4% non-fossil fuels by 2015; 40-45% reduction in the carbon intensity of GDP from 2005 levels by 2020).The EU needs greater market excess to China regarding wind energy development. It is better for the EU to see China as a partner than a threat in combating climate change. China’s leader Xi visited the EU on March 31st, this is a good gesture that China values the EU wants to learn from the EU experiences and reinterpret these into its own domestic circumstances for promoting sustainable development and a stable climate-energy relation.

Some western scholars believe that China, being the largest manufacture in wind energy, China should gradually reduce its protectionism and increase policy transparency in the global energy market. We see that China is still learning by doing in RE development, as says in Chinese crossing rivers by feeling stones. As for wind energy market, it is stable now because the market is of the best competitors survive from market competition since 2006. China’s wind power is moving towards a higher level to strengthen its capacity in technology and policy to deal with crucial problems in practice

Any EU-China trade dispute (including wind and solar) can set both sides back from the closer economic partnership that is ultimately in their respective interest. Such tension is not beneficial for both sides and can lose focus on the importance of joint cooperation for the global climate concern.

Annex. Overview of (renewable) energy policy framework proposed by the Commission

Year	Name of policies	General goals	Specific goals
2050	Energy Roadmap 2050 Communication	Common position of the EU external energy policy Long term plan	Change energy structure and focus on RE & energy efficiency; rethink the energy market; market incentive on investment; increase international-level cooperation; Dialogues with citizens.
2020	Energy 2020 Communication “20-20-20”	Middle term plan (lagging) Increase energy efficiency, establish internal energy market; Strengthen external position on energy; taking leading role in energy technology and innovation. Protect energy consumers	Increase the share of RE in the mix to 20%; improve energy saving by 20%; reduce carbon emission by 20%

Year	Name of policies	General goals	Specific goals
2009	Climate and Energy Package	To help achieve 20-20-20 goals	RE, carbon trade, carbon capture and storage; car emission, MS sharing carbon emission reduction
2008	Climate action-Energy for a Changing World	To help achieve 20-20-20 goals	
	Strategic Plan for low-carbon energy technology (grid, carbon capture)		
2006	Green paper on a European Strategy for Sustainable, competitive and Secure Energy	Internal energy market; Solidarity of energy market; Diverse energy supply structure; Single external EU energy policy	European Energy Supply Observatory; Mechanism for rapid solidarity Pan-European energy community
2001	Directive on RE electricity	All member states to implement by 2003 for the White Paper	
1999	Implementation strategy for the White Paper		
1997	White paper for a Community Strategy and Action Plan, Energy for the Future: Renewable Sources of Energy.		

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Trading Effect Emerging Stock Markets Risks-Return Volatility Dynamics and Enterprises Economic Exposure

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Abstract While investigating the role of trading effect in detecting the risks-return tradeoff, various volatility dynamics and macroeconomic exposure of firm returns, this research study employs monthly data from Pakistani stock market for the period from 1998 to 2012. For this purpose, three generalized autoregressive conditional heteroskedasticity models were functioned: GARCH-M for risks-return tradeoff, GARCH (1, 1) for capturing different volatility dynamics and EGARCH for asymmetric and leverage effect. This study rests on the following outcomes. Firstly, we unravel that trading effect is flag rising in the debate of risks-return tradeoff. Secondly, in the course of exploring whether the firm trading nature matters from the context of asymmetry and leverage effect, we find that it is certainly the case. Thirdly, trading effect holds considerable role in determining various volatility dynamics. Finally, we expose that macroeconomic variables affect stock returns differently depending upon firm trading nature, hence signifying the role of trading effect.

Keywords *Trading effect - Macroeconomic exposure - Volatility dynamic and Risks-return tradeoff.*

JEL Classification *F10 - F14 - G10 - G11 - G12*

1. Introduction

Chase for the stock returns has attracted considerable attention in the financial press; though, the economists have usually paid little interest to the issue of firm's returns from the context of its trading nature. This research study wishes to contribute closing this space. The subsequent parts of this section promote the inspiration for all the dimensions highlighted along with the literature survey in that.

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1.1 Inspiration for Trading Effect (Exporting Vs. Non-Exporting Firms)

Since due to the fact that most of the countries (like Pakistan) are facing balance of payment deficit, and therefore attempts to increase the exports (Aaby and Slater, 1989; Joynt, 1982; Kaynak, 1982; Miesenbock, 1988; O'Rourke, 1985), the research regarding exporting and non-exporting firms is of enormous importance. Exporting firms develop specific strategies in order to meet and face the competitive environment at both the domestic and international markets (McDougall, 1989).

The financial literature concurs that the exporting firms have better payment mechanism for workers and managers, are more R&D oriented, have more experienced management, have faster growth rate, have larger customer base, have large and diversified suppliers, have strong financial bases, have more research resources, are more productive, more innovative and are better in developing strategies particularly regarding the services, quality and marketing (e.g. see Bernard and Jensen, 1995; Farinas and Marcos, 2006; Hagemeyer and Kolasa, 2011; McDougall, 1989; McDougall *et al.*, 2003; Schank *et al.*, 2007; Schank *et al.*, 2010; Westhead, 1995); in contrast to their non-exporting counterparts. More so, Augier and DAVIS (2013) determined that the exporting firms absorb new technology and knowledge from the foreign market (foreign contacts) and thus through large market share exploit them to scale. Hence, in general; the exporting firms might be considered safer, credible and liquid than the non-exporting firms.

Whereas, of a counter argument; is that the exporting firms are exposed to both the domestic as well as international macroeconomic uncertainties unlike the non-exporting firms. Moreover, the exporting firms might be more responsive to international event thus more volatile than the non-exporting ones. Further, the exporting firms are also exposed to severe competition in the international market, therefore any lack in quality or change in cost of the product might affect their profitability more than non-exporting firms. More so, exporting firms are larger in size in contrast to non-exporting firms as documented by Castellani *et al.* (2010), Farinas and Marcos (2006) and Yaprak (2007)¹, but this might trap them in a very famous agency problem faced by the large size firms (e.g. Elyasiani *et al.*, 2007; Loderer and Waelchli, 2010; Pi and Timme, 1993) consequently can damage their performance in contrast to the non-exporting firms. In addition, owing to severe competition in international market, exporting firms need more elaborative design, packaging, handling and supervision, and hence require more educated and skilled manpower. To attract such manpower, they are forced to pay higher compensation than the non-exporting firms (Were and Mugerwa, 2009). Taken together, ***Khan et al. (2014) proposed that future studies must throw due importance to the firm trading effect while detecting the behaviour of their stock returns.***

Therefore, emanating from above, exporting firms can behave differently than the non-exporting firms. Thus, there is every reason to infer that there is trading effect (exporting vs. non-exporting firms) in terms of: effect of: economic factors on stock returns; pricing of risk; asymmetry & leverage effect; volatility; persistence of volatility together with mean reversion and speed of mean reversion of volatility of the stock returns of exporting vs. non-exporting firms. Further, this is a first such comprehensive attempt particularly in emerging markets with all these dimensions, exploring the differences in behaviour of stock returns of the exporting vs. non-exporting firms. More so, as Pakistan has not been explored in this context, hence it seems important for two reasons. Firstly, Pakistan is largely a developing country, thus it

¹ For further details in this regard, see International Study Group on Export and Productivity (ISGEP) 2008 for international comparison.

is very crucial to understand its exporting firm's behaviour. Secondly, Pakistan's growth in manufacturing and specifically in exporting has been largely slower than that of many other developing nations (notably, India and China) (IMF Country Report, 2010; 2012), therefore it looks quite interesting to understand that what kind of differences the stock returns of exporting firms set in contrast to their non-exporting counterparts.

1.2 Inspiration for Risk-Return Trade-off

As investors are chiefly concerned about the firm level stock; thus, it is very crucial for them to be aware of the pricing of risk with respect to firm trading nature. However, neglecting the micro level analysis (i.e. firm level); majority of the presented financial press primarily paid attention either at aggregate market level and/or sectoral level stock returns to determine the pricing of risk.² Traditionally, since the landmark involvement of Markowitz (1952) centers around the idea that investors always demand higher returns on market portfolio than the investment in risk free securities, the association between risk and returns had been put under strong pressure by the financial press. This falls as no shock specified the importance of risk while pricing the financial assets, financial derivatives and in the strategies of portfolio diversification (Mandimika and Chinzara, 2012). Further, subject to risk averseness through a theoretical breakthrough; Merton (1973) denoted that at aggregate market level, the required excess return is represented by a positive function of their conditional variance. Representing the aggregate wealth by W_t , indirect utility function by $J(\cdot)$, between time t and $t+1$, the expected return on aggregate wealth by $e_{w_{t+1}}$ and conditional variance on aggregate wealth by $\sigma_{w_{t+1}}^2$, Merton (1973) displayed that assuming the fixed investment opportunity set, the risk-return association can be explained by the following functional equation:

$$(e_{w_{t+1}}) = \left[\frac{-J_{ww} W_t}{J_w} \right] (\sigma_{w_{t+1}}^2) = \lambda (\sigma_{w_{t+1}}^2)$$

Where λ indicates risk averseness of investors measured by $[-J_{ww} W_t / J_w]$.

Equation (1) above holds that the future expected return by the investor is directly proportionate to the product of risk averseness and expected variations with returns. It is so because investors are usually risk averse, hence they will invest only if the expected returns from the project are attractive enough to pay off for the expected risk of that project.

The risk premium might be positive or negative. Although negative risk premium contradicts the fundamental portfolio theory (i.e. Markowitz, 1952), but still it has been determined in the empirical financial press (e.g. see Balios, 2008; Elyasiani and Mansur, 1998; Fraser and Power, 1997; Glosten *et al.*, 1993; LeBaron, 1989; Lettau and Ludvigson, 2010; Mandimika and Chinzara, 2012; Whitelaw, 1994). For such negative risk premium, at least four reasons have been stated in the financial literature. Firstly, Balios (2008) and LeBaron (1989) featured such outcomes to non synchronization of trading when the stock market is accredited by thin trading and illiquidity, motivating the investors to give up positive risk premium in chasing

² Most of the existing studies (e.g. see Campbell, 1985; French *et al.*, 1987; Fraser and Power, 1997; Glosten *et al.*, 1993; Harvey, 1991; Hansson and Hordahl, 1998; Jiranyakul, 2011; Koutmos *et al.*, 1993; Kavacic, 2008; Li *et al.*, 2005; Leon, 2008; Lettau and Ludvigson, 2010; Whitelaw, 1994; Yu and Hassan, 2008) focused on aggregate market level returns while Mandimika and Chinzara (2012) targeted both the sectoral and aggregate market level data to determine the risk-return trade-off.

the successful transactions. Secondly, Koutmos *et al.* (1993) documented that the negative risk premium might be due to the fact that local investors are not open to the foreign exchange risk, therefore they will not insist an exchange rate risk premium (i.e. returns are considered in Pak Rupees). Adding together, they stated that if returns are transformed to a foreign currency (e.g. US Dollar); there is high probability that positive risk premium can become evident. The third and fourth reasons rest on the argument of Elyasiani and Mansur (1998) and Glosten *et al.* (1993) who documented that the negative risk premium might be either due to the fact that riskier period coincides with the period when investors are relatively better in bearing risk or if the investors are interested in saving more during a riskier period while holding all risky assets, contest may increase the asset prices; hence, decreases the risk premium. However, on the contrary; the study of Campbell and Hentschel (1991) and French *et al.* (1987) in United States, Hansson and Hordahl, (1998) in Sweden, Karmakar (2007) in India, Yu and Hassan (2008) in Middle East and North African region and Jiranyakul (2011) in Thailand documented positive risk-return trade-off declaring positive risk premium.

More so, the latest study of Mandimika and Chinzara (2012) concluded that risk is not a priced factor at sectoral and aggregate market level stock returns in an emerging market. Whereas, the studies of Ewing *et al.* (2005) stated that even the sectoral level analysis limit our capability to generalize the results as the firms with considerably different features coexist even in a very narrowly defined sectors. Thus, relying on the argument that firms are heterogeneous in nature (Ewing *et al.*, 2005; Narayan and Sharma, 2011); it is quite possible that risk might be a priced factor at the firm level stock returns and can be subject to variations with respect to firm trading nature. Therefore, eyeing this potential research gap, this study for the first time in financial press; further explores that how does the risk-return trade-off vary with respect to firm trading nature in an emerging market of Pakistan.

1.3 Inspiration for Asymmetry and Leverage Effect

Presented financial press concluded that stock returns volatility increases after the stock price fall (e.g. see Black, 1976; Christies, 1982; Cheung and Ng, 1992; Engle and Patton, 2001; Ewing *et al.*, 2005; Mandimika and Chinzara, 2012). At least there are four theoretical financial/economic explanations for such effect namely: (i) leverage effect theory; (ii) asymmetric volatility of economic variables theory; (iii) time varying risk premium theory, and (iv) combination of both leverage effect and volatility feedback effect theory (Duffee, 1995; Mandimika and Chinzara, 2012). Firstly, the leverage effect theory declares that in the case of fall in share price (negative news), the financial leverage raises which consequently increases the stock returns volatility (Black, 1976; Christies, 1982). This 'leverage effect' has become synonymous with asymmetric volatility and however it is plausible that asymmetric volatility might basically reflects the time varying risk premium and/or asymmetric volatility of macroeconomic variables (Duffee, 1995; Mandimika and Chinzara, 2012). Therefore, secondly, the time varying risk premia theory centers on the positive relation between volatility and expected returns. It follows that in the course of probable rise in volatility; the expected required rate of returns also rises which consequently (according to asset valuation model) decreases the stock prices (Duffee, 1995; French *et al.*, 1987; Mandimika and Chinzara, 2012; Pindyck, 1984). It happens because volatility is an indicator of risk, and if the investors are supposed to be risk averse, a rise in volatility (risk) will bring the demand for that stock down consequently resulting in price fall. Hence, if volatility is priced then rise in volatility raises the required rate of return on stock which immediately leads to share price decline, frequently termed as volatility feedback effect (Karmakar, 2007).

Thirdly, asymmetric volatility of economic variables theory can also roots the existence of asymmetric volatility. As the empirical research (e.g. see French and Sichel, 1991; Schw-

ert, 1989) has documented that macroeconomic variables are more volatile during recession. Hence, if so, then it is quite reasonable to conjecture that a lower forecast of economic variable growth rate (e.g. GDP) results in an instant fall in stock prices, followed by higher stock return volatility in the period of low economic factors growth (Duffee, 1995). Fourthly, it is quite possible that asymmetric volatility might be the upshot of both leverage (financial) and volatility feedback effect simultaneously (Mandimika and Chinzara, 2012). If, for instance, there is running an expectation of rise in volatility in the stock market, resultantly, the market players will place more order to short (sell) than to long (buy) the stocks. Accordingly, the price will fall down to balance the supply and demand forces. Hence, an expected rise in volatility results in an instant price fall in accordance with hypothesis of volatility feedback. This fall in price will increase the leverage ratio, which in the light of hypothesis of leverage effect, will further bring the prices down (Karmakar, 2007; Mandimika and Chinzara, 2012).

Further, Mangani (2008) in South African stock exchange determined the lack of pricing of risk accompanied by limited evidence of asymmetry & leverage effect. However, this lack of asymmetry & leverage effect is challenging the previous results of Engle and Patton (2001), Ewing *et al.* (2005); Koutmos (1996); Karmakar (2007; Leon *et al.* (2005)), who have documented the presence of strong asymmetry & leverage effect on stock returns. In fact, the latest work by Chinzara and Aziakpono (2009), Chinzara (2011) and Mandimika and Chinzara (2012) documented that the volatility in South African stock market (JSE) is inherently asymmetric at sectoral and aggregate market level stock returns. The possible explanation for such difference in outcomes regarding asymmetric volatility might be the reality that the three latest studies used more fresh data (i.e. 1995-2009) than the study of Mangani (2008), who used the data set from 1973-2002. Therefore, it is quite reasonable to conjecture that in an emerging market like Pakistan, it is quite possible that the use of latest data (i.e. 1998-2012) together with conducting micro level analysis (firm level) might bring some new and interesting evidences regarding asymmetry & leverage effect.

More so, arguing that even the sectoral level analysis limit out capability to generalize the results since the firms with significantly different features coexist even in a very closely defined sector; Ewing *et al.* (2005) along with Karmakar (2007) directed the future scholars to conduct the firm level analysis for determining the asymmetry and leverage effect. Since, it is worthy for the investors to understand the asymmetric volatility in order to diversify their investment between the risky and stable assets and to select the best portfolio.

Thus, as discussed earlier; it is quite reasonable to argue that for the stock market players and policymakers, it is of immense importance to have detailed know how of asymmetric volatility particularly with respect to firm trading nature. As the existing studies (e.g. such studies focusing at aggregate data (aggregate market and/or sectoral level) includes: Engle and Patton (2001), Ewing *et al.* (2005), French *et al.* (1987), Koutmos (1996), Leon *et al.* (2005), Mandimika and Chinzara (2012), Oskoe and Shamsavari (2011), Phalavani and Ezzati (2010) and Saleem (2007), and principally in emerging markets targeted the aggregate data for determining the asymmetric and leverage effect. Although, due to firm heterogeneity; aggregate market and even sectoral level analysis provides deceptive results (e.g. see Ewing *et al.*, 2005). Hence, mainly from the point of view of emerging markets like Pakistan; it is quite worthy to conduct firm level analysis with respect to their trading nature; powering the investors, portfolio managers and policymakers for effective decision making.³ Moreover, existing studies

³ Specifically, with respect to Pakistani market; despite of the fact that it stands as the top performer in the region, the scholars examining the asymmetric volatility are very limited up till recent. For instance, the existing literature only targeted the aggregate market level returns for the asymmetric effect, nesting with great potential of misleading. For

have ignored this potential research area particularly in the emerging markets, which could be another strong motivational source for such research study.

1.4 Inspiration for Various Volatility Dynamics (i.e. Volatility, Persistence and Mean Reversion)

Stock market volatility can supply financial and economic instability (Chinzara and Aziakpono, 2009), therefore it is very crucial to examine its trends over the time. Extreme stock market volatility may derail the smooth operations of other financial markets in the country, and consequently can have negative impact on investments, savings, performance of real economy and economic growth by two possible means (Mandimika and Chinzara, 2012). Firstly, stock market volatility leads to economic uncertainty which marks the capital flight. This complicates the role of policymakers who are responsible for establishing an environment that cultivates the real growth of an economy by taking control of policy factors (e.g. interest rate) which are considerably affected by capital flows (Rigobon and Sack, 2003). Secondly, knowing that the volatility is a measure of risk, therefore rise in equity market volatility is an indication of increase in equity risk, hence can consequently root the flow of funds to relatively less risky assets. This action can increase the cost of funds (Edward and Garcia, 2008). At large, these factors could adversely influence the performance of an economy. Thus, over time, it is vital enough for the policymakers to know and understand the pattern of various volatility dynamics (Mandimika and Chinzara, 2012). Furthermore, forecasting volatility is a critical factor in risk management, portfolio strategies, hedging and market timings for the stock market (Engle and Patton, 2001; Ewing *et al.*, 2005).

Further, how persistence the volatility shocks are in a stock market, is a central question in detecting the association between the volatility and return, since the persistence volatility changes permit to the adjustments in risk premia (Elyasiani and Mansur, 1998). Next, in a related argument, Dueker (1997) stated that how long the stock market stays volatile, is a natural question as the volatility predictions are core to the option pricing and optimal hedging policies. More so, Karmakar (2007) stated that volatility persistence significantly influences the hedging strategies. In the view of financial press, the clustering of large change and small change in the pricing was one of the primary concerns in the volatility process (Engle and Patton, 2001). Moreover, Mandelbrot (1963) and Fama (1965) reported that large change in asset price is followed by another large change whereas small change in followed by another small change. Such behaviour of volatility is also documented by several other studies (e.g. see Baillie *et al.*, 1996; Chou, 1988; Engle and Patton, 2001; Ewing *et al.*, 2005; Schwert, 1989;). Such volatility clustering implies that volatility shocks today will influence the future expected volatility for many future horizons. However, the study of Engle *et al.* (1990) and Elyasiani and Mansur (1998) stated two possible reasons for volatility clustering: (i) new arrival process, (ii) market dynamics against the news. The first one implies that even if the stock market incorporates the information instantly and completely, returns may display clustering, if the information reaches in clusters. Secondly, assuming that the stock market participants hold heterogeneous priorities and take time to solve their anticipational differences and to absorb the information shocks, volatility clustering can be geared by market dynamics.

Next, the feature of mean reversion of stock returns volatility entails that by and large, volatility shocks hold the property of mean reversion in the stock market (Carroll and Connor,

example, see the studies of Arshad *et al.* (2012), Mahmud and Mirza (2011) and Saleem (2007) in this regard who focused at aggregate market level returns to examine the asymmetric volatility.

2011; Engle and Patton, 2001). They further added that theoretical foundations for the mean reversion pattern of stock returns volatility roots from volatility clustering, implying that volatility comes and goes. Hence, the period of low volatility will finally give way to the period of high volatility and likewise the high volatile period will be traced by a normal one (Carroll and Connor, 2011; Engle and Patton, 2001). Therefore, the mean reversion of volatility simply reports the presence of mean level of volatility for every financial asset which is eventually returned by the volatility. Even for a very long forest of volatility, it will ultimately return to this normal level of volatility, no matter when it is achieved (Engle and Patton, 2001). Such property of a financial asset is termed as mean reversion of volatility. However, most of the practitioners might disagree on the mean level of volatility and whether it is stable over all the time and corporate changes; yet they do agree on one common believe that there is a mean level of volatility to which the volatility steadily returns (Engle and Patton, 2001). Further, in majority of the existing financial press, the studies examining the stock returns volatility together with its persistence and mean reversion mainly targeted the aggregate market and/or sectoral level returns.⁴ However, due to firm heterogeneity; aggregate market and even sectoral level analysis provide deceptive results (e.g. see Chinzara, 2011; Ewing *et al.*, 2005). More so, Elyasiani *et al.* (2011) recommended that mean reversion pattern of stock return volatility should be examined by the future studies with due importance.

Thus, taming form the afore-mentioned arguments, it is quite sensible to argue that the volatility dynamics are of immense importance for the stock market players. But unfortunately studies in this respect are limited up till recent (particularly at firm level returns in emerging markets like Pakistan)⁵. Hence, eying this potential research gap, as per author knowledge, it is first such attempt particularly in emerging markets, exploring the role of trading effect in determining these volatility dynamics.

1.5 Inspiration for Economic Exposure of Stock Returns

Signifying the role of economic indicators in detecting the business overall systematic risk and cash flow, the connectivity between the macroeconomic factors and capital market is instinctively fascinating (Arnold and Vrugt, 2006; Chinzara, 2011). Together, the Arbitrage Pricing Theory (APT) and Dividend Discount Model (DDM), set theoretical foundations that employ the conduit to root the factoring of economic variables into the stock returns. These models entail that any expected or unexpected influx of new information regarding macroeconomic variables (e.g. inflation, exchange rate, interest rate, GDP etc), will impact the stock returns through discount factor, dividends or both.

Stemming from the empirical work of Chen *et al.* (1986), a large quantity of literature determined the substantial impact of economic factors on stock returns. Such as, the studies

⁴ For example, Carroll and Connor (2011), Engle and Patton (2001), Ewing *et al.* (2005), Elyasiani *et al.* (2011) and West and Worthington (2006), are among others for developed markets. However, the research work of Chinzara and Aziakpono (2009), Chinzara (2011) and Mandimika and Chinzara, (2012) for the South African stock market and Goudarzi and Ramanarayanan (2010) for Indian stock market targeted the aggregate market and/or sectoral level returns.

⁵ Despite of considerable achievements of Pakistani stock market, the studies regarding volatility dynamics particularly at micro level (i.e. firm level) are very limited. Such as existing literature (see Arshad *et al.* 2012; Ali and Afzal, 2012; Hameed and Ashraf, 2006; Mushtaq *et al.*, 2011; Mahmud and Mirza, 2011; Qayyum and Anwar, 2011; Rafique and Rehman, 2011; Rashid *et al.*, 2011; Saleem, 2007; and Zafar *et al.*, 2008) examined the stock returns volatility only at the aggregate market level in Pakistan. Though, aggregate and/or sectoral level analysis has been strongly criticized by the financial press.

focusing at aggregate market level data include: Abdalla and Murinde (1997), Ahmed (2008), Husain and Mehmood (1999), Ibrahim (1999), Ibrahim and Aziz (2003), Le and Youngho (2011), Mukherjee and Naka (1995), Maysami and Koh (2000), Ratanpakorn and Sharma (2007) and Rahman *et al.* (2009). However, the literature examining the sectoral level data include: Chinzara (2011) in South Africa, El-Sharif *et al.* (2005) in UK, Elyasiani *et al.* (2011), Hammoudeh and Li (2005), Kilian and Park (2009) and Nandha and Brooks (2009) in US, McSweeney and Worthington (2008) and West and Worthington (2006) in Australia, Arouri (2011), Degiannakis *et al.* (2013) and Scholtens and Yurtsever (2012) in Europe and Arouri and Nguyen (2010) in US and Europe etc. Similarly, from the context of Pakistan, studies have largely focused at the aggregate data (i.e. aggregate market or sectoral level returns) (e.g. see Akbar and Kundi, 2009; Butt *et al.*, 2010; Khan *et al.*, 2013 and Khan *et al.*, 2014 and Nishat and Shaheen, 2004 are among others).

Thus, firstly resting on the argument that the firms are heterogeneous in nature (Narayan and Sharma, 2011); this study conducts a firm level analysis. Secondly, believing that firms' behaviour is different with respect to their trading nature; it is quite possible that their stock returns also react differently to the macroeconomic variables. More so, Khan *et al.* (2014) recommended that future studies should address the firm trading effect while investigating the impact of economic factors on stock returns. Hence, as per author knowledge, this is first such type of study particularly in emerging markets like Pakistan.

Remaining of the paper is designed as follows. Section 2 entails the data used besides some of the descriptive statistics of the data. Section 3 presents methodology functioned. Section 4 details the discussion regarding the results. Section 5 highlights the related literature together with justifications; however, section 6 sums up the paper and persuasive policy implications together with future research avenues.

2. Data and Description

Data used in this study consist of monthly returns series for 160 firms for the period from June 1998 till June 2012, was obtained from Karachi Stock Exchange website and Business Recorder. However, the selection of monthly data is based on two praiseworthy reasons. At first, it enables to confine the long term movements and to prevent the impact of delays in clearing and settlements which considerably influences the stocks over shorter interval (daily or weekly) and also prevents the issue of spurious correlation (Beirne *et al.*, 2009; DeGennaro and Baillie, 1990; Elyasiani and Mansur, 1998; Faff and Chan, 1998; Ibrahim, 1999; Patra and Poshekwalé, 2006). Secondly, thin trading and non-trading days (i.e. holidays and weekends) together with bid-ask spread generates serious concerns regarding using daily data (Mohamed, 2011; Mandamika and Chinzara, 2012). More so, use of monthly data is consistent with the financial press (e.g. see Bloom, 2009; Chinzara, 2011; Doukas *et al.*, 2003; Khan *et al.*, 2013; Lanne and Luoto, 2008; Manolis *et al.*, 2002; West and Worthington, 2006).

Then as a practice in financial literature; the return series will be expressed in logarithmic difference between the two successive prices acquiring the continuous compounding returns (i.e. $\ln(P_t/P_{t-1})$, where \ln is the natural log, P_t is current closing price and P_{t-1} is previous closing price). While, based on financial literature (e.g. see Hagemeyer and Kolasa, 2011; Westhead, 1995;) exporting firms are identified on the grounds of their export sales. Data for the export sales are gathered from the annual reports of the firms together with the Reports (i.e. Balance Sheet Analysis) issued by the State Bank of Pakistan. The firms having export sales are termed as exporting; whereas, the firms with no export sales are termed as non-exporting firms (Hagemeyer and Kolasa, 2011). There are 96 exporting firms against 64 non-exporting firms in the sample.

Normally, data series displays features that are consistent with financial time series (e.g. see Elyaisani *et al.* 2011; Mandimika and Chinzara, 2012). For instance, the statistical significance of Jarque-Bera statistics coupled with the values of skewness and kurtosis unties that the distribution of data series is departing from normality. The high value of kurtosis clearly implies that data series support the character of fat tails.

The verity that most of the data series reflect serial correlation together with denial of normality, motivates and suggests that the application of GARCH type models can significantly improve the explanation of the return series (e.g. see Elyaisani and Mansur, 1998; Elyaisani *et al.* 2011; Mandimika and Chinzara, 2012). Moreover, as the Ljung Box Q Statistics stands significant for both majority of the (LBQ (12)) returns and (LBQ² (12)) square returns series. The former wires the existence of serial correlation for majority of the returns and square returns series, a contradiction to the stock market informational efficiency. However, the latter case roots the existence of heteroscedasticity and volatility clustering (time varying nature), hence mitigating the use of GARCH type models (as they confine the time varying behaviour of conditional volatility) (Kovacic, 2008; Mandimika and Chinzara, 2012). More so, functioning of both the Augmented Dicky Fuller (ADF) and Phillips-Perron (PP) unit root tests shows that the data series are stationary.⁶

3. Methodology

3.1 GARCH (1, 1)

Following the hallmark contribution of Engle (1982); later on, Bollerslev (1986) introduced a more generalized form of ARCH model, termed as GARCH model. In this Generalized ARCH model, he sets the current conditional variance as a function of previous square error term and past conditional variance. It is indeed incredible that this one GARCH (1, 1) model can be sufficiently applied in any financial time series in order to comprehend the volatility dynamics (e.g. see Engle, 2004; Elyaisani *et al.* 2011; Chinzara, 2011). Following the strong financial literature (e.g. see Chinzara, 2011; Engle, 2004; Elyaisani *et al.*, 2011; Goudarzi and Ramanarayanan, 2010); this research study also applied GARCH (1, 1) to estimate various volatility dynamics. Hence, GARCH (1, 1) stands as most appropriate order for this purpose. The analytical and systematic specification of the estimated multifactor model for each firm can be expressed as follows:

$$R_{it} = \beta_0 + \beta_1 KSE_t + \beta_2 EXR_t + \beta_3 RFR_t + \beta_4 CPI_t + \beta_5 IPI_t + \beta_6 M2_t + \beta_7 OIL_t + e_{it} \quad (1)$$

Equation (1) above represents R as a stock returns of a specific firm (*i*) at time *t*, while KSE denotes market returns, EXR stands for exchange rate, RFR shows risk free rate, CPI depicts consumer price index (inflation), IPI denotes industrial production index, M2 denotes broad money supply while OIL represents oil prices. Thus, it declares that the fore mentioned seven independent variables are used in the GARCH (1, 1) multifactor framework at each of firm level returns.

⁶ The results for descriptive statistics, unit roots tests and Ljung Box Q Statistics (for each firm) are not reported here because of succinctness.

Following is the general univariate equation regarding GARCH model (Chinzara, 2011):

$$r_t = \mu_i + \sum_{i=1}^k \alpha_i r_{t-i} + \varepsilon_t, \quad \varepsilon_t / I_{t-1} \sim N(0, h_t) \quad (2)$$

$$h_t = \omega + \sum_{i=1}^p \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^q \beta_j h_{t-j}, \quad \omega > 0, \quad |\alpha_i + \beta_j| < 1 \quad (3)$$

Equation (2) is a mean equation whose current innovation is a function of previous innovation. I_{t-1} hold zero mean, h_t indicating a variance which is serially uncorrelated. Further, lagged and current returns are denoted by r_{t-1} and r_t respectively. While, equation (3) is the variance equation of GARCH (p, q), where the conditional variance is displayed by h_t ; constant is indicated by ω ; the coefficient of lagged square residuals developed from mean equation (ε_{t-1}^2) are represented by α_i but β_j holds the representation of coefficient of lagged conditional variances. For the stationarity to hold, it is necessary that the sum of ARCH (α_i) and GARCH (β_j) terms must be less than one (Chinzara, 2011; Elyaisani *et al.*, 2011). If their sum is equal to one, the condition is said to be integrated in variance. Where, the current volatility shocks are to be considered in forecasting the future volatility for all future periods (Engle and Bollerslev, 1986; Karmakar, 2007). However, in the case where the sum exceeds one, then such situation declares that volatility shocks are non-mean reverting and are exploding to infinity (Brook, 2002; Elyaisani *et al.*, 2011; Mandimika and Chinzara, 2012). In fact, there is a tendency in the real financial data (i.e. stock returns) to hold the property of non-mean reversion (Mandimika and Chinzara, 2012).

The autoregressive route leading towards the persistence of volatility shocks is the sum of ARCH and GARCH terms (e.g. see Ewing *et al.*, 2005; Elyaisani *et al.*, 2011; Mandimika and Chinzara, 2012, who applied it to study the persistence of shocks). The more closer the sum is to one, the longer the persistence of volatility shock is. More so, another stand for measuring the persistence of volatility shock is the Half Life of volatility introduced by Engle and Bollerslev (1986), which was later on applied by the financial press (e.g. see Carroll and Connor, 2011; Elyaisani *et al.*, 2011). Following is the formula for computing the half life:

$$HL = \log(0.5) / \log(\text{ARCH} + \text{GARCH})$$

According to Engle and Bollerslev (1986), half life of volatility represents the time taken by the volatility shock to cover half distance back towards its mean volatility after following the deviation from it.

Next, the feature of mean reversion of stock returns volatility entails that by and large, volatility shocks hold the property of mean reversion in the stock market (Carroll and Connor, 2011; Engle and Patton, 2001). Statistically, following the literature (e.g. see Elyasiani *et al.*, 2011), mean reversion of stock returns volatility is examined by mean of ARCH and GARCH terms in GARCH (1, 1) model. For the mean reversion pattern to hold, the sum of ARCH and GARCH terms must be less than one (Carroll and Connor, 2011; Elyasiani *et al.*, 2011). Further, the half life so computed for each stock leads us to determine the speed of mean reversion model of stock returns volatility.

3.2 GARCH-M Model:

The GARCH in mean model developed by Engle *et al.* (1987) has been a great hallmark in the field of financial literature. Technically, it is applied to determine the pricing of risk by way of testing the relationship between standard deviation or conditional variance and stock returns. In accordance with the strong stream of financial press (e.g. see French *et al.*, 1987; Hansson and Hordahl, 1998; Jiranyakul, 2011; Lanne and Saikkonen, 2004; Lanne and Luoto, 2008 and Mandimika and Chinzara, 2012, who applied GARCH-M model to determine the risk-return relationship), this study also applied GARCH-M model to detect the pricing of risk in an emerging market. Following general equation represents this model:

$$r_t = \mu_i + \sum_{i=1}^k a_i r_{t-i} + \delta_i h_{t-i} + \varepsilon_t, \quad \varepsilon_t / I_{t-1} \sim N(0, h_t^2) \tag{4}$$

$$h_t = \omega + \sum_{i=1}^p \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^q \beta_j h_{t-j}, \quad \omega > 0, \quad |\alpha_i + \beta_j| < 1 \tag{5}$$

Where equation (4) is an appropriate mean equation, where indicate the stock returns, ε_t is the error term, I_{t-1} indicate the previous day information, h_t stands for the variance and h_{t-1} denotes the conditional standard error of ε_t at time $t-i$. However, equation (5) depicts the variance equation for a general GARCH (p, q) model. In this case, h_t marks the conditional variance for the residuals ε_t , α_i displays lagged square residuals, β_i denotes lagged conditional variance whereas w is constant. Particularly, with respect to this study, the coefficient of great importance is h_{t-i} . This coefficient (δ_i) holds the relation between conditional risk (h_t) and stock returns (r_t). In accordance with the conventional portfolio theory, the investors are compensated with higher returns for their higher risk craving; if the δ_i is positive and significant. More chiefly, it would entail that the risk has been priced for the period under concern.

3.3 EGARCH Model:

Nelson (1991) made a significant contribution by introducing Exponential GARCH model (EGARCH); having the capability to pick the asymmetric volatility of stock returns. It separately shows that how does the stock returns volatility is affected by the good news (price rise) and bad news (price fall) of same magnitude (Ewing *et al.*, 2005; Mandimika and Chinzara, 2012). Consistent with the financial literature (e.g. see Braun *et al.*, 1995; Cheung and Ng, 1992; Ewing *et al.*, 2005 and Mandimika and Chinzara, 2012 are among others), this study also applied EGARCH model to inspect the asymmetric response of stock returns volatility which is generally known as asymmetric & leverage effect. Following is the general equation representing EGARCH model (Mandimika and Chinzara, 2012):

$$\log(h_t) = \omega + \sum_{j=1}^p \beta_j \log h_{t-j} + \sum_{k=1}^m \gamma_k \frac{\varepsilon_{t-k}}{\sqrt{h_{t-k}}} + \sum_{i=1}^q \alpha_i \left[\frac{\varepsilon_{t-i}}{\sqrt{h_{t-i}}} - E \left(\frac{\varepsilon_{t-i}}{\sqrt{h_{t-i}}} \right) \right]; \tag{6}$$

$\omega > 0, |\alpha_i + \beta_j| < 1; \gamma_k < 0, \text{ if volatility is asymmetric.}$

Where, in equation (6), α_i and β_j have the same denotation as in the case of GARCH (1, 1) model. However, specifically related to this current study, the coefficient of importance is γ_k . If the coefficient $\gamma_k \neq 0$ in the above equation, the volatility is said to be asymmetric but when

$\gamma_k < 0$, then the negative news (price fall) has greater role in increasing stock returns volatility than positive news (price rise) of same magnitude. However, if $\gamma_k > 0$, in such situation the later one has stronger impact in increasing stock returns volatility than the former one of same magnitude (Brook, 2002).

4. Empirical Findings

4.1 Results Regarding Risks-Return Tradeoff

Table 4.1 presents the results regarding the risks-return tradeoff of the exporting vs. non exporting firms. Results untie two new evidences. Firstly, here it is disclosed that for bulk of the exporting firms, the statistically significant risk-return association is positive (i.e. for 43.75 percent of the firms); however, for bulk of the non-exporting firms, the statistically significant risk-return linkage is negative (i.e. 17.19 percent of the firms). Secondly, from the prospective of positive risk premium, exporting firms have dominated the non-exporting firms; whereas, with respect to negative risk premium, the later ones have dominated the former ones. For instance, 43.75 percent of the exporting against 23.44 percent of the non-exporting firms denoted significant and positive risk-return relation declaring positive risk premium while 17.19 percent of the non-exporting in contrast to 9.37 percent of the exporting firms indicated significant but negative risk-return linkages showing negative risk premium.

Table 4.1 Results of GARCH-M Model- Trading Effect

Table 4.1: By way of applying GARCH-M model, it presents number of firms in each category and their level of statistically significant and insignificant risk-return relationship with positive and negative trends (GARCH-M Coefficient (δ)). Further, results are also converted into percentage for each category and reported in parenthesis.

Level of Significance	Exporting vs. Non-Exporting	
	Exporting Firms	Non-Exporting Firms
Significant (+)	42(43.75)	15(23.44)
Significant (-)	9(9.37)	11(17.19)
Insignificant (+)	27(28.13)	22(34.38)
Insignificant (-)	18(18.75)	16(25.00)

Source: Author's own estimations.

4.2 Results Regarding Asymmetry and Leverage Effect

Table 4.2 holds the empirical results for the asymmetry and leverage effect for the trading (exporting) and non-trading (non-exporting) firms. Results reveal some new and very important outcomes. Firstly, for bulk of the non-exporting firms, bad news significantly increases conditional stock returns volatility more than good news of same magnitude (i.e. 57.81 percent of the non-exporting firms). Secondly, relative to exporting firms, the significant impact of bad news in increasing stock returns volatility more than good news of same intensity, is higher in

the case of non-exporting firms. For instance, 57.81 percent of the non-exporting firms against 41.66 percent of the exporting firms indicate the dominance of bad news in significantly increasing the stock returns volatility more than good news of same level, thus signifying the role of asymmetry and leverage effect.

Table 4.2: Results of EGARCH Model- Trading Effect

Table 4.2: By way of applying EGARCH model, it reflects number of firms in each category and their level of statistically significant and insignificant γ coefficient with positive and negative trends. Further, results are also converted into percentage for each category and reported in parenthesis.

<i>Level of Significance</i>	<i>Exporting vs. Non-Exporting</i>	
	<i>Exporting Firms</i>	<i>Non-Exporting Firms</i>
Significant (-)	40(41.66)	37(57.81)
Significant (+)	15(15.63)	6(9.38)
Insignificant (-)	15(15.63)	12(18.75)
Insignificant (+)	26(27.08)	9(14.06)

Source: Author’s own estimations.

4.3 Results Regarding Various Volatility Dynamics

Table 4.3 below shows the results related to various volatility dynamics for the exporting and non-exporting firms. Results uncover some interesting findings which are threefold. Firstly, regarding volatility, it is evident that higher percentage of the non-exporting firms is significantly volatile against both ARCH and GARCH effects as compared to the exporting firms. As in the case, 85.94 and 70.31 percent of the non-exporting firms next to 72.91 and 60.42 percent of the exporting firms are significantly volatile against ARCH (last period volatility shock-short term effect) and GARCH (previous period’s volatility shocks-long term effect) effects respectively. Secondly, taken together, persistence of volatility shocks are found be longer in the case of non-exporting than the exporting firms. For the case in point, 35.42 percent of the exporting against 21.88 percent of the non-exporting firms holds half life of less than two months, whereas half life stands more than six months for 12.59 percent of the exporting firms against 28.13 percent of the non-exporting. While the third feature of the results revealed that exporting firms dominate non-exporting firms in terms of both mean reversion and speed of mean reversion of stock returns volatility. For instance, 80.21 percent of the exporting against 65.62 percent of the non-exporting firms is mean reverting in its nature. Furthermore, 44.15 percent of the exporting in contrast to 33.33 percent of non-exporting firms holds half life of less than two months.

Table 4.3: Results of GARCH (1, 1) Model- Trading Effect

Table 4.3: By way of applying GARCH (1, 1) model, it denotes number of firms in each category and their level of statistically significant and insignificant ARCH and GARCH effects together with persistence, mean reversion and speed of mean reversion of their volatility. Further, results are also converted into percentage for each category and reported in parenthesis.

Volatility		Exporting vs. Non-Exporting	
		Exporting Firms	Non-Exporting Firms
ARCH	Sig(+)	70(72.91)	55(85.94)
	Insig(+)	23(23.96)	5(7.81)
	Sig(-)	3(3.13)	4(6.25)
GARCH	Sig(+)	58(60.42)	45(70.31)
	Insig(+)	38(39.58)	19(29.69)

Volatility	Exporting vs. Non-Exporting	
	Exporting Firms	Non-Exporting Firms
Persistence:		
	HL < 2	34(35.42)
	2 < HL < 6	31(32.29)
	HL > 6	12(12.50)
Mean Reversion		77(80.21)
		42(65.62)
Speed of Mean Reversion:		
	HL < 2	34(44.15)
	HL > 2	43(55.85)
		14(33.33)
		28(66.67)

Source: Author's own estimations.

4.4 Results Regarding Macroeconomic Exposure of Firm Returns

Table 4.4 below declares the results related to economic exposure of stock returns of the exporting vs. non-exporting firms. At first, market return is found to be prominent for the exporting firms in terms of significant positive impact (i.e. significant positive for about 76 percent) over the non-exporting firms (i.e. significant positive for around 63 percent).

Further, from the point of view of exchange rate and firm stock returns, higher percentage of the exporting firms show statistically significant and positive association with exchange rate in contrast with non-exporting firms. For example 18.75 percent of the exporting and 10.94 percent of the non-exporting firms indicate statistically significant and positive relation with exchange rate. Whereas, the statistically significant but negative impact of exchange rate on stock returns is relatively higher for non-exporting firms as compared to exporting firms. For example, it is for 17.18 percent of the non-exporting firms and just 8.34 percent of the exporting firms. Moreover, it is also evident that comparatively large proportion of non-exporting firms display statistically significant but negative association with risk free rate as compared to the exporting firms (for instance 15.63 percent of the non-exporting firms and just 5.20 percent of the exporting firms are significantly and negatively related to risk free rate).

Further, results rest on the empirical fact that higher percentage of non-exporting firms is negatively impacted by inflation as compared to exporting firms. For example, 26.56 percent of the non-exporting firms against 15.63 percent of the exporting firms are statistically significantly but negatively affected by inflation. More so, from the concern of real activity and stock returns, this research uncovers two new evidences. Firstly, relatively high percentage of non-exporting firms is statistically significantly related to industrial production index in both positive and negative directions. For example, among non-exporting firms, 14.06 percent of the firms are significantly and positively but 17.19 percent of the firms are significantly and negatively related to industrial production index. Secondly, for bulk of the non-exporting firms; the statistically significant impact of industrial production index is negative.

More so, from the results regarding money supply and stock returns, two new evidences are discovered. Firstly, for bulk of the exporting firms, the statistically significant relation of money supply is positive (i.e. 20.83 percent). Secondly, in case of non-exporting firms, both the statistical significant positive and negative linkage of money supply with stock returns in identical (i.e. 17.18 percent each). Moreover, comparatively, higher percentage of exporting firms is positively while relatively higher percentage of non-exporting firms is negatively related to changes in money supply. In addition, this research study marks important new evidence denoting that relatively higher percentage of non-exporting firms is statistically sig-

nificantly but negatively connected with the rising oil prices. For instance, the stock returns of 45.31 percent of the non-exporting firms in contrast to 22.92 percent of the exporting firms are significantly but negatively impacted by oil prices.

Table 4.4 Results of GARCH (1, 1) Model- Trading Effect

Table 4.4: By mean of applying GARCH (1, 1) model, it shows number of exporting and non exporting firms and their level of statistically significant and insignificant with positive and negative trends. Further, results are also converted into percentage for each category and reported in parenthesis.

Economic Variables	Exporting vs. Non-Exporting		
		Exporting Firms	Non-Exporting Firms
ΔKSE	Sig (+)	73(76.04)	40(62.50)
	Insig (+)	19(19.79)	22(34.38)
	Insig (-)	4(4.17)	2(3.12)
ΔEXR	Sig (+)	18(18.75)	7(10.94)
	Sig (-)	8(8.34)	11(17.18)
	Insig (+)	34(35.41)	20(31.25)
	Insig (-)	36(37.50)	26(40.63)
ΔRFR	Sig (+)	7(7.30)	3(4.68)
	Sig (-)	5(5.20)	10(15.63)
	Insig (+)	37(38.54)	28(43.75)
	Insig (-)	47(48.96)	23(35.94)
ΔCPI	Sig (+)	6(6.25)	9(14.06)
	Sig (-)	15(15.63)	17(26.56)
	Insig (+)	37(38.54)	18(28.13)
	Insig (-)	38(39.58)	20(31.25)
ΔIPI	Sig (+)	6(6.25)	9(14.06)
	Sig (-)	9(9.37)	11(17.19)
	Insig (+)	38(39.58)	17(26.56)
	Insig (-)	43(44.79)	27(42.18)
$\Delta M2$	Sig (+)	20(20.83)	11(17.18)
	Sig (-)	10(10.42)	11(17.18)
	Insig (+)	33(34.38)	19(29.69)
	Insig (-)	33(34.38)	23(35.94)
ΔOIL	Sig (+)	9(9.38)	6(9.38)
	Sig (-)	22(22.92)	29(45.31)
	Insig (+)	32(33.34)	19(29.68)
	Insig (-)	33(34.36)	10(15.63)

Source: Author's own estimations.

5. Comparison with Interrelated Work and Justifications

The similarity between the presented literature and this paper is that we have same objective (i.e. to examine the behaviour of stock returns). Nevertheless, the research questions embat-

tled in this paper are rather different. Thus, this current study enthalls fresh imminent on the volatility dynamics, pricing of risk, and macroeconomic exposure of firms returns. These differences are briefed as follows.

From the context of economic exposure, asymmetry & leverage effect, risks-return tradeoff and volatility dynamics; the existing studies mainly focused at aggregate market (most) and/or sectoral level (few) (for example, for the risks-return tradeoff, see Jiranyakul, 2011; Kavacic, 2008; Leon, 2008; Lettau and Ludvigson, 2010 and Mandimika and Chinzara, 2012 among others; for asymmetry & leverage effect, see Engle and Patton, 2001; Ewing *et al.*, 2005; Leon *et al.*, 2005; Mandimika and Chinzara, 2012 among others; for volatility dynamics, see Carroll and Connor, 2011; Engle and Patton, 2001; Ewing *et al.* 2005; Elyasiani *et al.* 2011 and West and Worthington, 2006; for economic exposure, see Arouri, 2011; Chinzara, 2011; Degiannakis *et al.*, 2013; Ibrahim and Aziz, 2003; McSweeney and Worthington, 2008; **Nishat and Shaheen, 2004**; Ratanpakorn and Sharma, 2007). Our research study is different. For the first time, we examined these dimension at firm level with respect to their trading nature. We determined considerable role of trading effect in conducting this exercise. So much so that risk premia is largely positive for exporting firms and negative for non-exporting firms. More so, asymmetry and leverage effect is largest in the case of non-exporting than the exporting ones. Similarly, former dominates the later in terms of volatility against both ARCH and GARCH effects (both short term and long term effects) and its persistence; however, the later ones lead the former in terms of both mean reversion and speed of mean reversion of volatility shocks. These empirical findings are not surprising in the light of financial press. The financial scholars concurs that the exporting firms have better payment mechanism for workers and managers, are more R&D oriented, have more experienced management, have faster growth rate, have larger customer base, have large and diversified suppliers, have strong financial bases, have more research resources, are more productive, more innovative and are better in developing strategies particularly regarding the services, quality and marketing (e.g. see Farinas and Marcos, 2006; Hagemeyer and Kolasa, 2011; McDougall, 1989; McDougall *et al.*, 2003; Westhead, 1995) in contrast to their non-exporting counterparts. Hence, these afore-mentioned arguments will encourage the investors to treat exporting firms differently from non-exporting firms. In such a way that relative to later ones, in the course of falling stock prices of former ones, investors will prefer to hold their stocks until realizing the positive risk premium considering them more credible, safer and liquid in contrast to their non-exporting counterparts. Furthermore, having more experienced management, exporting firms might be able to diversity themselves in a better way than the non-exporting firms. Consequently, resulting in comparatively higher statistically significant and positive risk-return trade-off, lower asymmetry and leverage effect, lower volatility and its persistence accompanied by higher mean reversion and faster speed of mean reversion of stock returns volatility for the exporting firms. While higher statistically significant but negative risk-return association, higher asymmetry and leverage effect, volatility and its persistence along with lesser mean reversion and slower speed of mean reversion of stock returns volatility for the non-exporting firms. Last but definitely not the least, such higher volatility shocks for both the trading and non-trading firms might root from the theoretical argument of *Iqbal (2012) stating that in Pakistani stock market, higher volatility might be attributed to Badla trading together with noise traders and speculators.*

Lastly, with respect to macroeconomic exposure of firm stock returns, the trading factor was ignored by the earlier studies. However, the empirical findings of this study declare that for the macroeconomic factors, trading effect appears to be flag rising. Such that for bulk of the cases in exporting firms, the significant impact of market returns is positive. More so, in large, the

significant impact of rising general price level, risk free rate, real activity and oil prices on stock returns is negative for the non-exporting firms than the exporting firm. While exporting firms dominates the non-exporting firms in terms of significant positive response to money expansion and currency depreciation in the economy. But, in the case of significant negative response to these economic indicators (i.e. money expansion and currency depreciation), the later ones dominate the former. These empirical results are not astonishing due the following theoretical foundations built by the financial press.

Firstly, looking into the composition of exporting firms, it is evident that the majority of the firms reflecting statistically significant and positive association with market returns are of large size as documented by Farinas and Marcos (2006) and Yaprak (2007); which makes them better represented in a capital weighted index (i.e. KSE-100 index) used as proxy for the market return and consequently grades them higher responsive to it in contrast to the non-exporting firms. Secondly, relatively higher statistically significant negative linkage of rising interest rate, real activity, inflation and oil prices with stock returns of non-exporting firms might be due to the fact that the exporting firms have better payment mechanism for workers and managers, are more R&D oriented, have more experienced management, have faster growth rate, have larger customer base, have large and diversified suppliers, have strong financial bases, have more research resources, are more productive, more innovative and are better in developing strategies particularly regarding the services, quality and marketing (e.g. see Farinas and Marcos, 2006; Hagemeyer and Kolasa, 2011; McDougall, 1989; McDougall *et al.*, 2003; Westhead, 1995) in contrast to their non-exporting counterparts. Thus it might compel the investor to short the stocks of non-exporting firms in the course of rise in these economic factors, considering them more risky, less credible and safer.

Further, relative higher significant positive impact of currency depreciation and money expansion on the stock returns of exporting firms, while comparatively their higher significant negative connectivity with the stock returns of non-exporting firms might rests of the following twofold grounds. Firstly, it is quite sensible to conjecture that if the non-exporting firms are negatively influenced by currency depreciation, it may be for the reason that the currency depreciation is often accompanied by economic downturn (e.g. see Flota, 2009). Secondly, the reasons that the exporting firms have better payment mechanism for workers and managers, are more R&D oriented, have more experienced management, have faster growth rate, have larger customer base, have large and diversified suppliers, have strong financial bases, have more research resources, are more productive, more innovative and are better in developing strategies particularly regarding the services, quality and marketing (e.g. see Farinas and Marcos, 2006; Hagemeyer and Kolasa, 2011; McDougall, 1989; McDougall *et al.*, 2003; Westhead, 1995) in contrast to their non-exporting counterparts, might push the investor to short the stocks of non-exporting firms and long the stocks of exporting firms in the course of currency depreciation and money expansion, considering the later ones more safer and credible. Further, exporting firms also benefit from currency depreciation through rise in profitability. Taken together, it might also place the exporting firms in a better position to take advantage of rising money supply in the economy through exploiting new ventures and opportunities, consequently resulting in higher profitability and the stock returns.

Conclusion

The main contribution of our research study is that it is the first to undertake the matter of trading effect in inspecting the pricing of risk, asymmetry and leverage effect and various vola-

tility dynamics together with macroeconomic exposure of stock returns, particularly in emerging markets. Our main contributonal outcomes are as follows. At first, we deducted that for bulk of the exporting firms, the risk premium is significant positive. However, for significant negative risk premium, the pattern is reversed- relatively large proportion of non-exporting firms is exposed to significant negative risk premium. Secondly, in the context of asymmetry and leverage effect, non-exporting firms dominated the exporting firms. Thirdly, in the process of detecting various volatility dynamics, it is unfolded that the volatility shocks are higher for the non-exporting than the exporting firms. Such as, for higher percentage of non-exporting firms; both the last period's volatility shock (ARCH-short term effect) and previous period's volatility shocks (GARCH-long term effect) played significant role in increasing stock returns volatility which are quite persistent than their exporting counterparts. More so, it is also untied that the exporting firms dominated the non-exporting ones in terms of mean reversion and speed of mean reversion of their volatility shocks. The fourth outcome revolved around the macroeconomic exposure of firm returns. In this view, study concurred that the interest rate, rising general price level, real activity and rising oil prices signature relatively higher significant negative impact on stock returns of non-exporting firms than the exporting ones. Furthermore, the market returns, money expansion and currency depreciation held significant positive relation with stock returns of bulk of the trading firms (exporting) than the non-trading ones (non-exporting).

This research study sets the implications for both the policy makers and investors. Keeping in view the considerable role of trading effect in determining the pricing of risk, volatility dynamics and economic exposure of stock returns; it will be quite worthy for the investors to diversify their portfolio investments between stable and risky assets. However, for the policy makers and financial regulators, it will be of immense importance to develop an economic and financial policy keeping in view the role of firm trading effect. The future research should try to address some other firm characteristics in order to build more detail insight into these dimensions.

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“Theory of Communicating Vessels”: The Problem of Currency Regulation¹

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Abstract One of the key dilemmas of modern monetary policy is the issue of currency regulation. In the center of controversy about the optimal approach to monetary policy is the problem of intervention or non-intervention by the central banks in the currency markets and in the process of formation of the exchange rate.

On the one hand most developed countries there is no any significant relationship between exchange rate and inflation, which in terms of monetary regulation defeats the purpose of intervention by central banks in the currency markets. However, in emerging markets, along with a significant relationship between exchange rate and inflation processes and the lack of effective tools of central banks appears necessity to intervene in the formation of exchange rates of national currencies. This in turn deepens the institutional failure and distortion of market mechanisms in economy. Thus, the problem of currency regulation is most acute in developing economies, including in Armenia. Analysis conducted in this research show significant distortions and inefficiencies currency regulation in Armenia including impact on inflationary processes in the real economy.

On the other hand, against the backdrop of global world financial and currency markets, as well as the instability of world currencies and related consequences, there are supporters of fixed exchange rates. The main argument for fixed exchange rates is primarily a high degree of influence of fluctuations in international exchange rates on monetary systems of the world, and the lack of acceptable diversification of the world currency markets.

All these assign the task of finding the optimum in currency regulation to authors and determine relevance extended research topic.

The basic hypothesis of this study is the idea that the maximum non-interference in the formation of the exchange rate by central banks is the most favorable for stable inflation in the economy.

Keywords Exchange rate - Inflation - Currency regulation - Monetary policy

JEL classification E42

¹ “**Theory of communicating vessels**”: The physical act of communicating vessels is put on the basis of the theory. The economic content of the theory is in close relation to exchange rate fluctuations and inflation caused by the inability to fix the exchange rate and the achievement of market indicators of inflation in the economy.

Methodology

In the frameworks of this study there was carried out triangulation, i.e. used both qualitative and quantitative methods. Here we will apply quantitative methods of comparative and contrastive analysis of the main variables considered, in which identified causal link between the exchange rate and inflation. Given the theme of the study, which is not necessary to go beyond the narrow scope of linguistic and seek a double meaning or implication technique under study is a qualitative method of content analysis. To identify the relationship between the exchange rate and inflation in Armenia in this research we use the technique within a quantitative method with the help of which we can determine the model and conduct a regression analysis with which this relationship is obtained.

In the model, as the dependent variable, we use CPI, and the independent variables are real effective exchange rate, nominal effective exchange rate, foreign trade-weighted average of CPI, output gap and lagged inflation. The considered model is a more general version of the standard model of the Phillips curve in an open economy and estimation of the relationship is conducted through OLS.

This methodology will focus on the synthesis and evaluation of the main results, which are derived from an analysis of the various studies of the issue. Conclusions of the research are based on the results obtained from the model, considering the conclusions of the studies on the subject.

Theoretical overview

The problem of mutual impact of exchange rate and inflation should be viewed in the context of two basic postulates. The first examines aspects of the impact of the exchange rate on domestic inflation, based on the internal factors of the economy. The second one also includes the impact of foreign markets through import prices. However, review of the literature leads to ambiguous conclusions.

The problem of relationship between exchange rate and inflation

Thus, inflation can be conceptually divided into two parts: demand-pull inflation and cost-push inflation.

The first approach to the study of inflation (known as the monetarist approach) focuses on the growth of the money supply. Taking into account a stable velocity of money and exogenous level of production, the expansion of the money supply can be controlled only by changing prices. For example, the theoretical explanation of the phenomenon of inflation in Cagan (1956) is largely developed with traditional monetarist perspective, represented by Milton Friedman, who claims that inflation is formed as a result of excess money supply over the potential market-driven production capacity or demand. As an example of the monetary doctrine of inflation there is fiscal and monetary approach, which emphasizes the impact of rising government deficits as a reason for the expected growth of the money supply, which in turn feeds the inflationary process (Sargent and Wallace, 1973). This scenario is especially true in countries with fiscal policy, free and dependent central bank, which automatically monetize budget deficit.

The argument of monetary expansion, however, is not entirely satisfactory, since the stability of inflation (the rate at which inflation converges to equilibrium after the shock) often ex-

ceeds the growth of the money supply. Therefore, the literature is based on cost-push inflation as the main alternative monetary point of view. This view explains the role of the exchange rate in the inflationary process and creating a vicious circle of increasing prices. In the context of developing countries, where the share of imported intermediate goods is high, large depreciation of the national currency, is likely to lead to an increase in import prices, which then affect the cost increase and ultimately to higher prices for the products in the economy. In addition, the structural dependence of import of capital along with a lack of foreign exchange reserves suggests that developing countries have a recurrent problem with the balance of payments and the depreciation of the national currency is endemic. It should be also noted that not only inflation, but also the fiscal crisis is considered as a result of balance of payments crisis.

Given the above, we can say that the impact of the exchange rate in relation to inflation itself depends on the choice of exchange rate regime in the country.

Exchange rate regime plays an important role in reducing or minimizing the risk of exchange rate fluctuations, which will have an impact on the economy. Any changes in the exchange rate will have a significant impact on the economy. As an example, consider the financial crisis in Thailand, when the government decided to introduce the floating exchange rate regime in mid-1997, which became part of the so-called Asian financial crisis.

Many studies have been carried out on the topic of the advantages and disadvantages of various exchange rate regimes (e.g., Aghevli, 1991; Obstfeld, 1995). From all of the actual studies we can note the empirical study of the impact of different exchange rate regimes on inflation and output. Alogoskoufis (1992) argues that under a floating exchange rate, inflation will be more persistent and the level of dependence on monetary policy will be higher than under a fixed exchange rate.² He proves this theory, based on research data from the US and the UK, since 1880, as well as 21 OECD countries in the postwar period. Obstfeld (1995) in his work confirms this result, except for the case with the US. He explains that the United States is attributed to the role of backup center in the Bretton Woods system. Collins (1996) in his work sought to explain the problem of choosing the exchange rate regime, using data from 24 countries in the Western Hemisphere during the period 1978-1992. She concluded that countries with small and relatively less open economies are less prone to choosing a flexible exchange rate, and countries with a current account deficit or the ones which were involved in the IMF program, by contrast, are more prone to choosing a flexible exchange rate. Ghosh et al. (1995) classify exchange rate regimes of 136 countries for the period from 1960 to 1989 on nine types (which are further classified into different categories) using the annual reports of the IMF measures of currency regulation and currency restrictions. Using deviation of the values from the annual global average, they found that inflation is significantly lower when the exchange rate pegs, particularly if binding is occasionally adjusted. They also concluded that the increase in production is slightly different under the actions of various exchange rate regimes.

With regard to other studies on the analysis of the impact of the exchange rate pass-through and fluctuations of price of imported goods, the most important one is the study of Feinberg (1986, 1989) and Woo (1984). More recent studies continue further research of the influence of the exchange rate on import prices and domestic inflation. Kim (1998) in his work used vector error correction model, and came to the conclusion that in the United States, the exchange rate has a negative long-term effect on the producer price index (PPI). Nevertheless, his work does not discuss the relationship in the short term, which is more important for the conduct

² Alogoskoufis GS (1992) Monetary accommodation, exchange rate regimes and inflation persistence, *Economic Journal* 102: 461-80.

of monetary policy. In this regard, Dellmo (1996) exploring the impact of changes in import prices on consumer price index (CPI) for Sweden, found that here this influence is relatively weak, despite the fact that Sweden is a small open economy.³ In the case of large US economy, the results of the impact of exchange rate pass-through relative to domestic prices are mixed. Koenig (1998) and Boldin (1998) concluded that the inclusion of import prices in a simple model for forecasting CPI improved forecasts for 1990.

Choudhri and Hakura (2006) investigated the extent of impact of exchange rate pass-through for 71 countries, including the crisis-hit countries in Latin America and Southeast Asia, using quarterly data from 1979 to 2000, to test the hypothesis Taylor (2000), that in countries with low inflation exchange rate pass-through on domestic prices is weaker.⁴ Mihaljek and Klau (2001) assessed the degree exchange rate pass-through on domestic prices for thirteen countries with developing economies, using quarterly data from 1980 to 2001.⁵ But these studies have one major drawback, which is that they do not take into account possible changes in the exchange rate regime between the pre-and post-crisis period.

Another approach to the study of the influence of the exchange rate pass-through is the study of nonlinearity in the Phillips curve with inclusion of the function curve of the exchange rate pass-through coefficient. Let's consider this method in more detail.

The presence of nonlinearity in the Phillips curve has corresponding implications for monetary policy. The slope of the Phillips curve, measuring the response of inflation to decline in production, shows directly the cost of disinflation. Schaling (2004) showed that when the Phillips curve is convex, i.e. when the sensitivity of inflation to the economic activity increases with the level of production, the optimal reaction function of monetary policy is asymmetric. Nonlinearity may also be present in the exchange rate pass-through into import prices. If the exchange rate pass-through, for example, stronger when the economy is in the stage of recovery, we can assume that the central bank's reaction to depreciation of the national currency in this context would be appropriate. In fact, the study of the presence of nonlinear mechanisms in the Phillips curve is an important topic in modern economic literature. Most research on nonlinear Phillips curve for advanced economies was focused on the slope of the Phillips curve and the effect of exchange rate. In the first case, Laxton, Rose and Tambakis (1999) and Bean (2000) proved that the Phillips curve is convex and Stiglitz (1997) and Eisner (1997) argue that the Phillips curve is concave.⁶ In the literature on the exchange rate pass-through effect, in turn, contain multiple sources of nonlinearity, which indicate that the degree of the exchange rate pass-through may be associated with some macroeconomic variables, including the exchange rate. Mann (1986), Goldberg (1995), Gil-Pareja (2000), Mahdavi (2002) and Olivei (2002) found that the asymmetry of the exchange rate pass-through is associated with the direction of changes in the exchange rate, while Ohno (1989), Pollard and Coughlin (2004) indicated the presence of asymmetry associated with the magnitude of exchange rate changes.

The business cycle is also noted as the source of nonlinearity of the exchange rate pass-through into import prices. Transfer of exchange rate devaluation on domestic prices will be

³ Dellmo H (1996) Relationships between Swedish Producer Prices and Import Prices and the CPI. Working Paper No. 29, Sveriges Riksbank.

⁴ Choudhri EU, Hakura DS (2006) Exchange Rate Pass-Through to Domestic Prices: Does the Inflationary Environment Matter? *Journal of International Money and Finance*, 25: 614-639

⁵ Mihaljek D, Klau M (2001) A Note on the Pass-Through from Exchange Rate and 28 Foreign Price Changes to Inflation in Selected Emerging Market Economies, *BIS Papers*, No.8: 69-81.

⁶ Filardo AJ (1998), New evidence on the output cost of fighting inflation, *Economic Review*, 83(3): 33-61, 3rd Quarter.

lower during the recession. Goldfajn and Werlang (2000) estimated the group consisting of 71 countries and found that depreciation of the national currency is transferred to the prices when the economy is in the stage of recovery. In the case of Brazil, Carneiro, Monteiro and Wu (2002), for example, obtained similar results, showing a reverse view of the Phillips curve, with the pass-through coefficient of the exchange rate as a function of the level of unemployment and the real exchange rate.⁷ In these works, the value of the exchange rate pass-through coefficient is a function of several variables.

Aigbokhan showed that the real exchange rate is the main factor determining the rate of inflation in Mexico during the 1980s and 1990s.⁸ Chhibber developed detailed econometric model that takes into account both monetary and structural factors in the study of the causes of inflation in Zimbabwe. This study shows that the monetary growth, world prices, exchange rate and interest rate are the main determinants of inflation in this country.⁹

Such a macroeconomic model of inflation has been used in work of Ghana Chhibber and Shafik.¹⁰ This study, which covers the period 1965-1988, suggests that Monetary growth is one of the key variables that explain inflation in Ghana. Variables such as the official exchange rate and real wages have failed to have a significant impact on inflation. However, a significant positive correlation was found between the parallels of the exchange rate and the general price level. On the issue of inflation, Chhibber suggested that there is only one link between the exchange rate and price inflation. He is basing his argument on empirical studies in some African countries and one of his main conclusions is that devaluation may have increased pressure on the general price level by increasing the cost of production in short term. Chhibber believed that on the extent to which the devaluation of the local currency will cause inflation to a large extent depends on the influence of policy measures, income and expenses (budget) of the Government, together with monetary policy.¹¹

The basic idea of the PPP theory - it is the law of one price. According to it in competitive markets in the absence of transportation costs and official trade barriers (such as tariffs) the same goods in different countries should be sold for the same price, if we express this price in the same currency. If this law does not take place, then there is a possibility of currency arbitrage, which involves adjusting the exchange rate as long as the law of one price will not be restored. Thus, the PPP connects exchange rate and the prices of goods denominated in different currencies. PPP also plays an important role in understanding the exchange rate fluctuations. For example, PPP is used to predict the equilibrium bilateral exchange rate between currencies, which is based on the analysis of trends in the consumer price index or other key indicators of price level.

Limitations of law of one price in stimulating of effective currency arbitrage in international markets, even for homogeneous goods, may be one of the reasons why the use of PPP based on price indices gives disappointing results on the correctness and validity of the PPP theory.

⁷ Muinhos MK (2001) Inflation targeting in an open financially integrated emerging economy: The case of Brazil, Banco Central do Brasil Working Paper Series no. 26, Aug.

⁸ Aigbokhan BE (1991) The Naira Exchange Rate Depreciation and Domestic Inflation. The Indian Journal of Economics, 71: 507-517.

⁹ Canetti E, Greene J (1991) Monetary Growth and Exchange Rate Depreciations as Causes of Inflation in African Countries: An Empirical Analysis. Mimeo, IMF, Washington.

¹⁰ Chhibber A, Shafik NS (1990) Exchange Rate Reform, Parallel Markets and Inflation in Africa: The Case of Ghana. World Bank Working Papers, WPS 427, May.

¹¹ Canetti E, Greene J (1991) Monetary Growth and Exchange Rate Depreciations as Causes of Inflation in African Countries: An Empirical Analysis. Mimeo, IMF, Washington.

For example, Huizinga (1987) and Meese, and Rogoff (1988) could not prove the hypothesis that exchange rates follow a random walk process. Frankel (1990) argues that if the deviation of exchange rate from PPP is slow, it will be difficult statistically or otherwise observe the convergence of exchange rates, based on PPP. Using a data set of dollar/pound exchange rate, spanning from 1869-1984, he was able to reject the random walk hypothesis of exchange rate. In the 1990s, there have been many studies (Diebold et al. (1991) and Glen (1992)), covering longer periods of time, which also refute this hypothesis. However, the disadvantage of these studies is that there are mixed operating until 1973 fixed exchange rates and operating since 1973 floating exchange rates.

Despite the theoretical validity of the law of one price and PPP, there are different results of empirical research concerning the theory of PPP. The results of the empirical analysis can be divided into studies of the 1990s and, respectively, research relating to the 2000s. Several studies conducted in the 1990s, support the theory of PPP in relation to such actively traded commodities like gold and oil (Froot and Rogoff (1996), Hakkio (1992), Frankel and Rose (1995), Mac Donald and Taylor (1992)).

Other studies have attempted to test the hypothesis of random walk of exchange rate and compare it with respect to the mean reversion based on PPP, using cross-sectional data. For example, Wei and Parsley (1995) tested the annual data for fourteen OECD countries traded goods. Just as in previous studies, they find that bringing the exchange rate to equilibrium according to the theory of PPP, at the exchange rate deviation from PPP, takes an average of 4 to 5 years. Thus, in the long run, at the exchange rate deviation from purchasing power parity, usually reversion relative to the mean is achieved, albeit at a slow pace.

More recent studies have used cointegration analysis regarding PPP. For example, Hong and Phillips (2005) used a modified cointegration analysis for the study of linear regression with respect to PPP, using monthly data on US, Japan and Canada, after the Bretton Woods agreement. While commonly used tests of cointegration ADF and PP gave different results on cointegration, modified cointegration analysis disproves null hypothesis of cointegration. Similarly, Bahmani-Oskooee and Goswami (2005), using monthly data from eight developing countries in Asia during 31 years, analyzed the theory of PPP on the black market. The results showed that while the variables in the model are cointegrated within Johansen cointegration analysis, internal and external prices are not exogenous factors in many countries, and because of that direct analysis gives a refutation of the PPP hypothesis.

Koekijk, Tims and van Dijk (2004) analyzed the hypothesis of purchasing power parity for the Eurozone countries for the period 1973-2003. The empirical results of their work support the hypothesis of PPP for a list of real exchange rates. They concluded that the process of economic integration in Europe has accelerated convergence of exchange rate to the PPP in the Eurozone.

Baum, Caglayan and Barkoulas (1998) made a model of the dynamics of adjustment to long-term purchasing power parity in the post-Bretton Woods agreement in the framework of nonlinear analysis. With help of the ESTAR model, they estimated variables deviations from PPP using both the CPI and values based on the wholesale price index for a wide range of US trading partners. The results of their study indicate reversion relative to the mean, which supports the hypothesis of PPP.

Canetti and Greene (1991) used the vector auto regression analysis in order to separate the impact of monetary growth from the effects of exchange rate changes on inflation projection in Africa and concluded that fluctuations of exchange rate and increase in money supply affect the changes in consumer prices in many sub-Saharan Africa. In particular, the authors find a significant causal effect of the exchange rate on prices in Sierra Leone, Tanzania and Congo.

Studies on the relationship between inflation and exchange rate were conducted over several decades. Ndungu (1997), using Granger causality analysis, based on the data from 1970 to 1993 in Kenya showed the mutual influence of the level of domestic inflation and exchange rate changes.¹² Ndungu made the following conclusions:

- The level of inflation and exchange rate changes affect each other;
- Domestic debt affects inflation unilaterally;
- The level of domestic inflation and changes in foreign exchange reserves affect each other;
- Changes in foreign reserves and exchange rate also interrelated.

Rana (1983) showed that changes in exchange rates do not affect the level of inflation in the ASEAN countries, except for Thailand.¹³ On the other hand, Kamin and Klau (2003) found empirical relationship between inflation and real exchange rate in many countries in Asia and Latin America. In addition, they also found that the effect of exchange rate changes on inflation in Latin America was much higher than in Asia and industrialized countries.

Noer, Arie and Piter (2010) conducted a comparative study on the relationship between inflation and real exchange rate. Using Granger causality test, they found a strong correlation between changes in the level of inflation and the real exchange rate in most of the countries surveyed.¹⁴

Exchange rate pass-through

Traditional economics considers that the goal of devaluation is to make import more expensive and export cheaper, devaluation is effective if domestic prices must remain unchanged. In the situation where currency devaluations affect domestic prices and the relationship with any other country, such a measure would certainly be exacerbated, as each subsequent devaluation do not create its own wage-price spiral, while the initial effect is neutralized. However, in this case, the domestic production does not increase enough to meet the additional demand caused by devaluation.

Oyejide noted that devaluation of exchange rate often leads to increased costs of imported inputs in local currency (raw materials and intermediate capital goods) and final goods through cost-push inflation. He noted that the non-traded goods can't be imported because the excess of demand for them will lead to an increase in domestic prices in the short term.¹⁵

Omotor considered the impact of prices on the exchange rate changes in Nigeria, using annual data for the period 1970-2003. Evidence suggests that exchange rate policy plays a significant role in determining inflation in Nigeria.¹⁶ There are also other studies that have reached similar conclusions (Odedokun, Odusola and Akinlo, Nnanna, and Zhang Lu). Hav-

¹² Ndungu NS (1997) Price and Exchange Rate Dynamics in Kenya: an Empirical Investigation (1970-1993). AERC research Paper, 58.

¹³ Rana PB(1983) The Impact of The Current Exchange Rate System on Trade and Inflation of Selected Developing Member Countries”. Asian Development Bank Economic Staff Paper, No. 18.

¹⁴ Noer AA, Arie JF, Piter A (2010) The relationship between inflation and real exchange rate: Comparative study between ASEAN+3, the EU and North America. European Journal of Economics, Finance and Administrative Sciences. 18

¹⁵ Oyejide TA (1989) Thoughts on Stability of Nigeria's Exchange Rate. The Nigerian Banker, September –December.

¹⁶ Omotor GD (2008) Exchange Rate Reform and its Inflationary Consequences: The Case of Nigeria. *Economski Pregled*, 59 (11): 688-716

ing considered the evidence, we were able to establish the main effect of the exchange rate on inflation in the country, although there are other variables such as money supply, government spending, and others.

There are other indicators for linking the exchange rate and price dynamics. These are so-called real exchange rate, the real effective exchange rate, as well as the exchange rate by purchasing power parity (PPP). Real exchange rate characterizes the change in the level of prices in one country compared with the price level to another, measured through the nominal exchange rate. Inflation is one of the irremovable characteristics of fatal capitalist economy. It can be more or less, take open or depressed form, but it is present in all economies for decades.

Over the past twenty years there has been a decline in the number of countries which use the fixed exchange rate as a formal anchor of monetary policy. In 1979, 68% of IMF member countries have used a fixed exchange rate policy, while their number in 1997 reduced to 36%. Including countries with limited floating exchange rate, the corresponding numbers fell from 76% to 44% (IMF, 1999). However, the official regimes tell us only the part of the story. The actual monetary policy may be changed without reflecting changes in the organization of monetary policy. Given the number of countries applying de facto fixed exchange rates as an anchor of its monetary policy, it appears that fixed exchange rates in one form or another are still important anchor of monetary policy around the world. Almost 60% of countries have fixed regime, although only 45% of them use a fixed exchange rate as a formal objective of monetary policy.¹⁷ Nevertheless, the number of countries using the fixed exchange rate decreased. In 1991, 76% had a fixed exchange rate as their primary tool of monetary policy, but this number has decreased to 60% (IMF, 1999 and International Financial Statistics, August 1999).

Under the new conditions of free capital flows there appeared questions about the suitability of the policy of a fixed exchange rate as a nominal anchor of monetary policy. In recent years, in different countries often use “strict” fixed exchange rate regime or a more flexible exchange rate policy. Consequently, the question arises, what can replace the fixed exchange rate as an anchor of monetary policy. Economists, central bank governors and large number of countries are increasingly set the policy of the establishment as a formal regime of inflation monetary policy. Almost all the authors have studied the relationship between inflation and exchange rate in the postwar period have come to the conclusion that exchange rate movements do not correspond exactly to the relative purchasing power parity, and that the introduction of floating exchange rates have increased dramatically the absolute size of the deviations from PPP rates. However, the concept of PPP is widely used in the practice of state regulation of the economy of developed countries. All authors who adhere to the concept of relative PPP emphasize that it is the basis of the quantity theory of money. English economist Gregory T. shows the connection of exchange rates to the quantity theory of money, “Exchange rates are determined by the ratio of the amount of money issued by the various countries.”

For the PPP theory as the basis of exchange rates formation, as a whole, is characterized by the exchange theory, which means exaggeration of the role of the circulation. Similar concept of exchange rate formation based on the quantity theory of money, which is denying labor theory of value, asserts that the value of money and the level of commodity prices are determined exclusively by the amount of money in circulation.

It should be noted that currency as the category enables connection and interaction of national and world economy.¹⁸ With a strong inflation in the country national currency is dis-

¹⁷ Thórarinn G. Pétursson “Exchange rate or inflation targeting in monetary policy”, Monetary Bulletin 2000/1

¹⁸ Krasavina LA, Alibegov TI (2006) International monetary and financial relations, p. 34 - Finance and Statistics

placed by more stable foreign currency, i.e. dollarization of the economy going. Therefore, in many developing countries, including the CIS countries, there is a dollarization of the country, which leads to high, and sometimes to excessive demand for foreign currency. The main reason of dollarization is the emergence of the difference between the current exchange rate and the real purchasing power of the national currency. To resolve this difference it is necessary to carry out devaluation of the national currency, but, as experience shows, in some CIS countries, the government and the Central Bank actively intervene in the formation of the current exchange rate of the national currency. In these conditions it is impossible to determine its market value, and therefore it is practically impossible to establish the real difference between the current exchange rate and objective purchasing power of the national currency.

In developed countries, the transition to convertibility of national currencies began as a rule, with its simultaneous devaluation and the subsequent introduction of a fixed exchange rate. The “floating” regime of the national currency exchange rate occurred when inflation reached a small size while revitalizing all sectors of the economy. For example, Austria, the UK was FRG France and Japan. In the CIS countries the transition to convertibility began and continues to this day in the deepening crisis of national production.

With regard to the literature on the dynamics of inflation and exchange rate Agenor and Montiel (1999), when considering purchasing power parity (PPP),¹⁹ noticed that the consumer price level is determined by the exchange rate. Therefore, the stabilization of inflation apparently requires that the rate of depreciation of the national currency is slowed to a rate of change of the exchange rate, thus giving it the task of ensuring price stability, and external balance would be achieved due to the policy of limiting the aggregate demand.

According to Goldberg and Knetter (1997) exchange rate pass-through is defined as “the degree of sensitivity of the imported goods prices to one percent change in the national currency exchange rate called the exchange rate pass-through to prices.” However, the change in import prices in some extent also affects the production and consumer prices. For this reason, in this work exchange rate pass-through is considered in a wider sense, as the consumer price changes can be related to previous changes in the nominal exchange rate.

The literature distinguishes between two channels of the exchange rate pass-through: the direct and indirect channels. The importance of each of them becomes more noticeable, depending on the degree of openness of the economy.

Direct transfer channel works through the external sector of the country, i.e. through import prices. If we denote exchange rate by E (the number of national currency per unit of foreign currency), and the price of imported goods in foreign currency by P^* , the $E \cdot P^*$ will represent the price of imported goods in the national currency. If P^* remains unchanged, and E is depreciated (stronger), then the price of imported goods in the national currency will grow proportionately. The result of this process is called the exchange rate pass-through to import prices. Nevertheless, the pass-through effect is complete, if the margins on products and marginal costs remain constant. Changes in import prices are also moving to production and consumer prices, if producers raise prices in line with the increase in import prices.

Indirect channel of the exchange rate pass-through refers to the competitiveness of products in the international markets. Depreciation of the domestic currency makes domestic goods relatively cheaper for foreign buyers, and as a result, aggregate demand and exports begin to grow and cause a rise in domestic prices. As the contracts for nominal wages remain unchanged in the short term, real wages fall, and production increases. However, when eventu-

¹⁹ Agenor P, Montiel P (1999) *Development Macroeconomics*, 2nd ed., Princeton University Press, Princeton, NJ.

ally the real wage increase and return to its former level, production costs will increase, the general price level will increase and volume of production will decrease. Thus, in the end, the depreciation of the national currency leads to a permanent increase in the price level with a temporary increase in production volume.

In reality, however, exchange rate pass-through can't be complete. Goldberg and Knetter (1997) argue that U.S. import prices represent only 50% of foreign exchange rate changes (despite the fact that the price reaction is different depending on the industry). Perhaps the most common explanation for this phenomenon is the so-called strategy of pricing based on the market, used by exporting companies. Instead of adjusting their prices to exchange rate changes, exporting companies leave prices for their goods unchanged and simply increase the premium. This behavior is called market-oriented pricing. This means that exporting firms are taking temporary loss of their income in order to avoid long-term losses (in the case of national currency appreciation) their market share. Many studies show that the expansion of market-oriented pricing is positively correlated with the concentration in the market. Market-oriented pricing is largely present in the competitive sectors.

Monetary policy of the CBA: Overview

Armenia has committed itself, as a country that implements inflation targeting²⁰ and implementing a policy of floating exchange rate policies. According to the official position of the CBA, as well as the IMF classification, Armenia belongs to the countries which implement the "managed float" policy as a part of their monetary policy.

From the very beginning of the inflation targeting the CBA has faced serious issues. The main difficulty lies in the fact that the central bank doesn't have sufficient tools to control inflationary pressures up to this day, which in its turn is caused by virtually not developed financial market.

Furthermore, the overall macroeconomic instability inherent in Armenian economy does not allow building effective prediction models, which is also a serious obstacle for the implementation of the inflation targeting.

As we can see in Figure 1, starting in 2006, the Central Bank failed to reach the target in more than a half of the periods. On the other hand, in the annual cut of five periods observed in two cases Central Bank failed to reach the target value (see Table 1). Moreover, we note that in 2008 the deviation from the target has reached 61%, and in 2011 - 40%. Deviations, though small, is also observed in 2013.

The official position of the monetary authorities about missing the target is based on the serious impact of the global financial crisis on the whole Armenian economy, which is reflected in the money market. Of course, some effects of the crisis can't be taken into consideration. It should be also noted that taking into consideration isolation of the economy, weak export, and in particular the problems in financial sector of Armenia, position of the monetary authorities is doubtful for this cases.

On the other hand, the financial crisis to some extent had to have positive impact on the economy of Armenia. Reduction in disposable income in the world has led to a decrease in a level of cash transfers in Armenian economy. This in its turn has contributed to the decline of the dollar supply in the country, which certainly could not affect the exchange rate of the

²⁰ Note: Armenia adopted inflation targeting in 2006

national currency. Indeed, private transfers in 2009 amounted to 1124 million dollars²¹ against 1635 million dollars in 2008. This reduction in the inflow of foreign currency has led to instability in money market and caused another round of inflationary pressure, which was exacerbated by negative inflation expectations from the real sector.

Figure 1 CPI and target, quarterly.

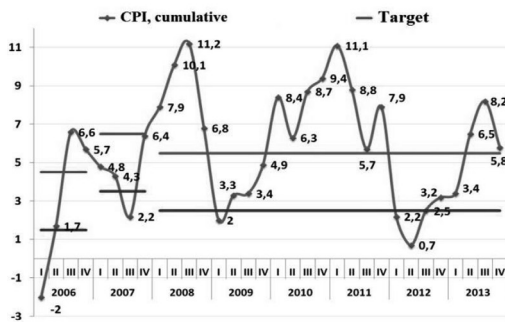


Table 1 CPI and targets annually.

	2006	2007	2008	2009	2010	2011	2012	2013
Target (bottom limit)	1,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
Target (high limit)	4,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5
The actual level of inflation	2,9	4,4	8,9	3,4	8,2	7,7	3,2	5,8
The deviation from the target	0%	0%	61%	0%	49%	40%	0%	5,5%

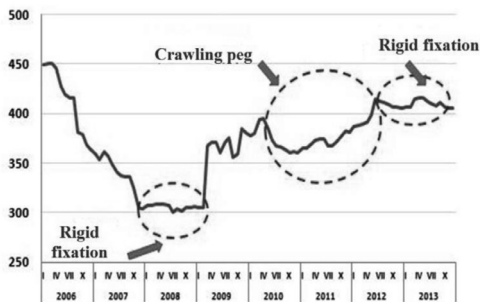
Source: Used data from the official website of the CB of RA-www.cba.am.

The response of “monetary authorities” to this situation was a tightening of monetary policy. A question arises. Is it possible to implement tight monetary policy under inflation targeting? As the experience shows and the inflation targeting regime requires, the combination of this model of monetary regulation in the framework with hard currency control reduces the effectiveness of monetary policy in General. Researchers have shown that none of inflation-targeting countries allows major intervention on the foreign exchange market by the Central Bank. Along with this, the situation in Armenia is absolutely opposite. Since the start of implementation of inflation targeting the CBA started active interventions in the currency market. According to the official position the main tool of the Central Bank in monetary policy in Armenia is the refinancing rate. However, research shows that over the past five or more years, all attempts to reduce inflationary pressures in the economy through a policy of “expensive money” have not led to any positive results. As a rule, a tightening of interest rate policy is followed by huge increase of the inflationary pressures. By the end of 2008, the refinancing rate has reached to 7.75%, while the inflation rate was at the same period 11.2%. After a certain lag of one or two quarters inflation rate declined slightly, but it was not due to so much the actions of the Central Bank in interest rate policy. This reduction was due to the General decline in business activity in the economy. The GDP growth rate for that period amounted to 6.8% against 13.7% in 2007. The next year was marked by an unprecedented drop in economic growth rates: - 14.4%!

So, what is the cause of insolvency of the interest rate as a monetary regulation instrument for the Central Bank of Armenia? The main problem in this case is very negligible correlation between financial system and the real sector of the economy. The reason for this is low level of development of the financial system. This inharmonious, unbalanced structure of the financial system (the share of the banking sector is more than 90% of total assets) makes the attempts of Central Bank to influence aggregate demand through the refinancing rate to vain.

²¹ Source: The data of the official website of the National Statistical Service of the Republic of Armenia.www.armstat.am

Figure 2 The exchange rate AMD/USD.



Source: Used data from the official website of the CB of RA-www.cba.am.

Noted problem deprives the Central Bank the effect of other instruments -especially open market operations securities. As of 2010 the level of capitalization of the market amounted to 1.49%. Such a small share of the financial market in the economy of Armenia does not allow the monetary authorities to use open market transactions of securities in order to impact the aggregate demand. However, taking into account the structure of transactions on the stock exchange, it is obvious that the Central Bank of Armenia has no other instruments of monetary regulation except foreign exchange policy.

As a result, almost from the beginning of implementation of inflation targeting the CBA uses a single instrument of influence on the real sector that is the hard currency regulation. Since late 2005 and the beginning of 2006 the basic policy of “monetary authorities” was strengthening the exchange rate of the national currency. The activity of the Central Bank on the foreign exchange market in this period is unprecedented! The level of sales amounted to 105,6 million dollars in 2005 reached 799 million in 2009. Such action on the foreign exchange market by the Central Bank of Armenia has led to significant appreciation of the exchange rate of the national currency. Since 2003 the strengthening of the dram against the USA dollar amounted to 52%. Since the end of 2007 to the beginning of 2009 the Central Bank de facto implements a policy of rigid fixation of the exchange rate. By March 2009 the Central Bank of Armenia faced a serious lack of international reserves which amounted to 1331,4 million dollars and almost reached critical minimum. This situation forced the Central Bank of Armenia to weaken its position of on the currency market, which led to a depreciation of the exchange rate of the national currency by about 21%. This situation has led to significant volatility, but also to the decrease of trust to “monetary authorities”, financial and macroeconomic imbalances, increasing inflationary expectations, and finally to significant negative consequences in the whole economy.

How effective and justified was the currency policy of the CBA? As we can see in figure 3, the strengthening of the exchange rate was accompanied by continuous strengthening of inflationary pressure in the economy. In the result of the strict containment of money supply with the help of foreign currency interventions have not led to tangible results in the monetary regulation.

It should be noted that the official position of the CBA denies the above formulated thesis. According to the report of “monetary authorities” strengthening of course has been caused by the large inflow of remittances, changes in the dynamics of the exchange rate of the dollar against other currencies, the recession in the U.S. economy, and increasing confidence in the national currency in the economy of Armenia.

Figure 4.

Figure 3 The CPI and the exchange rate, annually.

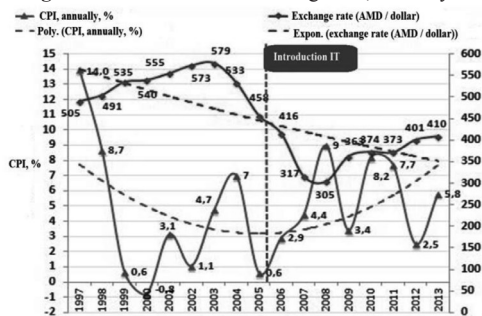
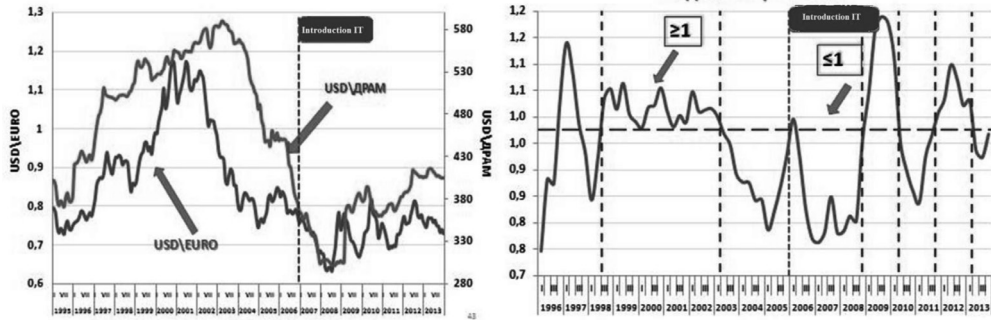


Figure 5. The index’s advance.

Figure 4 Dynamics of exchange rate of USD\EURO and USD\AMD monthly). **Figure 5** The index’s advance



Source: Used data from the official website of the CBoF RA -www.cba.am.

However, the author can't agree with this position. Studies clearly indicate artificial appreciation of the dram against the USA dollar.

First of all, it should be looked at the dynamics of the exchange rate of dram against the Euro.

As we can see in figure 4, changes in the exchange rate of the dollar against the Euro and dram till 2004 had similar trends. But then, the exchange rate of the dollar in Armenia acquired a completely reverse trend character to the world one.

Confirmation putting forward the thesis about the artificial strengthening of the exchange rate of the national currency, can be considered by indicators of the Index advance (see figure 5). The calculations showed that from 2004 till 2009 (during the period of strengthening of the exchange rate of the national currency) Index timing was constantly below 1, which indicates a higher rate of inflation than of exchange rate changes, and this in turn proves artificial nature of the changes on the currency market at that period.

A stable level of purchasing power parities is experienced for the whole period of strengthening the exchange rate of the dram in Armenia. At the same time the appreciation of the exchange rate of the national currency, as a rule, is accompanied by the increased purchasing power of the national currency. It should also be noted that the strengthening of the national currency, of course, is a result of a significant growth in the whole economy. However, the reviewed period such a jump in the rate of economic growth was not observed.

It is impossible to say that the strengthening of the dram is associated with the increasing confidence of the national currency. For the whole period of dollarization level of dram evaluation of economy in General and the banking system in particular, remained at a high level. A significant reduction in dollarization level is observed only at the end of 2008 and the beginning of 2009. Thus, in the third quarter of 2008, the level of dollarization of total deposits reached its minimum and amounted to 35, 5%. However, the events in March 2009 on the currency market have drastically undermined the credibility of the national currency and by the end of the first quarter of 2009, the level of dollarization of total deposits amounted to almost 70%.

What was the result? Monetary policy of the Central Bank of Armenia finally undermined the credibility of the “monetary authorities” from the real sector, intensified inflationary expectations, which in the shortest terms grew at quite high rates of inflation in the first place on the consumer market. Hard monetary policy for 5-6 years has led to the minimization of competitive advantages of Armenian goods in foreign markets, which had brought all attempts export-oriented manufacturers to expand the market. The latter has further weakened the position of

Armenia's economy on the world stage. In turn, strengthened exchange rate has worsened the situation with imports. Already dominating over the exports imports, which are characterized by a high degree of concentration, finally strengthened its position in the consumer market of the country.

Another negative effect of the artificial strengthening of dram's exchange rate can be considered as a significant decrease in real incomes. It is not a secret that the main share of income of the Armenian population is formed by the inflow of remittances. The latter, as a rule, proceed to the population in foreign currency, in most cases is in dollars. The depreciation of the dollar in Armenia resulted the decrease in AMD equivalent of incoming transfers. And if we add to this the growing level of consumer prices in Armenia in the last five or six years, it is obvious that the current RA Central Bank monetary policy has left a negative impact on the General welfare of the population.

And with all mentioned above, monetary policy of the Central Bank of Armenia has not led to significant results from the point of view of reducing inflationary pressures. Thus, carried out to the detriment of many macroeconomic indicators monetary policy turned out to be meaningless.

Model Specification

Let's imagine a small open economy, which produces, consumes and exports of domestic goods (H), as well as imports and consumes foreign products (F). The price of foreign goods P_F is determined by the exchange rate E (the ratio of the local currency to the US dollar) and the price of foreign goods in foreign currency P^*F (exogenous factors). The price of domestic goods P_H is determined by the equilibrium in the domestic market of goods.

To determine the equilibrium price of domestic goods, we begin with a review of the manufacturers that maximize their profits, choose L , as used of labor, and accordingly Q_H , as the level of production. With the decline of the marginal product of labor for a given level of power or potential \bar{Q}_H respectively, the demand for labor decreases with the increase in real wages W/P , where consumer price level P is the weighted average of the prices of domestic goods P_H and prices of foreign goods P_F .

Based on assumptions, we can get the supply curve for domestic products as a function of relative prices, or equivalent real exchange rate P_F/P_H ($\eta_{a,b}$ represents the elasticity of a against b.) The increase in the foreign prices leads to the increase of the subsistence minimum P , and therefore wage W , thereby increasing the real wages in the domestic market (W/P_H). The result is a reduction of supply on the domestic market.

$$\begin{aligned} S_H &= S_H(P_F/P_H; \bar{Q}_H) \\ \eta_{S_H, P_F/P_H} &< 0 \text{ и } \eta_{S_H, \bar{Q}_H} < 0 \end{aligned} \quad (1)$$

The demand of the residents of D_H and foreigners D_H^* for domestic goods, it is assumed that depend on relative prices and aggregate demand absorption A and A^* . For simplicity, assume that the external and internal demand for domestic goods have the same flexibility in accordance with the relative prices, and that their elasticity with respect to the absorption of a single in both cases.

$$\begin{aligned}
 D_H^* &= D_H(P_F/P_H; A^*) \\
 \eta_{D_H, P_F/P_H} &= \eta_{D_H^*, P_F/P_H} > 0 \\
 \eta_{D_H, A} &= \eta_{D_H^*, A^*} = 1
 \end{aligned}
 \tag{2}$$

equilibrium condition for domestic goods require the offer to be equal to the sum of internal and external demand:

$$S_H = D_H + D_H^*
 \tag{3}$$

We differentiate this equation by the method of logarithmic differentiation, allowing changes in the level of potential output \bar{Q}_H . Differential in the domestic and foreign commodity prices - equivalent, changes in the real exchange rate can be expressed as normal inverse function of the weighted average growth of internal and external absorption on potential internal volume of the issue. In other words, the increase in absorbance in relation to internal potential output increases the price of domestic goods relative to foreign, thereby strengthening the real exchange rate.

$$\begin{aligned}
 (\hat{P}_F - \hat{P}_H) &= -\varepsilon \left[(\delta \hat{A} + (1 - \delta) \hat{A}^*) - \hat{Q}_H \right] = \varepsilon \left[\hat{A}' - \hat{Q}_H \right] \\
 \delta &= \frac{D_H}{(D_H + D_H^*)} \\
 \varepsilon &= \frac{1}{\eta_{D_H, P_F/P_H} - \eta_{S_H, P_F/P_H}}
 \end{aligned}
 \tag{4}$$

The relationship between logarithmically real exchange rate and the gap between absorption and the potential volume of the issue is presented below; (\hat{P}_F/\hat{P}_H) represents the value of the real exchange rate in accordance with the balance in the internal market:

$$\log(\hat{P}_F/\hat{P}_H) = \Psi - \varepsilon \log(A'/\bar{Q}_H),$$

Where Ψ – constant variable

Note that equation (5) does not define which of the variables - the prices of domestic goods, the nominal exchange rate or the domestic absorption - adjusted in case of rejection of the market of domestic goods from the equilibrium state. Our hypothesis is that the nominal exchange rate and removals are determined first of all expectations, as well as fiscal and monetary policies, while domestic prices change in response to deviations between the actual and the equilibrium ratio of foreign commodity prices to domestic prices. Equation (7) shows the partial adjustment process, based on this reasoning, in which changes in internal prices proportional to the gap between the actual ratio between the foreign prices of the goods to the domestic and equilibrium ratio, (\hat{P}_F/\hat{P}_H) .²²

²² Adams C, Gros D (1986) The Consequences of Real Exchange Rate Rules for Inflation: Some Illustrative Examples. IMF Staff Papers, Vol. 33: 439-76.

$$\Delta \log(P_H)_t = \lambda \left(\log(P_F/P_H)_{t-1} - \log(\bar{P}_F/\bar{P}_H)_{t-1} \right), \lambda > 0 \quad (6)$$

If we substitute equation (5) into equation (6), we get the inflation rate for domestic goods as a function of the ratio of the absorption potential output and the level of the ratio of the foreign price of the goods to the domestic.

$$\Delta \log(P_H)_t = \lambda \log(P_F/P_H)_{t-1} - \lambda \Psi + \lambda \varepsilon \log(A'/\bar{Q}_H)_{t-1} \quad (7)$$

Equation (8) is a fundamental rationale for the relationship between inflation and the real exchange rate. Intuitively, we can assume that the depreciation of the real exchange rate in relation to the level that clears a market for Ukrainian goods, increasing the prices of foreign goods relative to domestic peer, switching the demand for domestic goods, while the increase in wages and, consequently, production costs - both these forces lead to rise in prices of domestic goods until such time as the real exchange rate will not return to the original level.

It should also be noted that equation (7) as a normal Phillips curve, doesn't include such traditional determinants of inflation as a monetary and fiscal policy. While monetary and fiscal policy can be fundamental causes of inflation, they are treated as in the standard textbook analysis as causing inflation through their impact on proximate determinants of inflation, exchange rate and absorption. For example, the easing of monetary policy may lead to higher inflation by increasing aggregate demand (the rise of A') and will devalue the exchange rate (thus, growth PF).

Therefore, while itself monetary policy is not covered in equation (8), some of its important effects are still included. In this sense, the equation (8) is a narrow description of the inflation process, focusing only on its immediate determinants. However, this can provide important information about the behavior of inflation in open economies, as well as based on the expectations augmented Phillips curve remains an important tool of analysis and forecasting in a more closed economy.

Before econometric calculation the equation (7), it is necessary to make a number of changes to the formula. First, our data for CPI inflation is the weighted average inflation of domestic and foreign goods, so it is not inflation only for domestic goods. Use lowercase letters for the determination of logarithms:

$$\Delta p = \alpha \Delta p_H + (1 - \alpha) \Delta p_F \quad (8)$$

Thus, substituting the expression for the inflation of domestic goods from equation (7) in equation (8):

$$\Delta p_t = -\alpha \lambda \Psi + \alpha \lambda (p_F - p_H)_{t-1} + \alpha \lambda \varepsilon (a' - \bar{q}_H)_{t-1} + (1 - \alpha) \Delta p_{Ft}^* + (1 - \alpha) \Delta e_t \quad (9)$$

Furthermore, multicurrency real effective exchange rate, which is used logarithm (RER) in our study is a function of the logarithmic ratio between the prices of foreign goods to domestic specified in the theoretical model:

$$RER = \frac{P^* \cdot E}{P} = \frac{P_F}{P_H^\alpha P_F^{1-\alpha}} \left(\frac{P_F}{P_H} \right)^\alpha \quad (10)$$

The replacement ratio of prices of foreign goods to domestic factor RER:

$$\Delta p_t = -\alpha\lambda\Psi + \lambda rer_{t-1} + \alpha\lambda\varepsilon(a' - \bar{q}_H)_{t-1} + (1 - \alpha)\Delta p_{F_t}^* + (1 - \alpha)\Delta e_t \quad (11)$$

For many countries in our sample, we used real GDP as a variable, replacing the weighted average absorbance values (A'), because of the unavailability of accurate data on domestic absorption, covering a sufficiently long time period. So the ratio of the absorption potential GDP is replaced by the rupture of GDP. The comparison between the absorption of GDP in countries where there is both indicators confirm that these variables are highly correlated among themselves.

Finally, we assume that inflation may be resistance, therefore, included in our equation logarithmically dependent variable. Thus the final rule will have the following form:

$$\Delta p_t = -\alpha\lambda\Psi + \lambda rer_{t-1} + \alpha\lambda\varepsilon(a' - \bar{q}_H)_{t-1} + (1 - \alpha)\Delta p_{F_t}^* + (1 - \alpha)\Delta e_t + \beta\Delta p_{t-1} \quad (11)$$

It is necessary to pay attention to the fact that this equation is more general and is a standard Phillips curve for an open economy. In cases when the factors Δe , Δp^* and rer model converges to the Phillips curve. Also, similar to the Phillips curve with adaptive expectations can be shown that the sum of coefficients providing Δp_{-1} and Δe unit, in the long term will not be a compromise between the level of the real exchange rate and inflation. As attempts to keep the unemployment rate below its natural level may cause continuous growth of inflation in conventional models of the Phillips curve, and attempts to keep the real exchange rate more impaired than its level of market equilibrium for a given break GDP lead to increasing inflation in these larger framework.²³

SurveyResults

The technique used above in the work carried out a regression analysis was conducted based on the model of the Phillips curve, the proposed Kamin (1996).

Table 6 Regression results for Armenia
Dependent variable: $\Delta \log(P)$

	OLS	
$\Delta \log(P)$ -1	0,26 (2,42)	
$\Delta \log(P^*)$	0,89 (27,82)	
$\Delta \log(E)$	0,51 (9,78)	
$\log(RER)$ -1	0,46 (32,96)	
YGAP-1	0,3 (3,31)	
Adjusted R squared	0,64	Note: t-statistics in parentheses. P = end-year CPI; P*= foreign weighted
Regression standart error	0,02	P; E= multilateral nominal effective exchange rate; RER= multilateral real
Darbin-Watson statistic	1,86	effective exchange rate; YGAP= log (real (GDP) - log (potential real GDP).

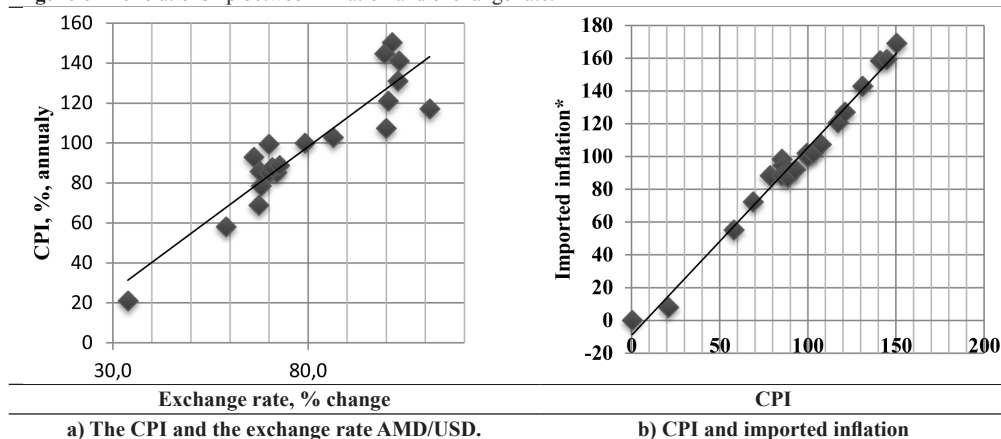
²³ Adams C, Gros D (1986) The Consequences of Real Exchange Rate Rules for Inflation: Some Illustrative Examples. IMF Staff Papers, Vol. 33: 439-76.

The study proved that Armenia to treat countries with a tendency towards fixing the exchange rate, where the relationship between changes in the nominal and real exchange rates and inflation is higher than in countries using other exchange rate regimes. As we can see in figure 6-a, there is a positive correlation between changes in the price level and real exchange rate. Also note that when calculating the regression we got R squared equal to 0.64, which further emphasizes the relationship.

Figure 2 The exchange rate AMD/USD.

Figure 3 The CPI and the exchange rate, annually.

Figure 6 The relationship between inflation and exchange rate.



Source: calculated by the authors.

In addition, the regression analysis shows high dependence of inflation from changes in import prices. It is obvious that Armenia, being an import-dependent country, will differ a great dependence of the General consumer price index from import prices (see figure 6-b). Taking into account all the above we can say that in Armenia there is quite a significant Association between changes in the nominal and real effective exchange rates and price levels, was also identified the relationship between foreign commodity prices and domestic inflation.

Conclusion and recommendations

What to do in this situation? Many mistakes had been committed. First of all, it should be noted that it was premature switching to inflation targeting. Armenia’s economy, given the underdevelopment of the financial sector, a low level of trust to “monetary authorities”, the overall macroeconomic instability of the economy, weak fiscal instruments and many other factors, was not ready to implement such a model of monetary regulation. However, for the sake of fairness, it should be noted that some countries, that have decided to implement inflation targeting, didn’t achieve goals from the first try. A number of countries, owing to failures in the money market, declared unwillingness “monetary authorities” to move and chose to install some kind of transition (preparatory) the period before the next attempt of transition to inflation targeting.

On the other hand, the situation on the money market, itself compels “monetary authorities” to seriously reconsider its stance of monetary policy implementation. Reduced to a critical minimum international reserves do not constitute any choice but to let the exchange rate of the

national currency float freely. It is obvious that there are not any other alternatives today. What kind of risks are there? Of course, the weakening positions of the Central Bank in the money market, most likely, will lead to higher prices. However, there is a positive side of the possible consequences. The weakening of the course will lead to the strengthening of the positions of export of Armenian goods in foreign markets. Of course, these positive effects will manifest themselves immediately. However, gradual and competent macroeconomic policy will allow mitigating the negative effects of the freely floating exchange rate at the initial stage to some extent. In any case, the floating rate will allow using the market mechanisms of self-regulation at their maximum. Thus, for today any other scenario might ultimately undermine macroeconomic stability in Armenia.

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Determinants of the Demand for Life Insurance Evidence from Jordan

Demeh Daradkah

Abstract This study investigates the relationship between the demand for life insurance measured by annual life insurance premiums and insurance density and some economic and demographic variables in Jordan during 1970 and 2012, using Ordinary Least Square (OLS) estimation. We find evidence that the demand for life insurance products is influenced by increase in income level and urbanization, suggesting that the life insurance industry can be well developed in lower-middle income country. In addition, the demand for life insurance in Jordan increases during inflationary period because, the average economic growth rates was higher than the average level of inflation rates during the period under study. However, the study found no evidence of young dependency on the demand for life insurance in Jordan, suggesting increasing the attention on products to protect against morality risk. Future research is recommended in this area for Jordan including other economic and demographic variables and investigating the supply side of life insurance in Jordan.

Keywords Jordan - Life Insurance demand - Insurance Density - and Time Series.

JEL Classification C32 - G22 - N25

Introduction

A growing body of work indicated the major role of a well development financial system in enhancing, and predicting the future economic growth, such as the extended work made by King and Levine(1993), Levine(1996), Levine and Zervos(1998),and Levine *et. al.* (2000), More recently Zeits(2003) and Hussels *et.al.*(2005), confirm the influence of well development financial system on the economic growth.

Therefore, a great development was noticed in the financial system sector. One of these sectors is the insurance industry, which is motivated by liberalization of the financial system and globalization (Outreville 2011). The availability of a well-developed insurance industry is very important for the stability and development of the economy, transferring of risk and enhancing the social welfare of any country (CEA 2006).

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However, as it is indicated by Outreville (2011), the share of total insurance premiums of developing countries is very low even though these countries have more than 80 percent of world population. In Jordan, total premiums in 2010 was USD 576 million, where life business was USD 54 million, presenting .00 percent of the world market. On the other hand, Non-life business was USD 522 million, presenting .03 percent of the world market (Swiss Re, sigma No 2/2011, updated January 2012).

The role of insurance market development on economic growth took serious attention by researchers such as Outreville (1990), Soo (1996), Ward and Zubruegg (2000), and Boon (2005). Researchers attention have moved on determining factors that affect the demand for insurance, either life or non-life insurance. Major studies have been performed trying to explain it in theoretical and empirical dimension. While there has been extensive literature examining the determinant of life insurance demand for developed countries, such as Truett and Truett (1990), Browne and Kim (1993), Beck and Webb (2003) and Feyan *et. al.* (2011). The empirical work on developing countries is still lacking a part from few studies, such as Outreville (1996), Ward and Zurbruegg (2002), Hwang and Gao (2003) and Elango and Johnes (2002).

The objective of this study is to highlight Jordan evidence on this issue, by determining the factors driving the demand for life insurance in Jordan during the period from 1970 to 2012, using Ordinary Least Square estimation (OLS).

The study consists of five sections, beside this introduction. Section Two, provides a documentary of the Insurance Industry in Jordan. Section Three, reviews empirical literature and determinants of life insurance. Section Four; discuss the data and methodology used in the study. Follows up by the analysis of section four. Conclusions and Recommendations are stated in section Six.

The Insurance Industry in Jordan:

This section presents an analysis of the insurance industry in Jordan.

Institutional Structure

There are 27 companies operating insurance in Jordan at the end of 2013, one of which is an agency for a foreign company and three of which are Islamic insurance companies (Takaful). These companies practice General insurance {Motor, Marine, Fire risk, General accident and Credit insurance}, Medical insurance and Life insurance.

Sixteen of the twenty-seven companies practice life and non-life business, nine of the twenty-seven practice non-life business only, where there is only one company specialized in life-business. One company specialized in General insurance and taking into account there is no reinsurance company in Jordan and no state controlled companies.

At the end of 2011, the number of employees in the insurance industry reached 2918 employee. In which 2602 of them were working in the insurance companies, 1988 of 2602 employee were in the management and technical staff and the rest 614 employees were in the production staff. In addition, there were 904 employees working as supplementary and support services provider. (Jordan Insurance Federation, 2013).

As indicated in Table (1), insurance premiums continue to increase over the period from 2003 to 2012, where total premium grew by 6.67 percent in 2012 to reach JD 466,606,995 (Life premium grew by 8.75 percent to reach JD 44,373,498 and Non-life grew by 6.45 per-

cent to reach JD 422,233,497). It is also indicated that life business represent a low share of total business not more than 12% over the period from 2003-2012 and unfortunately it continued to decrease for the last four years.

Table (1) Evaluation of Insurance Premiums, 2003-2012

Table	2011	2010	2009	2008	2007	2006	2005	2004	2003	
Volume of Premiums(10 6 JD)										
44.37	40.80	38.04	34.88	35.87	29.18	25.15	22.90	21.52	19.63	Life
422.23	396.63	370.59	330.28	297.15	262.47	233.58	196.3	169.42	151.5	Non-Life
466.61	437.43	408.63	365.15	333.02	291.65	258.74	219.3	191.42	171.5	Total
Share in Total Premiums (%)										
9.51	9.33	9.31	9.55	10.77	10.01	9.72	10.45	11.24	11.51	Life
90.49	90.67	90.69	90.45	89.23	89.99	90.28	89.55	88.76	88.49	Non-Life
Growth Rate(%)										
8.75	7.26	9.06	-2.76	22.92	16.01	9.81	6.42	9.05	-	Life
6.45	7.03	12.21	11.15	13.22	12.37	18.95	15.58	11.93	-	Non-Life
6.67	7.05	11.91	9.65	14.19	12.72	18.00	14.55	11.60	-	Total

Source: Jordan Insurance Federation, different years.

Comparative development:

Jordan insurance markets continue to develop with a penetration of 2.18 percent (penetration of 0.20 percent and 1.98 percent for life and non-life business, respectively), a penetration of over 2 percent of GDP would present a well development industry, compared with a penetration of 6.86 percent for the global world insurance (penetration of 2.88 percent and 3.98 percent for life and non-life business, respectively). Indicating a significant and further growth potential if it faces a number of challenges that affected its performance especially in the life insurance sector.

Recent analysis has highlighted that total premiums in 2010 was USD 576 million, where life business was USD 54 million, presenting .00 percent of the world market. On the other hand, Non-life business was USD 522 million, presenting .03 percent of the world market. (Table 2) Jordan ranked 85, 87 and 80 out of 88 countries { from North America, Latin America and Caribbean, Europe, Asia, Africa, Oceania} in total business, life business and non-life business, respectively.

Table (2) Premium Volume in Jordan.

Jordan	Premium Volume (in million of USD)		Nominal (in USD %)	Changes (in%) inflation- adjusted	Premiums in % of GDP	Share of the world market 2010 (in %)	Share of total Business 2010 (in %)
	2010	2009	2010	2010	2010	2010	2010
Total Business	576	514	11.9	6.6	2.18	.01	-
Life Business	54	49	9.1	3.8	0.20	0.00	9.3
None-Life Business	522	465	12.2	6.8	1.98	.03	90.7

Source: Swiss Re, sigma No 2/2011, updated January 2012.

Comparing Jordan to its partner from the Arab world as indicated in Table 3, Jordan has a much higher total business insurance penetration than United Arab Emirates, Saudi Arabia, Tunisia, Egypt, Qatar, Kuwait and Oman but lower than Lebanon, Bahrain and Morocco. For non-life business penetrations are high relative to the other Arab countries, were Jordan ranked the second after Lebanon. On the other hand, Life insurance has an insurance penetration of only 0.20 and represents only 9.3 percent of total business, where Jordan has a lower penetration than all Arab countries under the study except Saudi Arabia and Qatar. Indicating the underdevelopment of the sector compared to its partner from other Arab countries, which can be due to several factors such as economic, demographic, social or culture, institutional or market structure and political factors, which promote us to explore the determinant of the demand for life insurance in Jordan in this study. On the other hand, Lebanon, Morocco and Egypt show good examples that Islamic countries may have a well-developed life insurance business (Vittas 2004) also while Bahrain is a small island economy but has a well-developed life insurance sector.

Table(3) Insurance Penetration in 2010.

Country	Ratio of Premiums to GDP (%)			
	Total	Life	Non-life	% life of total business
Jordan	2.18	0.20	1.98	9.3
Lebanon	2.97	0.91	2.06	30.6
Bahrain	2.55	0.62	1.93	24.4
United Arab Emirates	2.01	0.36	1.64	18.0
Saudi Arabia	0.98	0.06	0.92	5.9
Morocco	2.84	0.91	1.93	31.9
Tunisia	1.75	0.26	1.50	14.6
Egypt	0.72	0.30	0.43	40.8
Qatar	0.73	0.05	.68	6.4
Kuwait	0.58	0.12	.46	20.8
Oman	1.31	0.22	1.09	17

Source: Swiss Re, sigma No 2/2011, updated January 2012.

Literature Reviews

Most of the previous studies such as, Soo (1996), Ward and Zurbrugg (2000), Boon (2005) found evidence that insurance sectors plays a crucial role in promoting the development and growth of the economy. Researchers attention have moved on determining factors that affect the demand for insurance, either life or non-life insurance. Moreover, the bulk of the existing studies focus on developing countries.

Primarily, studies used the utility function to investigate the life-cycle model. Almost all previous studies took Yaari (1965), as a starting point, he was the first to introduce the issue of uncertainty to life-cycle. Using the utility function of to examine the life cycle model, named the uncertainty of life span of consumption, where he found that individuals utility increase as he purchase insurance. Following Yaari (1965), studies try to examine the behavior of individual (purchasing the life insurance product) demand for life insurance.

Hammond *et.al.* (1967), examined the consumption of life insurance in USA using a cross-sectional data for the year 1953 and 1962. They found that income, net worth, life cycle state and of the age, race, occupation and education determine and influence the individual consumption of life insurance.

On the other hand, Lewis (1989), investigate the behavior of the beneficiaries (spouse and children), he found that life insurance consumption increase as risk aversion and probability of death increase and it decreases as the policy charges and family wealth increases.

Then studies try to examine the determinant of life insurance in supply and demand function either at country level or at cross-country level. Studies that examine both supply and demand side for cross-country level Such as Beenstock *et.al* (1986), use data for 10 developed countries during the period from 1970-1980. Outreville (1996), use data for 48 developing countries for 1986.

On the other hand, recent studies investigate the determinant of demand for life insurance such as, Truett and Truett (1990); they compare the demand for life insurance between US covering the period from 1960 to 1982 and Mexico covering the period from 1964 to 1979.

At cross-country level, Browne and Kim (1993), Use data for 45 developed and developing countries (the Arab countries included were Egypt, Morocco and Tunisia) for the year 1980 and 1987. Ward and Zubruegg (2002), compare the determinant of demand for life insurance between Asian(including Jordan) and OECD countries during the period from 1987 to 1998. A larger dataset of 68 developed (the Arab countries included were Egypt, Algeria and Tunisia) and developing countries during the period from 1961 to 2000 was conducted by Beck and Webb (2003). Similarly, Feyen *et.al.* (2011) and Park *et.al.* (2002), studied 90 developed and developing countries during the period from 2000 to 2008 and 37 countries across the glob, respectively. For emerging countries Elango and Jones (2011), focused on the determinants of the demand for life insurance for 35 countries (the Arab countries included were Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Qatar and United Arab Emirates) during the period from 1998 to 2008.)

At a single country level, Hawang and Gao (2003) examined the determinant for demand for life insurance in China during the period from 1986 to 1996. For Malaysia, Mahdzon and Victorian (2013), examine the determinant of life insurance demand of policyholder using a survey collected from 259 policyholders from the largest 5 life insurance companies in Malaysia, they found that demand for life insurance is derived by demographic and saving motives and not derived by financial literacy.

The determinant of demand for life insurance and Hypotheses.

Based on the previous studies we can group our explanatory variables into two groups.

First, the Economic Variables, which deals with the overall economic situation of a country (Income level, and Inflation).

Income Level it is the most important factor affecting the demand of life insurance. Higher income level will increase the demand for life insurance because as the income level increase, the ability to afford the life insurance product will increase (Feyen *et. al.* 2011). To maintain income and observe the excess income because life policy can be described as a saving instrument also as the presence of dependent member in the family for high level income family, the more the demand for life insurance product to hedge against the premature death(mortality risk), to maintain the same living standards(Hwang and Gao 2003).

Most studies found a positive and significant effect of the income level on the demand of life insurance, such as Browne and Kim (1993), Outreville (1996), Ward and Zurbruegg(2002), Beck and Webb(2003), Hwang and Gao (2003), Donghwi *et. al.* (2007), Feyen *et. al.* (2011), Elango and Jones (2011). Most studies measured it by Gross Domestic Product (GDP) as its

growth rate or per capita basis. Therefore, the following alternative hypothesis is proposed,

H1, There is a statistically significant relationship between the level of income and the demand for life insurance in Jordan.

Inflation Rate as it is known that inflation rate has a great effect on the economy as general and most studies found a negative effect on life insurance demand such as Browne and Kim (1993), Outreville(1996), Li et.al.(2007), Beck and Webb(2003), and Feyan *et. al.* (2011). It can be explained as inflation rate increases, the individuals saving decrease and life insurance policies as a saving instruments become less attractive.

Cargill and Troxel(1979), where they studies the effect of anticipated inflation in detailed on demand for life insurance they found negative but not significant effect.

Some studies used the average inflation rate such as Browne and Kim (1993), Outreville(1996) and Li *et.al.*(2007). On the other hand, other studies used the current annual inflation, such as, Feyan *et. al.* (2011), Elango and Jones (2011), Therefore, the following alternative hypothesis is proposed,

H2, There is a statistically significant relationship between the level of inflation and the demand for life insurance in Jordan

Second, **The Demographic variables**, which deals with the distribution of individuals that influence the demand of life insurance (Urbanization and age dependency ratio).

Urbanization measured as share of urban population in the total population, where Feyen *et. al.* (2011) used population density as a proxy for urbanization indicating that it is not a perfect proxy in some economies. Many researches imply a positive and significant effect such as, Hwang and Gao (2003), Hwang and Greenford (2005), Feyan *et. al.* (2011) and Elango and Johnes(2011). Because higher urbanization indicating more customer concentration and reduction in the cost of marketing and distribution of life insurance products (Beck and Webb 2003).

On the other hand, Outreville (1996) who used the agricultural status of the country (the rural population as a percentage of total population) as a proxy of urbanization and Beck and Web (2003), found insignificant effect on demand for insurance. Therefore, the following alternative hypothesis is proposed,

H3, There is a statistically significant relationship between the level of urbanization and the demand for life insurance in Jordan

Young Dependency, measured as the ratio of younger dependent (people younger than 15) to working age population (those ages 15-64). Beck and Webb(2003) argued that higher ratio means there are more younger population than older which means increase demand to hedge against morality risk(premature death), on the other hand, because most of the population is young which means they are not interesting in life policy as a saving and retirement instrument. Were they do not find a significant effect, their results is consistent with the results of Outreville(1996). Truett and Truett(1990), Browne and Kim (1993) and Feyan *et. al.* (2011), found a positive significant effect. Ward and Zurbruegg(2002) found a positive and significant effect for OECD countries but not significant effect for Asia countries. On the other hand, Li *et.al.*(2007) and Sen (2008) found negative and significant effect. Therefore, the following alternative hypothesis is proposed,

H4, There is a statistically significant relationship between young dependency and the demand for life insurance in Jordan

Variables and Measurements

We conduct an empirical analysis to find out the determinant of life insurance demand in Jordan, where total life insurance premium, and life density will measure life insurance demand. The independent variables will be classified into two groups Economic Variables, Income Level measured by GDP per capita at constant JD and Inflation Level, measured as annual percentage change in Consumer Price Index(CPI). Demographic Variables, Urbanization measured as Share of urban population in the total population and Young Dependency measured as the ratio of younger dependent (people younger than 15) to working age population (those ages 15-64). Using regression model with time series data between 1970 and 2012. The insurance variables were taken from the Jordan Insurance Federation (JOIF). The independent variables were obtained from the World Development Indicators (World Bank). Table 4 shows the summary of variables {definition, sources and expected relation with life insurance demand}

Table 4 Summary of the study Variables.

Variable	Proxies	Definition	Expected relation with demand for life insurance	Sources of Data
Dependent Variable				
Life Insurance Premium	Premium	Annual life insurance premiums	-	Jordan Insurance Federation (JOIF).
Insurance Density	Density	Annual life insurance premiums divided by Population	-	Jordan Insurance Federation (JOIF).
Economic Variables				
Income level	GDP	GDP per capita at constant JD	+ve	World Bank, World Development Indicators (WDI)
Inflation Rate	INF	Annual percentage change in CPI (%)	-ve	WDI
Demographic Variables				
Urbanization	URB	Share of urban population in the total population (%)	+ve	WDI
Young Dependency Ratio	Young	The ratio of younger dependent (people younger than 15) to working age population (those ages 15-64). (%)	-ve	WDI

Research Methods

To explore the relationship between these variables and the demand for life insurance Ordinary Least Square estimation (OLS) is applied , which is expressed in logarithmic value (Truett and Truett, 1990; Browne and Kim, 1993, and Hwang and Gao, 2003), where they argued that logarithmic linear equation is mostly applied for demand model, were estimated coefficient are described as elasticities.

In order to check whether the time series are stationery or non-stationary (having unit root), the unit root test for all time series are applied. The Dickey-Fuller test shows that for all the variables, except the dependent variables, the existence of unit root cannot be rejected at 5%

level of significance. Therefore, all the explanatory variables are non-stationary and have unit root. However, the unit roots test and visual inspection (graph) show that the first differences are stationary. It is clear that if each variable has unit root, then the regression analysis based on the non-stationary variables can be spurious regression. Thus, we need to check if there is a co-integration relation among variables. If they are co-integrated, then the regression analysis makes sense. If there is no co-integrating relation, then the regression result does not make sense. However, the result of the Engle-Granger (tau) co-integration tests show that the time series are co-integrated.

A Variance Inflation Factor (VIF) test was applied to test for Multicollinearity; the mean VIF for the three models was under 10 meaning that the estimation of Multicollinearity is not violated. The heteroscedasticity test (Brusch-Pagan test) associated with estimation of the models present can accept the null hypothesis of homoscedasticity and can use the OLS estimation.

To test our hypothesis,

The following two models, which relate life insurance demand and the economic and demographic variables, are applied;

$$Lpremiuims_t \equiv \beta_0 + \beta_1 \Delta LGDP_t + \beta_2 \Delta LINF_t + \beta_3 \Delta LURB_t + \beta_4 \Delta LYoung_t + \Sigma_t \quad t=1970, \dots, 2012 \text{ (OLS-1)}$$

$$LDensity_t \equiv \beta_0 + \beta_1 \Delta LGDP_t + \beta_2 \Delta LINF_t + \beta_3 \Delta LURB_t + \beta_4 \Delta LYoung_t + \Sigma_t \quad t=1970, \dots, 2012 \text{ (OLS-2)}$$

Where: premiums represent annual life insurance premiums; Density represents insurance density; GDP represents GDP per capita; INF represents inflation level; URB represents the urban population; Young represents young dependency ration; and t represents the year. The parameter β_0 is an intercept. The coefficient $\beta_1, \beta_2, \beta_3, \beta_4, ,$ are unknown parameters. L represents logarithms; Δ represents first difference; and Σ represent random error term.

Empirical Results

Summary statistics on the explanatory variables are reported in Table (5); the gross life insurance premium in Jordan has been successful in achieving rapid economic growth between 1970 and 2012, where it has been grown from JD 495000 in 1970 to JD 44,373,498 in 2012.

Table (5) Descriptive Statistics.

Variable	Mean	SD	Minimum	Maximum	Observation
life insurance premium(JD)	10.585	12.122	495000	4	43
Insurance Density (%)	2.714	1.922	0.328	7.021	43
Income level (JD)	1223.05	231.30	716.22	1664	38
Inflation Rate (%)	6.56	5.60	-0.20	25.71	43
Urbanization (%)	71.10	9.83	56.00	83.00	43
Young Dependency Ratio (%)	81.49	15.88	55.00	102.00	43

The penetration ratio has increased between 1970 and 2012. Even though the penetration ratio is still very low (under 2 percent), where the mean was 0.236 percent and the maximum penetration was 0.4219 percent in 2012.

The direct insurance premiums value per capita in Jordan shows an increasing trend between 1970 and 2012, this value rose from JD 0.33 in 1970 to JD 7.02 in 2102.

Although the insurance density and penetration in Jordan is still low, the life insurance industry has grown rapidly since 1970, implying the possibility of more success if we determine the factors that affect the demand for life insurance in Jordan.

The independent variables, the income level measured by GDP per capita shows an increasing trend between 1970 and 2012, with an average of JD 1233.05 indicating that

Jordan is a lower middle-income country. The average inflation rate is around 6.56 percent during 1970 and 2012, where this rate is considered high. In addition, there is high level of urbanization in Jordan with a mean of 71.1 percent meaning that most of the population is in cities.

Jordan population reach 6,318,000 at the end of 2012, where total population between ages 0-14 represent 34 percent of total population, total population between ages 15-64 represent 62 percent of total population and total population over 65 represent 3 percent of total population. Indicating that most of the Jordanian are young. Average young dependency ratio was 81.5 percent between 1970 and 2012, the higher this ration, the higher the demand for premature death products by income (Ward and Zurbruegg 2002).

The OLS estimation of the models gives us the following results (Table 6), for Economic Variables; for income level there is a statistical positive relation at 5 percent confidence between GDP per capita and demand for life insurance in Jordan. Measured by either gross life insurance premiums or insurance density. Consequently we accept hypothesis one. Indicating as the income is enhanced for Jordanian people, there demand will increase because life insurance products will become more affordable.

Table (6) Determinants of Life Insurance Demand in Jordan.

Variable	OLS-1	OLS-2
Constant	.0076 (.737)	-.0036 (0.872)
GDP	1.135 (0.024) **	1.152 (0.020)**
INF	.0893 (0.082)***	0.0963 (0.057)***
URB	7.777 (0.056)***	7.1082 (0.073)***
Young	-.3633 (.820)	-.2004 (0.898)
Observation	32	32
R-squared	0.35	0.36

Note: p-values in parentheses.

***, **, * represent significance at 1%, 5% and 10% level, respectively.

Our results is consistent with the results of most previous studies such as Truett and Truett (1990), Browne and Kim (1993), Outreville(1996), Ward and Zurbruegg (2002), Beck and Webb(2003), Hwang and Gao (2003), Donghwi *et. al.*(2007), Feyen *et. al.* (2011), Elango and Jones (2011).

Since logarithmic values are applied, the estimated coefficients are measures of elasticity. Implying that an increase in 10 percent of GDP per capita, the life insurance demand will increase by 13.13 percent indicating that demand is income elastic, this results is considered with the result of Ward and Zurbruegg (2002) for the Asian-sub sample.

In addition, it was argued that for a better understanding the demand for life insurance we need a measure that interact between the level of income and the distribution of income such as income inequality such as Gini Index that was used by Beck and Webb (2003) were they found no significant effect on demand for life insurance. or the share held by richest quintile used by Feyen *et. al.* (2011), were they found negative effect on demand for life insurance demand, their results are consistent with the results of Beenstock *et. al.* (1986). However, because of unavailability of data the whole period between 1970 and 2012. Income share held by highest 20% in Jordan was 43.8%, 50%, 44.4%, 46.1%, 45.5%, 42.3% and 43.6%, for the years 1987, 1992, 1997, 2003, 2006 and 2010, respectively. And the Gini Index was 36.1%, 43.4%, 36.4%, 38.9%, 37.7%, 33.8% and 35% for the years in the years 1987, 1992, 1997, 2003, 2006 and 2010, respectively¹.

For inflation level, it was found that there is a statistical positive relation at 10 percent confidence between inflation level and demand for life insurance, measured by gross life insurance premiums and insurance density. Consequently, we accept hypothesis two.

Indicating that demand for life insurance in Jordan is increasing although there is a high level of inflation. This surprising result can be explained as Hwang and Gao (2003) explained there results for china . In Jordan, the average economic growth rates (it was around 2.50 percent measured by growth in GDP per capita) was higher than the average level of inflation rates (it was around 6.56 percent) during the period under study. Indicating that the negative impact of inflation in Jordan did not affect the living standard for Jordanian people and consequently their demand for life insurance products.

Our results regarding the sign of the relation is consistent with the previous studies for developing countries such as Ward and Zurbruegg (2002) for their sample for Asia tiger and Elango and Johnes (2011), where they found positive but insignificant results.

In addition, we try alternative measures for inflation such as inflation GDP deflator (annual %) following Elango and Johnes (2011) and current and past inflation rates following Hwang and Gao(2003). In order to check that our results are not spurious because of our choice of variables but we also found the same results.

For demographic variables, there is a statistical positive relation at 10-confidence level between urbanization and demand for life insurance, measured by gross life insurance premiums and insurance density. Consequently, we accept hypothesis three. Our results are consistent with the results of Hwang and Gao (2003), Hwang and Greenford (2005), Feyan *et. al.* (2011) and Elango and Johnes (2011).

Implying that as the urbanization ratio increase, the demand for life insurance will increase in Jordan in sense of decreasing the cost of marketing and distribution of life insurance products.

Also as Hwang and Gao (2003) argued that as urbanization ratio increases, the percentage of population in cities increases, changing the social and demographic structure of the society enhancing people to rely more on themselves and their families and consequently increase the demand for life insurance.

For age dependency, we found no statistical significant relation between young dependency and the demand for life insurance in Jordan, measured by gross life insurance premiums and insurance density. Consequently, we reject hypothesis four, and accept the null hypothesis. Our results are consistent with the results of Outreville (1996), Ward and Zurbruegg (2002) for Asia countries, and Beck and Webb (2003).

¹ Data for Income inequality was take from the World Development Indicators (World Bank).

Implying that the demand for life insurance in Jordan is not motivated by young dependency, although most of the working people in Jordan are young. In 2012, the young dependency ratio was 55 percent and the old dependency ratio was 6 percent.

Indicating that most of the Jordanian are young to consider saving for retirement and thus decrease the demand for life insurance products. Consequently, we recommend increasing the attention on products to protect against morality risk (products bought by income-earner to protect against premature death) (Beck and Webb 2003).

Recommendation and Conclusion

The demand for life insurance in Jordan has grown rapidly between 1970 and 2012, where total life insurance premium was JD 495,000 in 1970 and reached 44,373,498 in 2012. In this study, we investigated the determinants of demand for life insurance measured by total life premiums and insurance density in Jordan during 1970 and 2012.

The study found that the demand for life insurance products is influenced by increase in income level and urbanization, suggesting that the life insurance industry can be well developed in lower-middle income country. In addition, the demand for life insurance in Jordan increases during inflationary period because, the average economic growth rates was higher than the average level of inflation rates during the period under study. However, the study found no evidence of young dependency on the demand for life insurance in Jordan, suggesting increasing the attention on products to protect against morality risk.

Future research is recommended in this area for Jordan (most of the previous study takes Jordan as in aggregate sample for developing countries, such as Ward and Zurbruegg 2002, Elango and Johnes,2011), including other economic and demographic variables, as well as adding institutional, social and political variables.

Although the current study focused on the demand side for life insurance, future research is recommended to investigate the supply side of life insurance in Jordan, as advocated by Browne and Kim (1993) focusing on government regulation, trade barriers, capital technical expertise and infrastructure for marketing and serving of life insurance products.

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Deflation and Economic Growth in Japan

Ehsan Rajabi • Junaina Muhammad

Abstract Fear of deflation leads to the hypothesis that deflation can have influential negative impact on growth. This paper aims to examine the relation between deflation and growth slowdown of the Japan economy through threshold effect. By using quarterly time series data from 1965 to 2010, log functional form and OLS threshold regression method, the research found existence of the threshold effect which is significant statistically and strong economically. The threshold point of mild deflation is actual true zero inflation. Below this point, the negative impact of deflation will occur on growth. However this finding is sensitive to period of study. Negative threshold impact of deflation turn to be insignificant if period 1990 to 2010 is taken. In addition, deflation has positive impact on economic growth. These finding which are observed from period with prevalence of deflation is in striking contrast with predication of fear of deflation theory of Keynesians but consistent with Austrian Business Cycle and productivity norm deflation theories. Hence, reasons for fear of danger of deflation in the case of Japan cannot be justified.

Keywords Deflation - Economic growth - Threshold

JEL Classification E31 - F43

1. Introduction

Does deflation have negative impact on growth? Friedman in his works shows that optimal growth will happen under mild deflation Friedman (1969). Selgin and most Austrian economists advocate productivity norm and mild deflation through free banking system (Salerno, 2003; Selgin & Affairs, 1997) As Selgin and Affairs (1997) mentioned, there is expectation of policy makers and economists to prepare themselves for mild deflation goal to achieve better allocation of resource and more growth, since indeed, most of developed countries have

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reached to this goal already (Borio & Filardo, 2004; T. Cargill & Parker, 2003; T. F. Cargill, 2001). Nonetheless, the end of 20th century was witnessed of growing fear of most economists and central bankers around the world about danger of deflation.

Cargill and Parker (2003); DeLong and Sims (1999) warned about danger of deflation. They believed, deflation must be taken into serious consideration even more than inflation, since CPI index has upward bias which means with low level of inflation in developed countries, actually the most important part of the world is in zero inflation which is a critical point to slip into trap of deflation. This fear is also shown in policy meeting in the world. Federal Open Macroeconomic Committee (FOMC) at its meeting in May 2003 warned US about danger of deflation, IMF Report on Deflation (2003) warned Europe especially Germany and Switzerland over the risk of deflation (M. D. Bordo, Lane, & Redish, 2004). Most of the economists had reflected this fear into experience of Japan in 1990th and beginning of 21th century which triggered hot debate between bank of Japan and other economists (e.g. Bernanke, 2000; T. F. Cargill, 2001; T. F. Cargill & Parker, 2004a, 2004b, 2004c; Ito & Mishkin, 2005; Ito & Mishkin, 2006; P. R. Krugman, Dominquez, & Rogoff, 1998). Figure 1 shows Japanese experience of deflation from 1990 to 2010.

Japan experienced bubble and burst from 1985-1990 (Ito & Mishkin, 2006). After that banking system faced crises, and there after Japan fall into stagnation followed by deflation. Hence most of them blamed bank of Japan policies for not being so active that had led Japan into long lasting deflation and stagnation. Figure 2 shows this long run stagnation of Japan specially after 1990.

This study conjectures that if the fear of opponents of deflation in Japan is valid, therefore it must exist not only negative impact of deflation on growth but also negative threshold effect of deflation on growth of Japan. Since as they theorized, there is no symmetric effect between inflation and deflation and low deflation almost have similar effect with high inflation on growth.

Many studies about threshold effect of inflation and growth have reached to this conclusion that low inflation will promote growth and after a rate of high inflation, threshold effect or structural break will appear that will lower growth (Khan & Ssnhadji, 2001; Sarel, 2006). Nevertheless, to the knowledge of this paper, no studies pay much attention to study of threshold effect of deflation on growth, in spite of the worldwide growing fear of deflation specially for the case of Japan. This study aims to fill this gap by examining the existence of threshold effect of deflation on growth during 1965 to 2010 for the Japan economy.

The Figure 3 below illustrates the aim of research better. Point A show optimal point of inflation according to monetarist view. According to this view for sustainable growth economy needs very low level of inflation which range from 2 to 5 percent each year. Above this range growth will be decreased. However, by increasing inflation, economy will reach a point call point B, which after that point, another impact of inflation on growth will be appeared, which cause growth decline more than before. This effect is call threshold effect of inflation on growth. Studies documented this point 12 percent for developed countries and 40 percent for underdeveloped countries. However if prices decrease below point A what will happen on growth? Below point A, growth will decrease as well, however if inflation reaches to Zero then changes to deflation, there is expectation of threshold effect of deflation on growth according to theory of fear of deflation. Searching and documenting this threshold point is new contribution of this research. In addition this study wants to know whether the impact of this threshold point is dependent on period of study or not. For this reason we divide the whole period into two subdivisions, period with low frequency of deflation which is 1965 to 1990 and period with high frequency of deflation which is 1990 to 2010. These subsamples give us better illustration of frequency of deflation than other subsamples such as 1965 to 1985 and 1986 to

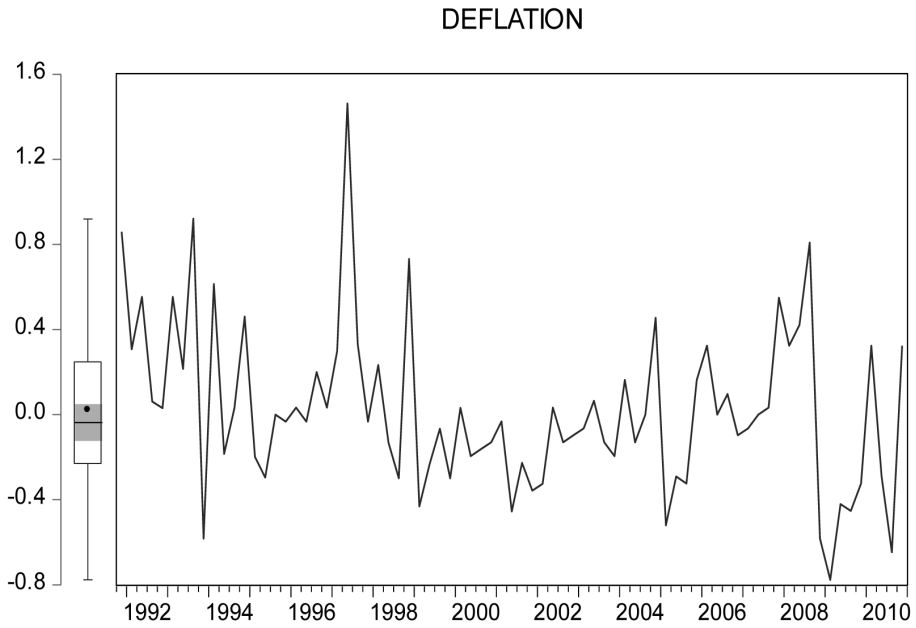
2010. Therefore, based on theory of fear deflation we predict that period with high frequency of deflation, negative threshold impact should be significant and greater than period with low frequency of deflation.

Study chooses Japan for these following reasons, since Japan is the only country which has experienced a relatively long deflation and decline in growth after World War II. As P. Krugman (2000) said: Japan is a leading indicator of “depression economics”. Great importance of the Japanese economy as one of the largest economies in the world implies that malfunction of the Japan economy can lead whole world into depression. That is why Krugman named it leading indicator of “depression economics”.

The rationale for choosing deflation is that, deflation is critical point in economic system which affects many social and economic factors; therefore judgment about deflation is judgment about value and logic of whole system. This strong statement about deflation follows from two contradicting views about deflation in history of economic idea. Based on proponent view of deflation, deflationary monetary system is essential for an economy to conduct its information effectively according to scarcity of resources to the decision makers thus it will enhance division of labor and productivity in long run and will prevent an economy to be trapped into great depression by cluster of market participants’ errors. Hence economy with deflationary monetary system is more stable, more productive than inflationary monetary system. In addition, this kind of system does not need any central planning like central banking, therefore, individuals have control of their money and wealth in their hand. Hence by virtue of these features individuals in deflationary monetary system have more freedom and independence than in inflationary monetary system. Furthermore they can better supervise their government from abusing their power against society since taxation is prime way of getting income in this regime. In overall the only consistent and ethical regime with value of freedom and free individuals is deflationary monetary system. On the other hand, opponent view of deflation claims that modern monetary system cannot stand deflation. Since by advent of deflation, modern economy will be led into downward spiral of depression and deflation which will be ended up not only in bankruptcy of most companies but also government (Fisher). Hence deflation will lead modern economy into great depression, high unemployment, poverty which will tear the fabric of social cooperation and integration. Therefore for sake of freedom of individual and social security it is needed to take certain measures to avoid of this treat as soon as possible. By examining relation of deflation and growth in the case of Japan, the research may be able help policy makers to choose proper view and avoid the wrong one for designing and implementing sound financial system.

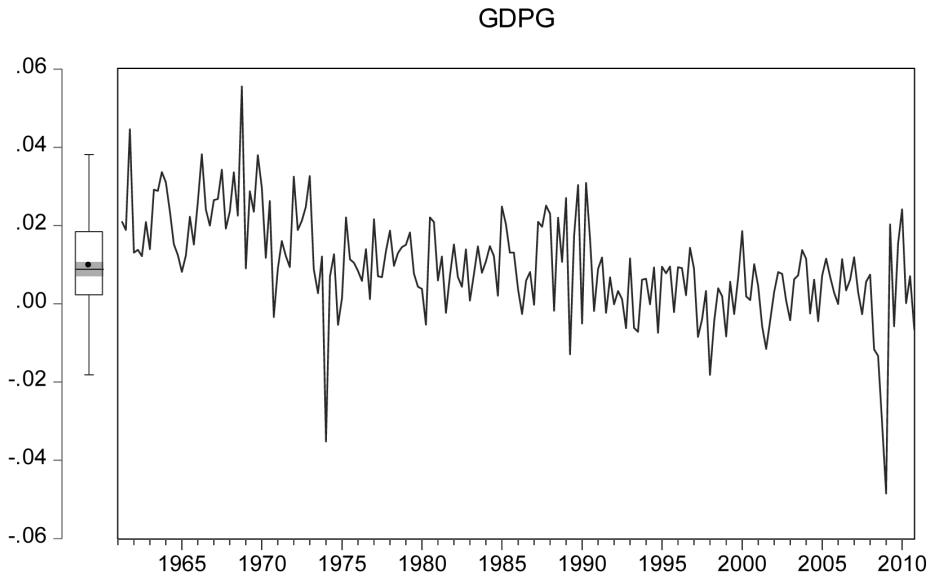
The organization of paper will be as follow, related literature to the study will be reviewed in Section 2, theoretical frameworks, model, methodology, data description in Section 3, and result discussions will be explained in Section 4. Finally, the research will be concluded by summary, conclusion, policy implications, limitations of study and area for further study in Section 5.

Fig.1 Deflation of Japan from 1992 to 2010



Source: OECD Economic Outlook, last updated date 12/6/2011. Based on Japan, consumer price index, Index, 2005=100, Adjustment Price Index.

Fig. 2 Growth slowdown from 1960 to 2010



Source: OECD Economic Outlook, last updated date 12/6/2011. Based on Japan, gross domestic product, Constant Prices, JPY, 2000 prices, seasonally adjusted quarterly data.

2. Literature review

The studies which have examined the relation of deflation and growth in other countries except Japan will be reviewed at first and the Japanese experience of deflation will come after. This review has used the new terminology: danger, severe danger and real danger for sake of clarity. As this paper mentioned earlier, danger means long run negative effect on growth, severe means run long negative effect of deflation on whole economy and real means lack of possible economic explanation for positive effect of deflation on growth.

2.1 Worldwide experience of deflation

In order to answer to this question that whether deflation is danger to economy,(M. D. Bordo et al., 2004); M. D. Bordo and Redish (2003) studied the United States ,Canada, the U.K. and Germany from 1880-1913, the period which is called classical gold standard .they used panel data regression and sensitivity analyses. They found that not only deflation is not danger but also is good or at best neutral. The exception was Canada in which monetary factor was important in effecting long term output, however this finding was challenged by economic historian(Thornton, 2003).

Thornton (2003) explained that Canada at that time was in the primitive state of development near to barter economy ,and money was gold which itself was considered as commodity in national accounting .Discovering mines of gold at that time in Canada had attracted many investors and factory builders, labors which promote economic growth. Therefore, it was not mere money like paper money without any cost of production which stimulates growth, rather it was commodity money such gold that had done this task. Moreover this new gold caused monetization of economy which intensified division of labour and consequently long term growth.

In another study M. Bordo and Filardo (2005) found that deflation will appear in three type good, bad and ugly deflation. Their statistical findings showed that most deflation is not associated with decline in output. Moreover; they found deflation and depression are quiet rare in history. They found also that deflation can be dangerous as name it bad and can be severe danger as name it ugly.

In similar study Borio and Filardo (2004) examined relation between deflation and depression with panel data method form 1800 to 2002 on G10 countries. They found that history is full of good deflation with exception of great depression period. Study of Atkeson and Kehoe (2004) admit finding of M. Bordo and Filardo (2005); Borio and Filardo (2004) “ *the only episode in which we find evidence of a link between deflations and depression is the Great Depression (1929–3)* ”. They found that deflation is not necessarily associated with depression since there are many period of deflations with growth and many periods of inflations with depression.

Guerrero and Parker (2006a) challenged the findings of Atkeson and Kehoe (2004) from methodological point of view “*A downside of their procedure is an obvious loss of degrees of freedom in their estimates*”. They examine the relation between deflation and depression and found that deflation and depression are less common after Second World War but they happened in quarter of observation before that time. They also found in contrast to Atkeson (2004) that incidence of deflation and depression is not just limited to great depression period, rather OECD countries have experienced deflation; however, as them-selves said their finding is not so robust. Furthermore the existence of deflation in OECD countries per se did not prove that

deflation is dangerous or bad. As M. D. Bordo et al. (2004); M. D. Bordo and Redish (2003) have shown, monetary factors are not important. Even for great depression period it is not clear that monetary factors had affected output negatively in long run.

Although Bermanke and James (1991); Bernanke (1994) tend to support monetary factors Cole, Ohanian, and Leung (2005) found that effect of total factor of productivity is more important than deflation in great depression period. They examined the effect of deflation and productivity shocks on output 1929 -1933 with a fully articulated model and panel data regression in 17 countries and show that productivity is the dominant shock, accounting for about 2/3 of the depression, with the monetary shock accounting for about 1/3. The finding of this article is kind of exceptional since most of the other articles had found that monetary shock is more important in era of great depression. Furthermore, it explains that recession in form of decreasing productivity can trigger deflation. These productivity shocks can be stemmed from high regulations such as antitrust regulation, labor union regulations, high tax income and high tariff in period between 1920 to 1940. However, it can be argued that depression or decreasing total supply is not sole factor in bringing deflation, in order to have deflation it is needed that society save more and spend less which is indicated by monetary shock. As Rothbard showed in his book decreasing total supply and total demand will bring deflation to economy.

Guerrero and Parker (2006b) again in another study examined USA history of deflation and depression from (1789-2003). They took the suggestion of Atkeson and Kehoe (2004) and control their study for regime dependency by defining eight dummy variables. The result was that deflations alone do not Granger-cause recessions, but recessions do Granger-cause deflations. By defining interaction term of deflation and recession, they applied another statistical test since effect of deflation on growth is reinforced with recession. This could be interpreted as testing Fisher (1931) hypothesis that debt and deflation jointly have strong negative impact on economy. They found that deflation along with recession has negative effect in growth. However they could not find any long run relation between deflation and depression by means of cointegration test. This was consistent with quantity theory of money. Therefore deflation cannot be danger for economy.

Just few studies, examined the severity of deflation. M. Bordo and Filardo (2005); Bordo and Filardo (2004) show that great depression of USA could be ugly deflation. Ugly deflation is near to meaning of severe in this sense that reinforcing spiral of debt deflation along with market mechanism could have damaging effect on economy even to bankruptcy of whole system. Bermanke and James (1991) saw debt-deflation spiral great importance in affecting USA great depression, but M. Bordo and Filardo (2005) has doubted to this conclusion.

This finding leads the research to reality of this danger which means whether deflation is real danger or illusionary danger. In another world, it is understood empirically that deflation could be good for growth, is there any economic theory to support it?

Friedman (1969) proved that optimal growth will happened under mild deflation. Selgin and Affairs (1997) in his study, advocate mild deflation as productivity norm for new monetary policy. According to Selgin and Affairs (1997) Productivity norm is going to reflect itself into mild deflation, allows for changing of relatives price in accordance to scarcity of resources, choices and tastes of public. It means that relative prices signal the true information about scarcity of resources and tastes of consumers which will lead economy to more effective allocation of resource and growth as well. Austrian economists (e.g. Bagus, 2003, 2008; Rothbard, 2004; Salerno, 2003) have this view as well. Moreover, they add that mild deflation brings also stability for economy. In their view mass entrepreneurial error is created through injecting easy credit and paper money by new banking system which makes economy unstable.

The overall review of these empirical researches tends to support that deflation as monetary phenomena cannot effect growth negatively in long run. In other world non-monetary factors are important for effecting output. It remind us the notion of classical economists, Austrian economists like Mises (1953) that money is just medium of exchange not wealth and its quantity is not important. In addition, they have shown deflation is not only danger, but also could be good one, empirically. Nevertheless, there are also period of deflations and depressions, but they are not full proof evidences to conclude deflation causes depression.

2.2 The Japanese experience of deflation

Many studies which are done about Japan blamed deflation and policy of central bank of Japan as main cause of long lasting recession of Japan (e.g. Bernanke, 2000, 2002; T. F. Cargill, 2001; T. F. Cargill & Parker, 2004a; Ito & Mishkin, 2006; Itoh & Shimoi, 2000; P. Krugman, 2000; P. R. Krugman et al., 1998). T. F. Cargill and Parker (2004b) examined association between consumption and deflation by using OLS method and annual data for Japan (1955-2002) and the United States (1929-2002). They found that deflation can lead to decrease in consumption and aggregate demand.

Nevertheless, all economists were not convinced that deflation was responsible for the Japanese stagnation and recession. The Bank of Japan reasoned that nonmonetary factors were primary cause for deflation and recession (T. F. Cargill & Parker, 2004b). Ahearne et al. (2002); Borio and Filardo (2004); Koo (2003); Okina and Shiratsuka (2003) are not convinced that the mild deflation is responsible for output stagnation. Atkeson and Kehoe (2004) Claimed that recession of the Japanese economy cannot be attributed to deflation. Hayashi and Prescott (2002) argued that the economic slowdown in Japan in recent years can be explained by decline in TFP, while the demand-led factors, in their view, are not significant. In contrary, Motonishi and Yoshikawa (1999) hold that negative demand-led factor is the most important cause of the present stagnation of Japan. their finding is reinforced by Fukao, Inui, Kawai, and Miyagawa (2004) which conclude that decline in TFP growth at the macro level from the 1980s to the 1990 was not to be so great, and only could explain 0.20 point of output change. Johnsson (2005) studied the experience of the Japanese deflation from 1990 -2001 with Austrian school view point. He found that there are both productivity driven deflation and demand led deflation in Japan in this period.

In summary, most study about deflation and depression favored the non monetary factors but most fear about deflation in Japan stems from monetary factors. From this contradiction, this study wants to understand how much the reason behind this fear is valid. Hence this review shows that evidence about danger of deflation in general and especially about Japan is mix and needs more study. By searching for threshold effect point, in next section, the research will examine to what extend this fear is reasonable.

3. Data and Methodology

Augmented Dickey-Fuller and Phillips-Perron Unit Root tests will be run by research to check for integrity of data on level, if all variables were stationery on level then OLS regression can be applied on data. Multicollinearity, Misspecification of Model, Serial Correlation and Heteroskedasticity will be checked by appropriate tests and methods. These tests and method are: Adjusted R-squared, AIC, SBC and HQC statistics, Residual normality test, Ramsey Reset

Test, CUSUM of Square Test for checking the misspecification of model, Breusch-Godfrey Serial Correlation LM Test for serial correlation problem, and Breusch-Pagan-Godfrey Heteroskedasticity test for checking Heteroskedasticity.

If the model had one of these problem, the research tries to resolve the problem, and if not the OLS regression is BLUE estimator of β (Asteriou & Hall, 2007) Therefore the model will be run with OLS method after meeting the Classical assumptions of OLS.

3.1 Model specification

For examining the existence of threshold effect during deflation, proxy of these variables should be defined and included in regression line. For doing this task quarterly time series regression from 1965 to 2010 and control variables such as population growth, term of trade growth, initial income

$$dY_t = \alpha + \Upsilon * Def_t + \beta dX_t + \xi * D_0 * Def_t + \varepsilon_t \quad (1)$$

X is proxy of control variables other than Dummy. $D_i * Def$ is interaction term of Dummy with deflation or inflation. d is proxy of change which this study is used growth instead. t implies that data are time series. Therefore, the model of interest is below model:

$$FDPG_t = \alpha_1 + \alpha_2 Def_t + \alpha_3 d_i * Def_t + \alpha_4 POPG_t + \alpha_5 IGDPG_t + \alpha_6 INING_t + \alpha_7 OPENG_t + \alpha_8 TOFTG_t + \varepsilon_t \quad (2)$$

The Dummy deflation model defined as below:

$D_i = 1$ if $Def \leq 0.00$ percentage inflation

$D_i = 0$ if $Def > 0.00$

GDPG = the growth rate of GDP

Def = price level change which is deflation or inflation. Deflation is measured as decline of price level from previous time period and inflation is measured as increase of price level from previous period.

IGDPG = the growth rate of GDP dedicated to investment

POPG = the growth rate of population.

INING = the growth rate of initial income level.

OPENG = the growth rate of openness

TOFTG = the growth rate of term of trade.

The Dummy variable is defined as threshold points for negative impact of true deflation on growth based on researches which are done on Upward CPI Bias. These Dummy are therefore: is defined as deflation less than equal zero percentage point nominal inflation.

Initial income level is defined as GDP per capita from the previous period and openness is measured as proportion of exports plus imports in GDP and term of trade is measured as exports divided by imports and Quarterly CPI index is used for measuring changing of price level.

3.2 Description of data

All variables of this paper are obtained from quarterly seasonally adjusted time series of original variables from 1965 to 2010 with exception of population. The rationale behind choosing

quarterly rather than annual time series for deflation is that unlike inflation, deflation will affect the decision of market participants regarding production much sooner than inflation. For inflation to have real effect on production it needs at least 18 months, in another word it has 18 months' time lags, however for deflation it just need less than 3 months or 3 months time lags. This is so because decision regarding initiating a new project or expanding an old one due to inflation is much more time consuming than decision regarding cutting of production due to deflation. Hence using quarterly data has much more information for studying deflation than annual data. The original quarterly seasonally adjusted variables are real GDP, export, import, gross fix capital formation and CPI which all are expressed in 2000 year constant prices in term of Millions Japanese Yen with exception of CPI which is based on 2005 year in term of percentage. All of them are from OECD Economic Outlook. Since research deals with changes than absolute term, therefore different base year is not important. Quarterly data of population more than 15 year is used by this paper which is obtained from Bureau, Ministry of Internal Affairs & Comm., Japan, since it is better proxy for labor work. All original data are extracted from DataStream, and the variables of growth for this research are obtained with taking the first difference of natural log of this original data. Therefore, all growth rates are in quarterly form, since original data are seasonally adjusted thus growth rate as well.

4. Empirical result

4.1 Stationary test

One of the prerequisite of running OLS Regression is stationery of data on level. Non stationery data will lead to spurious regression (Asteriou & Hall, 2007). In Table 2,3,4 the paper has done both Augmented Dickey-Fuller and Phillips-Perron tests for whole period between 1965-2010 and 1985 to 2010 periods. The result shows the null hypotheses of having unit root on intercept and trend and intercept can be rejected at 5 percent significance level for all variables of interest except for POPG in second period just for intercept in ADF test. Therefore, data of research are I(0) type and necessary condition of running OLS Regression has met.

Table 2 Unit root test whole period

Series	Level		Level	
	Intercept	Trend and intercept	Intercept	Trend and intercept
GDPG	-3.892 (4) ^a	-5.85 (2) ^a	-10.36 (7) ^a	-11.80 (3) ^a
POPG	-3.03(7) ^b	-3.45(4) ^b	-7.91(12) ^a	-15.86 (10) ^a
IGDPG	-8.10 (2) ^a	-6.45 (2) ^a	-13.29(5) ^a	-13.58(4) ^a
ININCG	-4.07(4) ^a	-6.10 (3) ^a	-10.42(7) ^a	-11.82(4) ^a
TOFTG	-6.65(4) ^a	-6.65(4) ^a	-10.41(5) ^a	-10.39(5) ^a
OPENG	-7.69(4) ^a	-7.73(4) ^a	-11.82(9) ^a	-11.83(9) ^a
DEF	-3.00(4) ^b	-4.36(4) ^a	-4.93(6) ^a	- 7.24(7) ^a

Notes: Figures are the pseudo t -statistics for testing the null hypothesis that the series is nonstationary.

a and b denotes significance at 1% and 5% level. For the series in level (constant with trend) the critical values for rejection are 4.11 and -3.48 at 1% level the lag length is determined by the AIC.

Table 3 Unit root test period 1965-1990

Series	Augmented Dickey-Fuller		Phillips-Perron	
	Level		Level	
	Intercept	Trend and intercept	Intercept	Trend and intercept
GDPG	-3.32 ^a	-3.82 ^b	-8.78 ^a	-9.33 ^a
POPG	-4.16 ^a	-3.41 ^b	-5.80 ^a	-6.50 ^a
IGDPG	-3.62 ^a	-3.63 ^b	-10.52 ^a	-10.51 ^a
ININCG	-3.47 ^b	-3.76 ^b	-8.84 ^a	-9.32 ^a
TOFTG	-4.71 ^a	-4.79 ^a	-7.70 ^a	-7.74 ^a
OPENG	-5.56 ^a	-6.01 ^a	-9.53 ^a	-6.64 ^a
DEF	-2.99 ^b	-3.36 ^c	-4.32 ^a	-4.85 ^a

a and b denotes significance at 1% and 5% level

Table 4 Unit root test period 1990-2010

Series	Augmented Dickey-Fuller		Phillips-Perron	
	Level		Level	
	Intercept	Trend and intercept	Intercept	Trend and intercept
GDPG	-3.77 ^a	-3.89 ^b	-7.57 ^a	-7.73 ^a
POPG	-2.66 ^c	-7.67 ^a	-8.38 ^a	-18.34 ^a
IGDPG	-5.20 ^a	-5.28 ^a	-8.43 ^a	-8.47 ^a
ININCG	-3.53 ^a	-3.63 ^b	-7.84 ^a	-8.02 ^a
TOFTG	-5.47 ^a	-5.45 ^a	-7.41 ^a	-7.37 ^a
OPENG	-4.84 ^a	-4.81 ^a	-7.54 ^a	-7.45 ^a
DEF	-3.08 ^b	-3.70 ^b	-6.45 ^a	-7.61 ^a

a and b denotes significance at 1% and 5% level

Another possible source of biasness of OLS Regression is correlation between independent variables i.e. Multicollinearity (Asteriou & Hall, 2007). Correlation matrix of Table 5 clearly shows that between independent variables of interest there is no correlation. Hence the OLS regression will not suffer from this problem.

Table 5 Correlation Matrix

	GCPI	GIGDPG	GPOP15	GININC	GTOFT	GOPEN
GCPI	1.000000	0.052531	0.425145	0.231410	0.245976	0.150076
GIGDPG	0.052531	1.000000	0.145688	0.336907	-0.373994	0.133910
GPOP15	0.425145	0.145688	1.000000	0.405685	0.087723	0.017940
GININC	0.231410	0.336907	0.405685	1.000000	-0.056372	0.247633
GTOFT	0.245976	-0.373994	0.087723	-0.056372	1.000000	0.163300
GOPEN	0.150076	0.133910	0.017940	0.247633	0.163300	1.000000

Omitted necessary variable is another source of biasness of OLS regression. By including important variables we expect improvement in adjusted R-Squared and decrease in AIC , SBC and HQC statistics (Asteriou & Hall, 2007).

The result in Table 6 shows that Adjusted R-Squared for $D_0 * Def_t$ are higher than model without dummy. The result of AIC, HQC and SBC statistics are also lower for them compared to model without dummy. Furthermore, if dummy interaction variable was not important, the p -value and magnitude of coefficients of our model must not change (Asteriou & Hall, 2007), however the results of Table 6 show that there is significant change of p -value and magnitude of coefficient for $D_0 * Def_t$ as we include $D0*Def$ in regression. This is also consistent with hypothesis of this research which is existence of non-linear relation between deflation and growth. Hence, all statistics suggest us using interaction dummy variable.

Table 6 Statistics for including influential dummy interaction variables

Test	No Dummy	D0*Def
Ad R-Squared	0.4394	0.4564
AIC	-6.4228	-6.4484
SBC	-6.3005	-6.3086
HQC	-6.3733	-6.3918

Misspecification problem is checked with running Residual normality test, Ramsey Reset Test. Misspecification problem will lead to non-normality of residual distribution of model(Asteriou & Hall, 2007). Jarque-Bera statistic on Table 7 shows that, null hypothesis of normality of residual at 5 percent significant level failed to be rejected except for 1964-2010 period, that is because outlier in residuals. Moreover, the results of Ramsey Reset Test for general misspecification show that there is no possibility of rejecting Null Hypotheses of no misspecification problem.

Table 7 shows the results for Breusch-Godfrey Serial Correlation LM Test .The results imply that, null hypotheses of no serial correlation between residuals failed to be rejected. The research does not suffer from Heteroskedasticity problem by using white method in estimation. Hence our model is safe from Autocorrelation and Heteroskedasticity problems.

Table 7 Misspecification tests

Statistics		1964-2010	1985-2010	1990-2010	1964-1990
Residual normality test	JarqueBera	14.36 (0.0007)	3.44 (0.17)	2.82 (0.14)	1.66 (0.45)
	Breusch-Godfrey Serial Correlation LM Test	2.1210(0.12)	0.55(0.57)	0.13 (0.87)	3.66 (0.02)
Ramsey Reset Test	t-statistic	0.5291 (0.59)	0.35 (0.68)	0.41 (0.68)	1.58 (0.11)
	F-statistic	0.2799(0.59)	0.12 (0.58)	0.16 (0.68)	2.52 (0.11)

4.2 Interpretation and discussion of results

Table 8 shows the results of OLS Regression with and without interaction Dummies. The overall result shows that coefficients of POPG and IGDPG are significant at one percent level with positive expected sign for both dummy and without dummy models with exception of period 1990-2010 for POPG which is insignificant. Coefficients of Def is not significant in model without dummy, however it turns to be significant at 5 percent significance level when dummy is included in other models, which confirms our justification for including threshold

dummy. In addition, in models with dummy the coefficients of $D0*Def$ are significant at five percent and one percent significance level with exception of period of 1990 -2010 level with positive expected sign for $D0$. Growth.

Table 8 Regression of model with Dummy and without dummy different periods

Variable	Expected sign	Without dummy	1965-2010	1990-2010	1964-1990
C	+	0.0024 (0.0013)	0.0044 (0.0013) ^a	0.0039 (0.0015) ^b	0.0099 (0.0035) ^b
Def	-	-0.2432 (0.1560)	-0.2954 (0.1547) ^b	-0.8715 (0.3708) ^b	-0.3430 (0.1460) ^b
D_i*Def	+	1.4533 (0.6967) ^b	0.9701 (0.8308)	3.5538 (0.8565) ^a
POPG	+	3.1673 (0.6258) ^a	3.0424 (0.5656) ^a	0.6117 (0.6543)	2.7347 (0.9982) ^a
IGDPG	+	0.2899 (0.0419) ^a	0.2731 (0.0431) ^a	0.2791 (0.0493) ^a	0.2419 (0.0466) ^a
ININCG	+	0.0964 (0.0830)	0.0584 (0.0792)	-0.0762 (0.0871)	-0.0270 (0.0788)
OPENG	+	-0.0089 (0.0328)	-0.0086 (0.0287)	0.0545 (0.0296)	-0.0546 (0.0344)
TOFTG	+	0.0979 (0.0290) ^a	0.0869 (0.0280) ^a	0.1762 (0.0335) ^a	0.0301 (0.0234)
S-E of Regression		0.0095	0.009425	0.0064	0.0091
Adj R ²		0.4394	0.4771	0.6474	0.4245

of term of trade is also significant in all models with expected sign with exception of period 1965-1990. Other control variables are not significant in all models. With respect to our objective of this study which is impact of deflation on economic growth of Japan, we limit our analyses to deflation and growth hereafter.

CPI of this study is based on 2005 base year; therefore it is new improved CPI Index which its biasness has decreased substantially. Study of Shiratsuka (2006); Unayama (2004) suggests us to take 0.2 percentage rate as true rate of zero inflation, therefore it can be inferred that 0.00 percentage rate of inflation is already mild deflation that can be good candidate for threshold point. In another word, zero inflation regarding correction of CPI bias is mild deflation. Based on this fact period 1964-2010 which is whole period of study threshold point of deflation have negative impact on economy with power around 1.45 percent. It means that if deflation increases by 100 percent, growth will decrease by around 145 percent. Positive impact of deflation has power around 0.24 percent. Hence the cumulative effect is around 1.21 percent which shows that the negative effect of deflation is huge. Hence study find the existence of threshold effect of deflation on economic growth of Japan, The results for dummies less than zero correspond to strong deflation has no significant difference with above results which for saving the space it is not included in this paper, however it can be interpreted that Japan has not face with strong deflation yet. (The results for dummies less than zero is available on request. However it is soon at this point of study to conclude about huge negative impact of deflation on growth for Japan. Maybe the result is sensitive to period of study.

To check whether the negative effect of deflation is sensitive to time period or not, we divide the whole period into two sub periods. The period between 1965 to 1990 and from 1990 to 2010. The rationale behind this choice is twofold: first 1990 is the ending of Japanese financial crises which thereafter Japan trapped in last long deflation. Second: ending of financial crises

means ending the effect of panic on growth, therefore 1990 to 2010 provide us period with high frequency of deflation without effect of panic.

First surprising result is in second period which is 1990 to 2010, deflation is much more frequent but overall cumulative effect of deflation is around 0.10 percent which is much lower compared to 3.2 percent in first period. In fact, in 1990 to 2010 which is the end of Japan financial crises, the positive and negative effect of deflation converge together, which mean cumulative effect will reach around 0.1 that is near to zero. This finding sounds plausible since Japan economy already passed the effect of panic and error correction effect of deflation is already in work. Hence, if the theory of fear of deflation is valid as Keynesian claim, there is expectation of the existence of huge detrimental impact of deflation on growth in second period which has more frequency of deflation. In contrary study reaches to opposite conclusion, period with more deflation, both threshold point and overall result has lower impact on growth in long term.

Although, overall impact of deflation on growth is negative, this study brings two important questions for further research and explanation. What factors can explain the huge negative impact of deflation on first period and low negative impact of deflation in second period. These results are not consistent with hypotheses of the research that if deflation is danger, it must have powerful negative effect on growth if economy passes through true zero inflation into deflation, since there is not huge decrease in growth in second period. Although the threshold power is 0.97 percent, the cumulative effect is 0.1 percent, which means by 100 percent in increase in deflation, growth will decline by 10 percent. This finding is hold true if we assume that threshold point is significant but table 4-6 shows that even threshold point is not significant in second period, therefore deflation have mere positive impact on growth. In conclusion the fear of most mainstream economists about danger of deflation cannot be justified with these striking findings. Is there any economic explanation for these phenomena?

Expected negative sign of Def for all models and positive sign of interaction dummies imply that deflation has both advantages and disadvantages. Advantages of deflation are increasing purchase power for public, error correction process therefore less unbiased relative prices of goods and services in showing scarcity of resources, preference of public and more saving, therefore more long term investment in future, and disadvantages are increasing real rate of interest, burden of debt and decreasing consumption, therefore decreasing investment in short run. If advantages of deflation is greater than disadvantages of it, thus deflation does not pose a problem for economy. This model shows that the disadvantage of deflation is much more than advantage if we consider whole period and first period. However, disadvantage will decrease and advantage increase in second period until that overall impact of deflation converge to zero and positive even in long run.

These findings are not consistent with prediction of Keynesian economists about danger of deflation although very consistent with Austrian business cycle theory. This theory predicts that after period of high easy credit expansion, such as first period of our study, deflation have detrimental impact on growth, it wipes out all bad investment which has been made in period of high easy credit expansion. They call this process as error correction process. After error correction period of deflation, the good effect of deflation will be appearing which is corresponding with second period of our study. They call this effect, productivity–norm deflation. This productivity norm deflation is at work because, deflation cause, entrepreneurs and households to be guided by prices which are true proxy for scarcity of resources, in another world with not distorted prices. Hence they can allocate resources to their best urgent needs. Therefore we expect from this theory deflation has positive impact on growth even, which is consistent to our finding.

5. Summary and conclusion

This study has reviewed most major literature about the relation of deflation and growth. In spite that, most of this literature has found deflation, as monetary phenomenon like inflation, the growing fear about deflation in Japan, makes deflation a big puzzle: if deflation is neutral or even beneficial why policy makers must be afraid of it. This puzzle, led this research to study the threshold effect of deflation on growth in case of Japan with quarterly time series data from 1965 to 2010 and OLS regression method. The data of study passed all of the necessary and sufficient conditions for running OLS method which makes the OLS regression BLUE. The prediction of study is that if the fear of deflation is the case, then huge negative threshold effect of deflation on growth must exist when economy of Japan passes through true zero inflation into deflation. The study used three periods for examining this threshold effect. One whole period, which is period between 1965 to 2010 and two sub periods, which are 1965 to 1990 and 1990 to 2010 periods. The results are astonishing. In whole period of study, When the Japanese economy passes through true zero inflation into deflation, threshold effect appears with powerful negative effect on growth of Japan which makes deflation as danger for the Japanese economy. However study, does not find the emergence of severe danger in economy by examining other threshold points lower than zero inflation, since in severe danger, capital and labor which are proxied by gross capital formation and population cannot have significant effect on growth but our result shows that these two proxies have significant effect on growth in all dummy variables.

This result is consistent with prediction of study however it is sensitive to chosen period of study. The results of two subdivided periods are not consistent with Keynesian theory of fear of deflation and hence prediction of study. The first period which has much lower frequency of deflation and it is prevailed by inflation, the impact of threshold effect is detrimental and significant however in second period which is prevailed by deflation the threshold effect has much lower impact on growth and it is insignificant as well which make cumulative effect of deflation positive on growth. These finding can be best explain by Austrian Business Cycle Theory and productivity norm deflation. In short, ABCT theory is that after period of easy credit expansion, incidence of deflation will cause detrimental impact on economy as we observe on first period. In Austrian terminology this is error correction process of deflation for freeing economy of bad investments which were undertaken under easy credit expansion period. After error correction period, productivity-norm deflation come into effect in long run, which enhance productivity and growth through signaling true information of scarcity of resources to economic agents as we observe in second period.

The results of this research, however, have limitations and are conditioned on some important assumptions: First: the research has assumed that production function of Japan is kind of Cobb–Douglas with more factors than L and K and further assumed that Cobb–Douglas production function is constant over fifty years. In spite that the model of research has passed misspecification tests successfully, more accurate production function and more control variables can give better and more robust results. Second: The results of the research are based on experience of the Japan economy during 1965 to 2010; therefore generalization of the research results for other countries is not possible and is conditioned to further studies in other countries.

Deflation is not danger for economy per se, huge burden of debt, inflexible relative prices, zero nominal rate of interest and panic, turn deflation to be a danger, however these channels are not long lasting. All of these channels are natural results of economic intervention of government in economy, through central banks and unions. With regard to the results of the re-

search, policy makers and central bankers should avoid of issuing debts with monetary policies that keeps changing price level near true zero inflation rate. In addition, Sustainable policies for decreasing the burden of government debt, decrease the power of labor unions ,and designing a new sound monetary system that prioritizes these goals together should be considered as first national and international preference for avoiding danger of deflation and welcoming its positive effect on economy. All of these policy advises based on assumption that deflation has positive effect on growth which is shown by this research, however , as it mentioned above this research has its limitations, thus to take into account seriously these policy advises further research should be done.

Further studies in proper production function of Japan and upward CPI bias seems to be fruitful for more valid judgment about effect of deflation on growth for economy of Japan, furthermore, study the experiance of deflation in other different time spans and different countries can shed more light on the relation of deflation and growth.

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Tourist Flows and Factors Attractiveness in Southern Mediterranean Countries

Rabaa Chibet

Abstract Tourism has a long history in the South East Mediterranean Countries (SEMC) and became in most of them a powerful tool for development and a strong dimension of Euro-Mediterranean cooperation. This is explained mainly by the natural and cultural resources of the region, the approval of its climate and proximity to major markets. To study the attractiveness factors that influence the development of tourism flows in SEMC, a panel gravity model, which is based on bilateral tourism flows from one country of origin to a country of destination is used. The results show the positive impact of regional agreements, as well as the existence of common borders and common language between SEMC help develop their tourist flows.

Keywords SEMC, Tourism sector - Gravity model

JEL classification L83 - F15 - F36

Introduction

The Mediterranean is a large inland sea between Southern Europe, North Africa and Western Asia. It is a sea full of hidden and attractive seaside resort treasures. The Mediterranean is valued for its climate and geographical location. All sides of the Mediterranean are rich in natural beauty: the coast, the terrain, all combine to create beautiful landscapes. Also, besides the charm of the natural environment, the Mediterranean region has serious cultural attractions. Indeed, the Mediterranean Basin is exceptionally rich in natural and cultural values which explains its tourism potential. This is why this space is the first tourist space in the world. With these advantages, the Mediterranean countries have a great potential to further develop tourism, an activity that will create wealth in the entire region, a framework at a time of cooperation, economic trade and human mobility and a sector that is a major focus of the cooperation and the promotion of regional integration among the countries.

In this study, we try to empirically determine the factors that influence the development of tourism between the SEMC. To do so, this article is organized as follows: in a first section, we present the importance of tourism, the study of international tourist flows and intra-regional

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in the SEMC. In a second section, we use the gravity model to determine the (geographic and economic historical) factors of attractiveness that develops tourism flows in the SEMC.

I. The importance of tourism in the SEMC

Tourism is one of the fundamental areas of activity. It promotes the movement of people, capital, goods and knowledge. Tourism can also be seen as a lever for development countries. As Nathalie Fabry (2009) wrote, “apart from mobility barriers of distance, administrative formalities (visas), geopolitical factors (terrorism, political crises) and health (vaccines, epidemics), the prospects for recalls tourism development seem almost limitless.”

According to the World Tourism Organization (2011), the Mediterranean area forms the most important tourist destination in the world. It totaled 295 million international arrivals in 2010. The Mediterranean has received in 2010 over 12.4 million international arrivals more compared to 2009. Considered as a homogeneous area of destination, it is the first tourist destination in the world, ahead of Europe, the Americas, Asia Pacific, the Middle East and sub-Saharan Africa.

1. Tourist flows in SEMC

Mediterranean countries enjoy a high visibility and significant tourist attractions. They have registered the world's highest growth in the number of international arrivals in the last two decades: 9% on average according to the World Tourism Organization (UNWTO), against 1% for northern neighbors since 2005. International tourist arrivals in the SEMC increased 17.08 million in 1990 to 82,300 in 2010. However, this country, since 2010 experienced a significant decline in the number of its arrival and its market share in international tourism. In 2011, the decrease in number of tourist arrivals was 12.3%. The known events in the region make it less attractive for international tourists.

Overall, the direct impact of the events of 2011 caused a loss of nearly 9 million arrivals accumulated on the southern and eastern shores of the Mediterranean:

- For the countries of North Africa (Morocco, Algeria, Tunisia, Libya, Egypt - including Mauritania off MED 11), the evolution between 2010 and 2011 was 20.5%, with 26 million arrivals of international tourists for the period 2000-2011, growth has been 68.10%. Three destinations are not out: Morocco, Tunisia and Egypt, three countries whose economy and employment depend heavily on tourism.
- To the east of the Mediterranean, Palestine, Israel, Jordan, Lebanon, Syria and Turkey bank, lower arrivals was made less (-5.02% between 2010 and 2011). Due to the weight of Turkey, a major destination in the world.

The events of 2011 did not have any impact on the number of tourist arrivals in Algeria, Morocco and Turkey has increased by 15.70%, 0.58% and 8.68%. For other countries, the year 2011 was characterized by a dramatic drop in tourist arrivals from 12.77% to 90.41% in Jordan in Libya.

Table 1 International tourist arrivals in the MED area 11

Countries	2000	2010	2011	% change 2011/2010
Algeria	866	2070	2395	15,70%
Egypt	5506	14051	9497	-32,41%
Israel	2672	2803	2820	0,61%
Jordan	1427	4557	3975	-12,77%
Lebanon	742	2168	1655	-23,66%
Libya	174	271	26	-90,41%
Morocco	4420	9288	9342	0,58%
Palestine	1055	522	446	-14,56%
Syria	3015	8546	5070	-40,67%
Tunisia	5244	6902	4782	-30,72%
Turkey	10428	27000	29343	8,68%
Total	35549	78178	69351	-11,3%

(Source: UNWTO Barometer 2012)

2. Importance of tourism in the SEMC

Tourism is a vital sector for the economy of most SEMC. It is an essential part of the GDP of these countries and as intensive activity in labor, generates a significant number of jobs. Turkey is the first destination of all MED 11. In 2011, tourism receipts reached 23,020 compared to 20,807 in 2010. As for Morocco, the tourism year 2011 can be considered good with growth of its tourism revenue. However, Jordan, Tunisia and Egypt had their tourism revenue declining in 2011.

The share of tourism in GDP is significant in the MED countries. Indeed, in Egypt, Jordan, Morocco, Syria, Tunisia and Turkey, tourism growth has been faster than growth in other sectors, resulting from its increasing role in the economy. In Algeria and Libya, the development of the tourism sector is not a priority policy due to the energy sector being in full expansion.

Tourism employment makes a very significant contribution to overall employment in the MED 11 countries. Tourism contributes about 8% of total employment in Jordan, Tunisia and Morocco, a little less in Syria, more than 9% of total employment in Lebanon. The share of tourism in total employment is declining in Israel, Libya and Turkey.

Table 2 Weight of tourism in the economy of the MED countries

Year	International tourism receipts (\$ millions)		% of GDP	% of jobs
	2010	2011	2010	2010
Algeria	267	n.a.	4,1	3,6
Egypt	12 528	8 707	8,2	7
Israel	4 768	4 849	2,6	2,8
Jordan	3 585	3 000	9	8
Lebanon	8 012	n.a.	9,5	9
Libya	60	n.a.	1,6	1,6
Morocco	6557	6703	9,5	7,9
Palestine	667	n.a.	n.a.	n.a.
Syria	6 190	n.a.	6,3	5,3
Tunisia	2 645	1 805	8,7	7,9
Turkey	20 807	23 020	4	2,1

(Sources: UNWTO and WTTC)

3. Growing inequalities in tourism flows between the riparian countries

The markets of the East Mediterranean shore and those on the southern shore have the fastest growth in international arrivals in the Mediterranean. Indeed, the South Shore realizes an average annual growth rate of arrivals over 11 years (2000-2010) of 6.95%. However, the eastern shore had in the same period an average annual growth rate of arrivals of 9.54%. On the other hand, the North Shore has an average annual growth rate of arrivals of 0.24%. The global market share between 2000 and 2010 on the southern shore increased by 1.19 points whereas a growth of 2.41 was achieved by the eastern shore. However, the North Shore suffered a loss of 7.31 points in the global market share in the same period (Pauchant (2011)).

Despite the importance of the tourism sector as a key sector in the economy of the SEMC, tourism presents specific challenges:

- Tourist flows are highly concentrated in the coastal areas.
- The tourism business is very seasonal. It is concentrated in five months (May to September, with a peak in July and August).
- Tourist flows are uneven between the two sides:
 - The first inequality concerns demand, mainly oriented towards the more developed countries of the Mediterranean (France, Spain and Italy).
 - The second inequality is even within the shores of South Africa (?), where the request is directed to certain countries over others: Turkey, Tunisia and Egypt are the three favored destinations SEMC.
 - The third inequality regards the tourist offer between the North and South of the Mediterranean, where natural resources and capabilities of housing and transportation are unequal.

4. Tourism and regional integration in the SEMC

The analysis of international arrivals in the Mediterranean countries shows that the level of tourism integration in the Euro- Mediterranean region is very strong. Therefore, the European Union is a major market that emits tourists in SEMC. Since 2009, over 77% of tourists are headed to Morocco and over 83% of tourists to Turkey. In 2010, over 55% of tourists from

the European region visited Tunisia and 75.8% more tourists visited Egypt (League of Arab States (2011)).

However, tourist flows south-north are low. Creating therefore a competition between countries of the South, when they have to select local partners, adds a barrier to South-South integration.

As far as the European market is concerned, the new emerging markets such as India, Brazil, China and Russia still generate low tourist flows, but growing in the SEMC .

Syria, Jordan, Lebanon and Tunisia have become in recent years important destinations for Arab tourists. Indeed, in 2009, 71.9% and 80.2% of Arab tourists visited respectively Syria and Lebanon and in 2010, 83.7% of Arab tourists visited Jordan and Tunisia 43% (League of Arab States (2011)).

This regionalization is due to various factors. First, a geographical factor, since the element of proximity is critical in any process of integration. Indeed, the existence of borders commuted facilitates trade and the promotion of intra-regional cooperation. In addition, a historical factor, since the SEMC have a long and rich common history which is an advantage for the development of regional tourism cooperation. Thus, the existence of a common language and short distances reduce transport costs and facilitate travel by car. This is the case in the Maghreb countries, where Tunisians, Algerians and Libyans can travel without geopolitical constraints.

Development prospects are great: tourism should continue to experience dynamic growth in most countries of the southern shore, so that the number of tourists visiting the SEMC is expected to double between 2005 and 2020. "Tourism illustrates the difficulty of the region to think beyond national and political divisions in terms of market. From a prospective point of view, yet it is the key to effective rapprochement between the two shores and the first of all the process of regionalization, cooperation and integration" (Guillaume Alméras and Cécile Jolly (2010)).

The process of Euro-Mediterranean integration, revived by the creation of the Union for the Mediterranean (2008), is particularly favorable to the structuring of the tourism sector, as it provides a framework for both cooperation and exchanges economic and human mobility. Thus, the implementation of sustainable tourism that contributes to the development, protects the environment and respects the cultures is important to deepen Euro-Mediterranean integration and increase regional tourist flows (both North-South and South).

II Empirical Analysis

1. Review of the literature

Several recent studies use the gravity model to analyze tourism demand and study the factors of influence. These studies showed that the gravity model is a useful analytical tool, although the analysis of international flows is carried out on a specific sector of tourism. Indeed, Dana Dudokh (2009) studied the factors influencing the choice of destination for tourists during the period 2000 to 2007 in 8 countries (Oman, Saudi Arabia, Syria , Tunisia, Yemen , Egypt, Lebanon and Bahrain) using a gravity model . The results show that per capita income has a positive influence on the demand for tourism. However, the relative price is inversely proportional to the total number of trips abroad by tourists. Substitution prices have a positive impact on tourism demand. So when the price of substitution increases, the demand for tourism and mainly for recipient countries increases. The cost of transportation has a negative impact on tourism demand.

Hanafiah.M Mohd Mohd Harun.M and Jamaluddin.M (2010) studied, using a gravity model, the relationship between bilateral trade and tourism in Malaysia and analyzed the sensitivity of economic parameters that affect international demand for tourism between Malaysia and Asian countries (China, Japan, Thailand, Indonesia and the United Arab Emirates) for the period 1997-2008. The results show that the variables of GDP are statistically significant and positively affect tourism demand in Malaysia. The coefficient of distance is negative, as expected. This result explains that the cost of moving and relative prices reduce the demand for tourism.

Li-Yen Chang and Da-Jie Lin (2010) estimated a gravity model to develop the relationship between passenger flow and the factors that can significantly affect the flow. These are factors of production, attraction and the distance between two countries. They find that the positive signs of the variables GDP for both countries of origin and destination can increase the flow of passengers. Thus, when a country's GDP increases, the economic and business travel demand, too, will increase. In addition, national income (per capita) is a variable that has a positive effect on the flows of passengers to the country of origin while the distance has a negative effect.

2. Theoretical Foundations and presentation of the gravity model

2.1 Theoretical Foundations

The gravity model has many advantages for modeling bilateral trade flows. Since the pioneering work of Tinbergen (1962), trade between countries is often modeled using the model called gravity. According to this model, which is based on the theory of Newton, the bilateral trade flows are positively related to the size of each partner (which can be measured by GDP) and negatively affected by the level of "transport costs" (mostly captured by the distance between).

Then, the gravity model has been renewed, including the introduction of several other factors in the literature to analyze trade flows, such as GDP per capita as a proxy for standard of living indices (Bergstrand (1985-1989)) as well as variables to examine differences in the geographic and historical links including the existence of borders and common language (Fontagné and al (1998)), the risk of exchange rate and trade policies by the explicit introduction of variable tariff and non tariff barriers (Festoc (1997), Castillo (2003)).

The influence of regional trade agreements (RTAs) should not be overlooked in the analysis of trade flows. It will be assimilated through dummy variables that mark the presence or absence of regional agreements (Bayoumi and Eichengreen (1995) and Frankel and Wei (1998)).

2.2 Presentation of the model

The gravity equation used in this work is derived from the work of Bergstrand (1985), which incorporates traditional determinants of trade such as geographic distance, GDP and GDP per capita. We introduce dummy variables determining the importance of South-South economic integration in MENA.

Empirical regressions will be conducted using panel data. This data type takes into account at the same time individual and temporal dimensions. In addition, the panel regressions are more appropriate (the cross section regressions) when using the gravity model, because they can control the country-specific effects and time effects (Peter Egger (2000)). A gravity model and panel will be adopted.

Tourism has become one of the most remarkable socio-economic phenomena and it is considered as an essential dimension of regional integration and trade activities. Gravity models were the first causal models developed for forecasting tourism demand. In fact, tourism is a

form of international trade, the factors behind the tourist flow to a region can be naturally studied in the context of a gravity model (Vietze, C, (2008), Hanafiah, MF and MH Harun, (2010)).

The equation of the model is that which is presented below:

$$\text{Log}(T_{ij}) = \alpha_0 + \alpha_1 \log(Y_i) + \alpha_2 \log(Y_j) + \alpha_3 \log(y_i) + \alpha_4 \log(y_j) + \alpha_5 \log(D_{ij}) + \alpha_6(L_{ij}) + \alpha_7(C_{ij}) + \alpha_8 \text{GAFTA}_{ij} + \alpha_9 \text{UMA}_{ij} + \alpha_{10} \text{Agadir}_{ij} + U_{ij}$$

Where:

i and j : are respectively the destination country i and the origin country j .

$\text{Log}(T_{ij})$: The logarithm of the number of tourist arrivals to country j in country i in millions.

$\text{Log}(Y_i)$: The logarithm of the Gross Domestic Product (GDP) of the country of destination i .

$\text{Log}(Y_j)$: The logarithm of the Gross Domestic Product (GDP) of the country of origin j .

$\text{Log}(y_i)$: The logarithm of Gross Domestic Product per capita in the destination country i .

$\text{Log}(y_j)$: The logarithm of Gross Domestic Product per capita of country j .

$\text{Log}(D_{ij})$: The logarithm of the distance between countries i and j distance.

(L_{ij}) is a binary variable that is unity if the country of origin and the country of destination have a common language and zero otherwise.

(C_{ij}) : The distance according to the degree of contiguity between countries i and j is a binary variable that is equal to unity if the country of origin and the country of destination have a common land border and zero otherwise.

GAFTA_{ij} : binary variable shows the membership or non-GAFTA agreement between Arab countries.

UMA_{ij} : binary variable shows the membership or non-UMA agreement between the countries of the Arab Maghreb.

Agadir_{ij} : binary variable shows the membership or non Agadir Agreement between Tunisia, Jordan, Egypt and Morocco.

U_{ij} : is an error term

The sample is composed of a set of 9 SEMC countries (Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia and Turkey). We propose to analyze the evolution process of tourist flows between these countries. Data on macroeconomic variables come from the World Bank, the International Monetary Fund Statistics (IMF) and the World Tourism Organization (UNWTO). The analysis period runs from 2006 to 2011.

3. Estimation

3.1. Early signs of the variables

The expected signs of the variables describing their effects on tourism flows and their coefficients allow us to understand the proportions in which they affect changes in these flows.

The expected GDP of the country of origin and country of destination sign is positive, as more developed economies and bilateral tourist flows will tend to develop: α_1 and α_2 should therefore be positive. Similarly, the expected sign α_3 of α_4 and which denote the coefficients of the variables GDP per head respectively of the country of destination and origin should be positive.

Kilometer distance for each pair of regions of origin and destination is included as a proxy for transportation costs, and therefore, it should have a negative impact on the tourism move-

ments (Eilat & Einav, 2004; Khadaroo & Seetanah 2008, De la Mata-Verduras & Llano, 2012). Geographically very distant countries will face higher costs (Disdier and Head (2008)). However, tourists prefer to the country of destination-specific attributes (culture, climate, tranquility) can partially compensate for the negative influence of the distance (Nicolau, MAS, 2006). The expected sign of α_5 is negative.

Sharing an official language also can greatly reduce communication barriers. This advantage of easy communication should therefore be reflected positively on tourism flows (Zhang and Jensen 2007). Then we expect a positive sign for the variable α_6 .

Proximity should facilitate tourist flows, and the presence of a common border should have a considerable impact on the development of these flows as (Gil-Pareja and 2007. A1). Then we expect a positive sign of the variable α_7 .

The existence of a regional integration agreement is likely to promote regional cooperation and integration between countries. Thus, the expected sign of the coefficients: α_8 , α_9 , and α_{10} will positive (Jean-Marc Siroën (2007)).

3.2 Estimation Method

Both conventional techniques estimates panel data models are the method Fixed effects (FE) (Within) and the random effects (RE) (Between). Based on our results, the test of significance of the Lagrange Multiplier (Breusch Pagan LM) confirms the significance of random effects.

The Hausman test is used to check the most appropriate data model. In view of this test, the probability (chi2) associated with this test is less than 5%. Therefore, the model must be specified with individual fixed effects and we must remember the estimator (Within).

Although the Hausman test method calls for fixed effects, it could be applied to the extent that this method does not estimate the invariant variables over time, which is the case of three our variables: distance, degree of contiguity and common language.

It is therefore necessary to use the method of instrumental variables proposed by Hausman-Taylor (1981). Indeed, it allows us to estimate our model taking into account both the explanatory variables variants and time invariant, while correcting for endogeneity correlated with bilateral effects variables: “The easiest way to overcome the correlation between specific effects and the explanatory variables is to eliminate specific effects using the estimator Within. But these changes do not allow estimating the impact of an invariant variable in time. The instrumental variables estimator of Hausman and Taylor can lift this limit “(Kpodar K (2007). This method has found new applications in international economics, including showing its relevance to estimate gravity equations (Babetskaia-Kukharchuk and Maurel, 2004; Carrère, 2005; PERIDY, 2005).

Connected to the test(chi 2) (see Table 2) compares the random effects model to the Hausman Taylor (HT) model. According to this test, the rejection of the H0 hypothesis has led us to conclude that the (HT) method produces the best estimated parameters as random effect model.

3.3 Economic Analysis of estimation results

Tables 3 The estimation results

variables	FE (1)	RE (2)	HT (3)
GDP i (Log Yi)	1.277 (3.66)***	0.556 (3.33)***	0.763 (3.28)***
GDP per capita i (Log yi)	-0.712 (-1.81)*	-0.028 (-0.13)	-0.174 (-0.64)
GDP j (Log Yj)	0.234 (1.88)*	0.510 (4.67)***	0.363 (1.86)***
GDP per capita j (Log yj)	-0.289 (-1.07)	-0.467 (-2.13)**	-0.316 (-1.34)
Distance (log Dij)	....	-0.662 (-5.70)***	-0.453 (-1.87)*
Border effects (Cij)	....	0.783 (2.39)**	0.995 (1.81)*
Common language (Lij)	....	0.04 (0.14)	0.083 (1.19)
GAFTA agreemen (GAFTAij)	....	0.253 (0.92)	0.189 (0.44)
Agadir agreement (AGADIRij)	....	-1.091 (-1.86)*	-1.107 (-1.21)
UMA agreement (UMAIj)	....	1.045 (2.88)**	0.958 (1.74)*
Constant	1.016 (1.89)*	5.854 (5.60)**	4.153 (2.20)*
Number of observations	155	155	155
Number of group	31	31	31
Fischer test (specific effect)	46.42 (0.0000)		
Housman P-values	23.01 (0.0001)		
Chi 2		Chi2(10)	Chi2(10)
Wald P-values		137.32 (0.000)	83.85 (0.000)

***) Significant at 1%; **) significant at 5% *) significant at 10%

The results show that the coefficients of the variables of GDP for both countries of destination (0.736) and origin (0.363) are statistically significant and positively affect tourism flows between the SEMC. Indeed, GDP is a basic measure of a country’s overall economic performance. Thus, when the GDP of a country increases, economic activities and travel demand will increase.

The coefficient on GDP per capita for both countries is negative and not the expected sign. This shows that when GDP per capita increases, the desire to travel in the SEMC decreases and therefore the tourist flows between the SEMC decreases. This perhaps shows that when GDP per capita increases, the desire to travel to the North and other distant countries increases.

The distance variable (an approximation of the cost of transport) has a significant negative effect on tourist flows (-0.453). Indeed, when the distance between two countries increases, travel time and travel costs increase. Therefore, the desire to travel will also be reduced. The

coefficient associated with the variable border is positive, statistically significant and slightly close to unity (0.995). Indeed, the element of proximity is essential in any process of regional integration. Thus, the existence of borders commuted facilitates trade and the promotion of intra-regional cooperation in tourism.

The coefficient of the existence of a common language between the two partner countries has a positive sign (0.083). Sharing an official language can greatly reduce communication barriers. This advantage should easily communicate positively affect tourism flows between the SEMC. These historical and geographical factors promote bilateral tourism flows between SEMC and are important elements to significantly influence the desire to travel agents and encourage South-South integration. The results of the gravity model suggest that regional agreements (GAFTA and UMA) can increase and promote the development of tourism flows between member countries. Indeed, the sign of the coefficient on the dummy variable is positive GAFTA (0.18) indicating that the association agreements have the expected sign and they positively affect tourism demand. To the agreement of the Arab Maghreb Union (UMA), the coefficient of this variable is positive and statistically significant and high (0.958). This explains the importance of this agreement in the development of tourism between the Arab Maghreb countries, especially in tourist flows from Algeria, Libya and Morocco to Tunisia.

However, the sign of the coefficient AGADIR Agreement is negative (-1.107) and does not have the expected sign. Thus, this agreement does not show its real role in the development of tourism, especially, it is limited to only four Arab countries and shows their small role in tourism cooperation between them.

It therefore appears that regional agreements are a significant factor in the development of tourist flows and intra-regional integration between the SEMC.

Conclusion

SEMC absorb a considerable share of tourist flows are becoming more and more important in the way of service status to that of a real industry for the creation of millions of jobs and employment and contributing to boost economies these countries through currency inflows.

The tourism sector is a highly regionalized in the SEMC activity. Indeed, many geographical, historical and economic factors that promotes regionalization.

In order to study the factors that influence the choice of tourist destination and to identify the determinants of bilateral tourism flows and the impact of trade agreements in the tourism sector between the SEMC, we applied the model of tourism demand based on a gravity model. The empirical results of the gravity model shows the importance of the explanatory variables (GDP, language and common border) in the development of tourist flows. But the distance is an obstacle to their development.

SEMC have a long and rich common history which is an advantage for the development of regional tourism cooperation. The existence of a common language and proximity distances and reduce transportation costs. This is the case of the Maghreb countries, where Tunisians, Algerians and Libyans can travel without geopolitical and cultural constraints.

Also, the membership of the two countries to the same regional agreement allows evaluating its effect on the volume of bilateral tourism flows. Therefore a positive sign indicates a positive effect of the agreement on tourism demand.

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Environmental Impacts of the Nutrition

Giulia Ciuffreda

Abstract This paper explores the connection between the nutrition transition towards the North American dietary style and environmental depletion phenomena. Due to socio-economic dynamics, such as population growth, urbanization, globalization, and income levels, developing countries are undergoing a dietary shift towards a higher consumption of energy-dense foods, typical of the western diet. However, energy-dense foods are currently produced through industrial agriculture processes, causing noticeable stress on the environment. In particular, conventional agriculture methods result in heavy climate changing gas emissions, threats to biodiversity conservation, and depletion of natural resources. Developed countries have already experienced the nutrition transition, recording a certain spread of North-American dietary habits among their population since the 50s. Developing countries are undergoing the same process now, but it seems that this nutrition transition is occurring at a much faster pace than in the past. Moreover, it involves a huge percentage of the world population. As a consequence, there is growing concern on environmental depletion phenomena caused by industrial farming in the production of typical North American foods. If the demand for energy-dense food keeps increasing according to its current trend and no shift towards sustainable production systems occur, conventional farms activity will become more and more unsustainable for the planet, threatening seriously food security. After a general introduction to the topic, we examine the existing evidence of the nutrition transition and explain its main characteristics. Then, we explore the major causes of this trend. After that, we will focus on conventional agriculture practices and their environmental impact, given the characteristics of the nutrition transition. Last, we conclude by drawing a comprehensive picture of the issue.

Keywords Nutrition transition - Sustainable diet - Environmental depletion - Intensive agriculture - Sustainable farming - Food security

JEL classification Q18

1. Introduction

It is a widely known fact that the world population has grown quite remarkably in the last decades, particularly in poor and developing countries. Population dynamics have led to an increased demand for food that, thanks to the development of new technologies and agrochemicals, resulted in the so-called green revolution. Thus, agricultural practices became increasingly characterized by intensive single-crop plantations, agrochemicals, and mechanization. In the short run, the green revolution has improved productivity and reduced food prices. Yet, single-crop plantation and use of agrochemicals are counterproductive in the long run, as they are responsible for environmental depletion, resulting in decreasing production and increasing food prices in many areas of the world¹. Due to the globalization of agricultural practices, the green revolution has spread in developing countries, where demand for food was rising; one very famous example is India, where reforms promoted in the 80's have pushed the spread of intensive agriculture practices.

Not only the number of people is changing, but its redistribution between rural and urban areas is shifting, too, mostly in favour of the second alternative. Urbanization has a double meaning: on one hand, it is the increasing share of urban dwellers; on the other hand it implies the expansion of urban land uses². Urbanization is highly associated to globalization in several ways. Defining globalization and providing incontrovertible evidence is very hard: not only potential gains and losses are debated among experts, but its very existence is denied by many eminent scholars, and the discussion is still ongoing. In this work, we assume that, though counter-globalization trends do exist, there are some very strong globalizing forces at work. Among all definitions of globalization, a useful one is provided by FAO³: “*reduction in barriers to the cross-border movements of goods, services and capital; an increased flow of commodities, technology, information, financial capital, modes of distribution and marketing; and, to a certain extent, migration of people and labour*”. This reduction in barriers and increasing transport and communication grids has allowed many cities to grow economically and demographically. Considering food demand and the supply system, international trade allows for a higher availability and diversity of food, but it has also brought to a convergence of practices in food production, distribution, and consumption that is damaging the environment. In particular, Godfray *et al.* (2010)⁴ state that, since economic development is causing higher purchasing power in many countries and higher food consumption, we will have to satisfy an increasing demand for animal products and processed food from a larger population, while ensuring environmental sustainability. As a matter of facts, not only the quantity of food demanded is soaring, but the kind of food consumed worldwide is undergoing a shift towards those products typical of the North-American diet.

Such dynamics are deeply connected to environmental depletion phenomena. According to the fifth edition of UNEP Global Environmental Outlook⁵ climate change, loss of biodi-

¹ Barilla Center for Food and Nutrition (2012), “*Eating planet – Nutrirsi oggi: una sfida per l'uomo e per il pianeta*”, Milano: Edizioni Ambiente.

² Satterthwaite D., McGranahan G., and Tacoli C. (2010), “Urbanization and its implication for food and farming”, *Phil. Trans. R. Soc. B* vol. 365 no. 1554, pp. 2809-2820.

³ Kennedy G., Nantel G., and Shetty P.(2004), “Globalization of food systems in developing countries: a synthesis of country case studies”, in FAO Paper no 83, “*Globalization of food systems in developing countries: impact on food security and nutrition*”, Rome 2004, pp 1-26.

⁴ Godfray H.C.J. et al.(2010), “*Food Security: the Challenge of Feeding 9 Billion People*”, in *Science*, vol. 327 no. 5967, pp. 812-818.

⁵ UNEP (2012), “*GEO 5 – Global Environmental Outlook*”, internet : <http://www.unep.org/geo/> (consulted on June 25th, 2013).

versity, and pollution seem to be the most delicate challenges, since little or no progress has been achieved. Climate change is a natural phenomenon, but the majority of the academic community believes that this process is speeding up because of human activities-related atmospheric pollution; however, some scientists assert that rising temperatures are not caused by human activities, and, thus, are not a dangerous sign of the Earth's depletion. In this work, we will take as a valid hypothesis the one upheld by the majority of scientists, i.e. that climate change is being amplified by atmospheric pollution due to human greenhouse gas emissions; UNEP maintains this hypothesis, too. GEO 5 report states that greenhouse gas emissions and concentrations keep rising, so that temperatures seem to be increasing both globally and regionally, and there are no positive signs of regression of such tendency. Climate change has an influence on extreme climatological disasters, which are increasing in number and intensity: in particular, floods have more than doubled between the 1980s and the 2000s. Biodiversity loss is a most critical issue, since many species, habitats, and ecosystems are lost or at risk, mainly due to climate change and overexploitation of resources. Pollution of air, soil, and water is a serious challenge as well, and land overuse results in major desertification and productivity decrease in drylands.

The aim of this paper is to explain the correlation between the nutrition transition towards the North American dietary style and environmental depletion phenomena, which have become a noticeable source of concern today. In particular, it analyzes how and why this transition is happening, and what impacts such changes have on the environment. Although the nutrition transition and environmental damages caused by intensive agriculture have been deeply studied in previous years, a very few papers deal with both dynamics at the same time, emphasizing their link. However, there is a rising need to explore the two topics together: energy-dense foods, typical of the North-American diet, are produced through industrial agriculture processes that cause a remarkable stress on the environment. The nutrition transition is occurring now in developing countries, where population is growing, at a faster pace than before. As a consequence, the demand for high-energy dense foods is soaring, so that the environmental depletion caused by conventional agriculture is a major challenge to food security. First, we will present the existing evidence of the nutrition transition and its main causes. Then, we will explain how industrial agriculture is damaging the environment. Last, we conclude by evaluating the role of the nutrition transition.

2. The nutrition transition: evidence

There is some evidence that the world dietary habits have been changing in an unprecedented way in the last decades, and that this shift is happening at a faster pace today. Drewnowski and Popkin (1997)⁶ have conducted a deep research on the world dietary trends, stressing that official data show an ongoing nutrition transition affected by incomes, urbanization, and globalization, and that the way this transition is occurring has changed over time. Popkin (2004)⁷ maintains that the nutrition transition includes three main elements: change in dietary habits, change in body composition, and reduced physical activity. For the purpose of the present work, the first issue only is analyzed in depth. Overall, in the second half of the XX century

⁶ Drewnowski A. and Popkin B. M. (1997), "The Nutrition Transition: New Trends in the Global Diet", *Nutrition Reviews* vol 55 no. 2, pp. 31-43.

⁷ Popkin B. M. (2004), "The Nutrition Transition: an Overview of the World Patterns of Change", *Nutrition Reviews* vol. 62 no 7, pp. S140-S143.

there has been an increase in energy-dense food, in particular edible oils, fats, and sweeteners⁸, which has been identified as a westernization of local diets, i.e. a shift from traditional food towards typical North-American eating habits. Even though each country and each region is experiencing a different path, reported data⁹ show that between 1970 and 1995-1997 the world calories intake from meat and vegetable oils has increased by 33% and 46% respectively, while energy intake from starch roots and pulses has decreased by 30%; although cereals still make up the largest share of the world's diet, the energy intake from fat and sugar is increasing at the expenses of complex carbohydrates.

Recent data (see figures 7 and 8 below)¹⁰ show that the global variation of food intake in the last 30 years appears to be very different in each continent, yet there is a general trend of steady consumption of cereals, starchy roots, pulses, sugar and sweeteners; vegetables, fruits, edible oils, meat and dairy consumption tends to increase almost everywhere, while animal fats intake is quite steady, except from Asia. Unsurprisingly, the most "westernizing" area in terms of food intake is Asia, where a general rise of income (particularly in China and the "Asian Tigers") has led to an overall increased consumption, especially of foods typical of the North-American diet. In Africa the nutrition transition is slower, but still there are clear signs of an increase in demand for vegetable oils, meat, eggs, and milk (dairy consumption has not risen very much over time, but absolute quantity is rather high, compared to vegetables and fruits). Developed areas (Europe, Oceania, and the Americas) show less relevant variation, with Oceania displaying a counter-trend behavior about pulses, eggs, dairy, and meat; this is because consumption in the developed world is already high in absolute terms, as fig. 8 illustrates. One remark has to be done on "the Americas" grouping: North America (where the western diet comes from) and South America used to have very different dietary habits, so North-South aggregate data may not be extremely significant. We can hypothesize that developing South American states consumption tendency might be more similar to that of the Asian states: absolute quantity lower than average, but high percentage change. On the contrary, North American trends might be more similar to that of the other developing areas: high absolute quantities and low, if not negative, percentage changes.

⁸ *Ibidem*.

⁹ Drewnowski A (2000), "Nutrition Transition and Global Dietary Trends", Nutrition vol. 16 no 7/8, pp. 31-43.

¹⁰ In FAO database food types are grouped as follows: cereals include wheat, maize, barley, rice, oats, millet, sorghum rye, other cereals; starchy roots include cassava, potatoes, sweet potatoes, yams, other roots; pulses include beans, peas, and other pulses; vegetables include tomatoes, onions, and other vegetables; fruits include oranges, mandarins, citrus, bananas, apples, pineapples, plantains, grapefruit, dates, grapes, and other fruits; sugar and sweeteners includes sugar, honey, and others; vegetable oils includes oil from soybean, groundnut, sunflower seed, rape and mustard, cottonseed, palm kernel, palm, sesame seed, coconut, olive, rice bran, maize germs, oil crops and others; meat includes bovine, mutton & goat, pig, poultry, others; animal fats includes butter and ghee, cream, raw fat, fish body and liver oil.

Fig. 1 Percentage change of regional consumption per food type (Kg/Yr per capita), over the period 1980-2009, (FAO data re-elaboration, 2012)

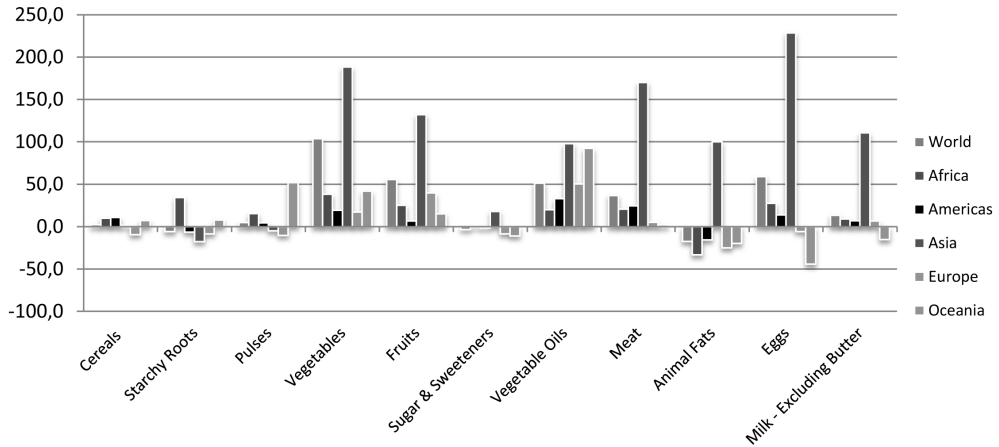
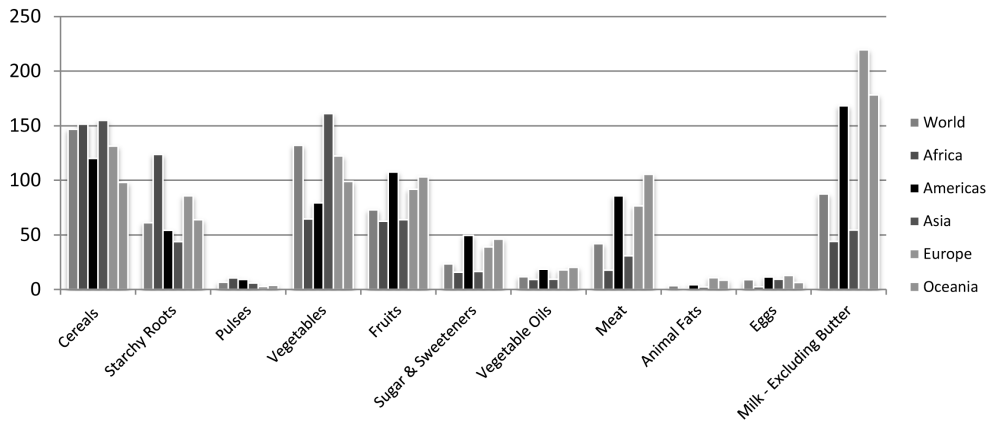


Fig. 2 Absolute regional consumption per food type in 2009, expressed in Kg/Yr per capita (Source: FAOSTAT, 2012)



FAO (2004)¹¹ provides for a cross-country study, showing that dietary patterns are going through two main processes: convergence and adaptation. Changes in food prices and individual incomes seem to be driving food demand towards the same choices in all regions (polished grains, animal products, vegetable oils), while changes in lifestyle seem to be leading towards similar adaptation phenomena (higher consumption of packaged and processed food) in different countries. This is also due to a certain idea of “being modern”; evidence from South Africa demonstrates that fried food is considered a sign of modern living, while boiled food is regarded as outdated.

Beyond data on food demand in terms of kilos per year, which give us a first indication of how consumption has changed, another important information to take into account is the relative weight of each food type in terms of calories per day. Figs. 9 and 10 below report data on Kcal/Day per capita of different food types. The percentage change of consumption shows

¹¹ Kennedy G., Nantel G., and Shetty P.(2004), *see reference list*.

tendencies extremely similar to fig. 8 above; considering such trends and looking at fig. 10, the conversion process observed by FAO¹² finds some confirmation in 2009 data: the divergences in regional percentage changes lead to similar consumption habits in absolute terms. For instance, the consumption of fruits and vegetables in Asia and Africa has remarkably increased, but only to reach the average consumption patterns; the same, the intake of calories deriving from meat, animal fats, eggs and milk in Asia has risen exceptionally, so that the absolute calories amount is growing similar to that of developed regions.

Fig. 3 percentage change of regional consumption per food type (KCal/Day per capita), over the period 1989-2009 (FAO data re-elaboration, 2012)

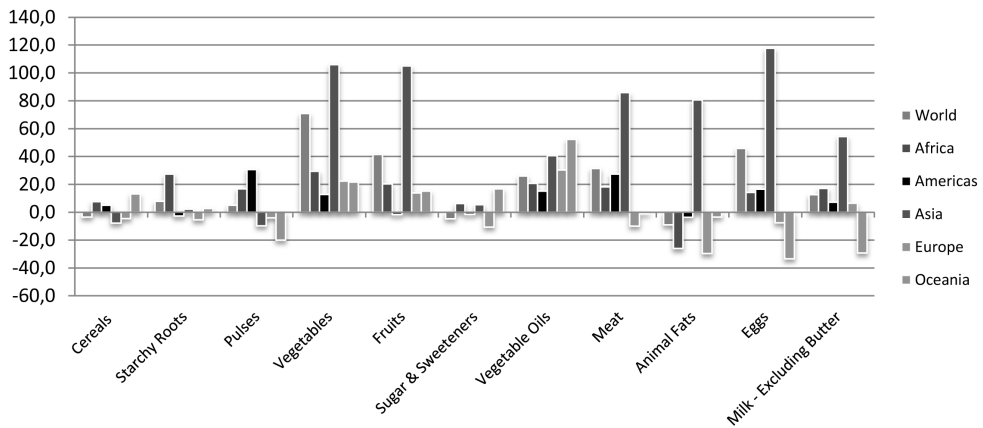
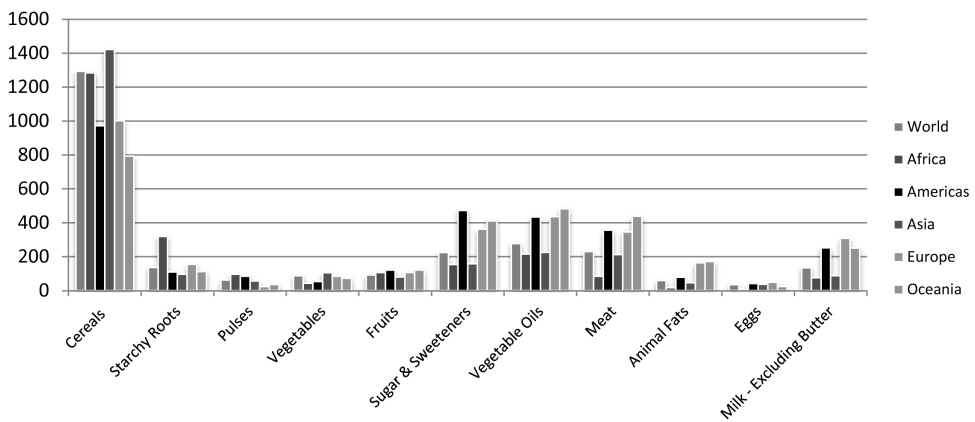


Fig. 4 Absolute regional consumption per food type in 2009, expressed in KCal/Day per capita (Source: FAOSTAT, 2012)



¹² *Ibidem.*

This dietary transition, along with population growth, has led to an increasing demand for fish, meat and animal products, causing what has been defined as the “livestock revolution”¹³. Developed countries will, in absolute terms, keep a high consumption of animal fats and proteins, while developing countries account for 85% of global rising demand in cereals and meat. According to Steinfeld and Gerber (2010)¹⁴, while the green revolution was a planned policy, the livestock revolution is occurring without political planning, as a direct consequence of a remarkable increase of the demand for animal source foods, which is expected to increase by 68% (meat) and 57% (milk). Demand for meat implies a greater demand for cereals to feed livestock and a higher environmental impact of dietary habits, as it will be demonstrated in the next part. Yet, though total world calories intake are on the rise in the developing world, food insecurity and under-nutrition will persist. This livestock revolution, like the green revolution, is primarily involving developing countries, where the increase in the share of production and consumption is more significant, causing heavier stress on resources and a need for rapid technological change¹⁵. There is a need for policy regulation of the livestock industry, since it may bring opportunities, as well as dangers: in low-income countries, meat is an important source of nutrients to fight against under-nutrition, but in wealthier countries it brings health problems, and, moreover, without proper techniques livestock management causes environmental depletion.

3. Main causes of the westernization of diets

Drewnowski and Popkin (1997) have tried to investigate possible genetic and inner causes of fat- and sugar-rich food preferences observed all around the world. According to their findings, although human beings have directed their choices towards high-energy food to survive during the evolution process, there seems to be a regulatory mechanism for sugars, but not for fats. Sugar is highly desired by children, and less by adults; the same, proteins demand may be tied, to a certain extent, to internal mechanisms. On the contrary, the perception of fat in foods is often misguided and its consumption appears to be determined by economic factors, plus a general desire for a more diverse diet. Thus, socio-economic factors like urbanization, incomes and economic growth, prices dynamics, and globalization are regarded as the leading cause for the nutrition transition.

According to Drewnowski (2000), the nutrition transition is highly influenced by income levels and GNP, so that two steps can be identified: at an early stage of the transition there is an increase in oil and vegetable fats consumption, while in the second phase dietary habits move towards a higher intake of animal products and western processed foods. Developing countries may be an example of the first stage, while wealthier nations (like Japan) have already reached the second step. Between the ‘50s and the ‘70s, economic growth in Japan has been followed by an increase in fats intake: the traditional diet based on rice, fish, and soybeans has been enriched with meat (poultry, in particular), milk, and dairy products. Drewnowski and Popkin (1997) report that from 1946 to 1987, Japanese people have experienced a three-fold increase in fat intake (from 9% to 25% of daily energy), while cereals have been reduced from

¹³ Pinststrup-Andersen P., Pandya-Lorch R., and Rosegrant M. W. (1999), “World Food Prospects: Critical Issues for the EarlyTwenty-First Century”, *IFPRI Food Policy Report October*, Washington D.C.: International Food Policy Research Institute.

¹⁴ Steinfeld H., Gerber P. (2010), “Livestock production and the global environment: Consume less or produce better?”, *PNAS* vol. 107 no. 43, October 26, 2010, pp. 18237-18238.

¹⁵ *Ibidem*.

66% to 39% of daily energy. Developed countries have already undergone this transition. The research mentioned above has found out that today GNP-nutrition shift ratio is less strong than in the past. The analysis of 1962 data has outlined a remarkable connection between incomes and animal fats, while a less marked behavior has been observed with animal proteins and sweeteners; vegetable fat consumption was pretty constant and independent of GNP levels. The same study, conducted on 1990 data, has detected an increase of animal fat consumption in poor countries, and a reduction in rich countries, while results for animal proteins and sweeteners did not change substantially; consumption in vegetable fat remained independent of income levels, but significantly higher. The conclusion drawn from this study is that the nutrition transition is happening today at much lower incomes than before. This means that dietary shifts are much faster than in the past, with the result that in many developing countries chronic under-nutrition and rising over-nutrition are found together, causing a double burden for the State to deal with. The same hypothesis is maintained by Abrahams *et al.* (2011)¹⁶ in a study on 40 Sub-Saharan countries: even though most of the countries analyzed appear to be in the early stages of the transition, the recession of famine and the concurrent increased access to low-cost western food (due to globalization and urbanization dynamics) are deeply affecting dietary habits and speeding-up the transition in low- and middle-income countries.

China and India are an example of nutrition transition due to advanced living standards and improved economic performances, although income inequality is still high. A rapid increase in GDP per capita has led to a shift towards western lifestyle; in particular, all income groups have moved away from a cereal-based diet, seen as poverty status¹⁷, to higher energy-dense diets. Reported data¹⁸ show that, approximately from the mid-‘70s to the mid ‘90s, Chinese people have sharply increased animal products consumption (almost eight-fold), and vegetable and fruit consumption, while in India global demand for dairy and edible oils has grown fast. A similar pattern has been followed by South America: all Latin American countries show an increase in animal protein and fat, sugar and processed food intake, occurred between 1970 and 1997; at the same time, despite being the principal source of energy, cereals’ consumption has decreased. Yet, each of them is in a different step of the nutrition transition and wealthier countries (like Chile) or rapidly developing ones (Brazil) seem to be in a much advanced phase¹⁹.

The main reason why dietary shifts are occurring at lower income levels than in the past, along with rising income, is a general reduction in “western” foods’ prices, due to industrialization of agriculture and livestock. Price is very important in food selection and it can be affected by economic means, but it is difficult to find a balance between reducing calories intake of wealthier people without harming food insecure households²⁰. Egypt, for instance, is undergoing an early phase of the nutrition transition²¹, with growing consumption of polished grains (wheat and rice), animal products, fats, and vegetable oils. The shift from a kind of bread mainly made of corn flour to a wheat flour dependency is due to State subsidies, accord-

¹⁶ Abrahams Z. *et al.* (2011), “Diet and mortality rates in Sub-Saharan Africa: stages in the nutrition transition” *BMC Public Health* 2011 11:801.

¹⁷ Popkin B. M. (2001), “Nutrition transition: The changing global nutrition challenge”, *Asia Pacific Journal of Clinical Nutrition*, vol 10 (suppl.), pp. S13-S18.

¹⁸ Popkin B. M. *et al.* (2001), “Trends in Diet, Nutritional Status, and Diet-related Non-communicable Diseases in China and India: The Economic Costs of the Nutrition Transition”, *Nutrition reviews* vol. 59 no. 12, pp. 379-390.

¹⁹ Bermudez O. I. and Tucker K. L. (2003), “Trends in dietary patterns of Latin America populations”, *Cad. Saude Publica*, vol 19 (sup. 1), pp. S87-S99.

²⁰ Popkin B. M. (2001), see above.

²¹ Galal O. M. (2002), “The nutrition transition in Egypt: obesity, undernutrition, and the food consumption context”, *Public Health Nutrition* vol. 5 no 1A, pp. 141-148.

ing to Galal (2002), which made wheat bread and flour less expensive, thus more preferable by consumers.

Satterthwaite, McGranahan, and Tacoli (2010) have remarked that urbanization, beyond economic growth, has a deep impact on food production and consumption, mainly for three reasons: first, cities' physical expansion causes losses of local agricultural lands, forcing people to rely on large international chains; second, urbanization in less developed countries is not always associated to income growth, so that there are large masses of urban poor suffering from food insecurity; last, increased consumption of meat. A FAO cross-country study²² has shown, as well, that urban dwellers tend to consume more edible oils, animal products, sweeteners, and, to a minor extent, fruits and vegetables. Satterthwaite, McGranahan, and Tacoli (2010) believe that this last feature of urbanization is mainly due to higher incomes, not to urbanization itself. However, there is some evidence contrasting with this statement. According to Ghassemi, Harrison, and Mohammad (2002)²³, Iran is experiencing a rapid dietary shift, in a context of a quick demographic transition (due to fertility rate control policy), urbanization, and social development, but the absence of a steady economic growth. Data provided in the mentioned research show that, since 1985, urban population in Iran tends to move towards an inexpensive energy-dense diet, rich in bread, sugar, fats and oils, while animal proteins, fruit and vegetable consumption has decreased. Iran is a clear example of a fast transition, happening at low income levels and affecting urban poor above all, causing a double burden of undernutrition and overnutrition. Furthermore, a study conducted on China²⁴ shows that, keeping a steady level of socio-demographic variables, income, and food prices, there is a "urban effect" on dietary habits, causing a shift towards western diets: higher consumption of superior grains, fats, animal products, sweeteners, and processed food. This "urban effect", according to Popkin (2001), marks a significant difference between urban and rural dietary habits in low-income countries; on the contrary, in wealthier countries there seems to be a market penetration in rural areas, due to transportation and national distribution infrastructures, causing a convergence of rural habits towards urban dietary styles.

Another issue affecting dietary habits, usually deriving from economic growth and urbanization, is globalization and spreading mass media. This is a common feature of developing economies: for instance, in China, during the '70s, there was no television, no transportation, and (almost) no food trade; today, almost 90% of households own a television, transportation has developed, and industrial techniques are applied to the food chain, too²⁵. Evaluating globalization's real impact on food choices is a hard task, because it is always mixed up with other dimensions affecting lifestyle changes. As mentioned above, the nutrition transition implies a dietary convergence towards the North-American diet. This shift cannot be always connected to globalization dynamics: taking again China as an example, the dietary transition started when domestic production of vegetable oil increased, while changes in lifestyle pushed people to consume more food away from home and to increase the use of sweeteners; a higher demand for animal products and fats caused more import, but foreign food or habits started to play a role in the country only later, when the transition had already begun²⁶.

²² Kennedy G., Nantel G., and Shetty P. (2004), see reference list.

²³ Ghassemi H., Harrison G., and Mohammad K. (2002), "An accelerated nutrition transition in Iran", *Public Health Nutrition* vol. 5 no 1A, pp. 149-155

²⁴ Popkin B. M. (1999), "Urbanization, lifestyle changes, and the nutrition transition", *World Development* vol. 27 no 11, pp. 1905-1916.

²⁵ Popkin B. M. (2001), see reference list.

²⁶ Drewnowski A. and Popkin B. M. (1997), see reference list.

On the contrary, in some cases globalization seems to have a good part in the transition: one is South Korea. This country underwent a process of modernization much earlier, compared to other Asian countries (except for Japan); according to Kim *et al.* (2000)²⁷, food shortages in South Korea have led to higher importation of wheat from the US in the '70s, originating a process that has led to a higher demand of foreign products and, as a consequence, the spread of fast food restaurants, food processing technologies, importation of meat. In the last thirty years, South Korean people have reduced consumption of plants in favor of animal products, anticipating the rest of the region; one remarkable feature of this country is that, contrary to most of the other ones, the dietary transition has not caused a marked rise in fat intake. One explanation²⁸ is that many socio-cultural movements to protect and retain the traditional diet have developed and spread through mass media, exploiting other features of globalization (for instance, by creating a chain of traditional Korean fast-food restaurants). Globalization of food culture is also affecting Indigenous Peoples' communities with a long history of traditions separated from those of the countries they live in. A study on forty-four large cultural areas from the Canadian-Arctic²⁹ shows that there has been a sharp reduction in the consumption of traditional food, and higher demand for fats, sugars, and proteins, especially among the youngsters and in more urban or connected areas.

4. Expansion and intensification of agriculture

To assess the environmental impact of food production, interconnected dynamics must be taken into account. The growing demand for agricultural products is due to increasing world population, the need to ensure food security, and rising consumption of animal products, so that the need for feed-grains cultivation has risen, too. Thus, to face the demand both for human needs and animal livestock, farming had to find a way to achieve higher yields.

In a detailed study on food production, the Barilla Center for Food and Nutrition (BCFN)³⁰ has provided data on carbon footprint, water footprint, and ecological footprint³¹ of most food types. The Life-Cycle Assessment (LCA) analysis takes into account farm production, processing, packaging, transport, and cooking. Even though we focus on the production stage only, a synthesis of wider data provided by the BCFN (see Table 1 below) gives a clear idea of the importance of changing diets in terms of resources consumption. The general outcome of the research is that more energy-dense foods require production methods having a deeper impact on the environment.

²⁷ Kim S. *et al.* (2000), "The Nutrition Transition in South Korea", *American Journal of Clinical Nutrition* vol. 71, pp. 44-53.

²⁸ Kuhnlein H. V. *et al.* (2004), see above

²⁹ Kuhnlein H. V. *et al.* (2004), "Arctic Indigenous Peoples experience the nutrition transition with changing dietary patterns and obesity", *The Journal of Nutrition* vol. 134 no 6, pp. 1447-1453.

³⁰ Barilla Center for Food and Nutrition (2011), "*Doppia piramide: alimentazione sana per le persone, sostenibile per il pianeta*", Parma: BCFN.

³¹ The Carbon footprint measures carbon dioxide emissions and all other greenhouse gases emission, converted in carbon dioxide emissions through proper coefficients, established by IPCC. The Water footprint indicates the amount of freshwater needed for a certain production, including rainwater absorbed by plants (green water), surface water and groundwater used (blue water), polluted water (grey water). The Ecological footprint determines the amount of land needed to provide for all services necessary to production, divided in: energy land, cropland, forest land, built-up land, fishing ground; this indicator is largely artificial (for instance, energy land is calculated as the amount of land needed to absorb carbon dioxide emissions), and does not include degraded land, but it is recognized by the academic community as a valid instrument, even though some methodological improvements are desirable.

Table 1 Carbon footprint, water footprint, and ecological footprint of selected foods including production, processing, packaging, and transport (Source: BCFN, 2011)

Type of food (data per kilo)	Carbon footprint (CO ₂ equivalent)	Water footprint (litres of water)	Ecological footprint (m ² total)
Agricultural food			
Fruit	70	600	3
Greenhouse vegetables	4000	106	9
Seasonal vegetables	302	106	4
Pulses	1130	1800	16
Foods resulting from agricultural products processing			
Pasta	1564	1390	12
Rice	2750	3400	9
Bread	983	1300	6,7
Sugar	470	1500	4
Oil	3897	4900	14,6
Animal products (livestock)			
Red meat	30400	15500	106
White meat (pig)	4359	4800	36
White meat (avians)	3830	3900	33
Butter	8800	5000	75
Cheese	8784	5000	75
Milk	1000	3300	15
Eggs	5233	3300	14

The improvement of yields occurred in the last decades has been reached through the physical expansion of agricultural land and, above all, through intensification of production. In other words, new consumption patterns have led farming enterprises to embrace intensive monocrop production systems to enhance yields remarkably. The main features of the so-called conventional (industrial) farming are: mechanization, greater use of fossil fuels, chemical fertilizers and pesticides, intensive monocrop cultivations. According to Foley *et al.* (2005)³², nowadays almost 40% of the total land surface is employed in croplands and pastures (not to mention livestock), becoming one of the largest terrestrial biomes on earth; this figure is consistent with official FAOSTAT data³³, reporting that 38,47% of total land area is classified as agricultural land. The way farming has evolved towards intensive croplands is causing a deep alteration on surrounding ecosystems.

The widespread shift to intensive agriculture and livestock results, above all, in climate-changing gas emissions, loss of biodiversity, and land degradation. Sonesson, Davis and Ziegler (2010)³⁴ outline that, while post-farm activities are quite similar among food groups, implying

³² Foley, J.A. *et al.* (2005), "Global Consequences of Land Use", *Science* vol. 309, no. 570, July 2005, pp. 570-574

³³ FAOSTAT database (2012), internet: <http://faostat3.fao.org> (consulted on August, 14th, 2013)

³⁴ Sonesson U., Davis J., and Ziegler F. (2010), "Food Production and Emissions of Greenhouse Gases", *SIK-Report no. 802*, Göteborg: SIK – The Swedish Institute for Food and Biotechnology, ISBN 978-91-7290-291-6

similar impacts on the atmosphere, in-farm activities differ substantially among food groups in terms of emissions. However, a common trait highlighted is that carbon dioxide emissions are relatively lower, compared to other biogenic greenhouse gas emissions: methane, nitrous oxide and dioxide. The research mentioned above offers a wide explanation of where does greenhouse gases emissions come from in each sector. Climate-changing gas emissions in agriculture are mostly due to the use of chemical fertilizers and pesticides; nitrogen, in particular, interacts with other particles present in soil and water, causing direct and indirect emissions of nitrous dioxide. Besides, agricultural operations requiring fossil fuels energy, as well as transportation of inputs necessary to production, result in carbon dioxide emissions. According to Smith *et al.* (1997)³⁵, there is a linear relationship between nitrogen fertilizers' quantity and nitrous oxide and dioxide emissions, even though other variables may affect the final result, such as fertilizers' timing, crop residues, water management, nitrification inhibitors, etc. Animal products' environmental impact depends on the kind of animal livestock. Sonesson, Davis and Ziegler report that red meat and dairy from beef cause a high level of methane emissions, due to enteric fermentation of ruminants; such emissions may be higher in nitrous dioxide if the cattle is fed with grains and soy, instead of non-edible grass. White meat from poultry has relatively less importance in direct climate-changing gas emissions, but poultry livestock needs a high amount of fossil-fuel energy; the same, white meat from pork causes less methane production than beef, but pigs need to be fed in grains, causing a rise in nitrous dioxide emissions. If we take into account all elements previously presented, as well as emissions due to deforestation and land-use change, it is clear how much intensive agriculture and livestock can affect local and global climate.

Another feature of the dramatic increase in food production is the preference for the so-called High Yielding Varieties (HYV), meaning those breeds that perform better in intensive farms. Today, although there are more or less 50.000 edible plants, rice, maize, and wheat provide for 60% of the global energy intake³⁶. Thus, contrary to traditional farming, intensive agriculture relies on a few crops cultivated in wide areas, affecting all three types of biodiversity: genetic, specific, and ecosystemic. Furthermore, intensive agriculture has a double set of impacts on biodiversity: at the single field level, it modifies natural vegetation and soil biota, while at the landscape level the large size and homogeneity of cultivations affects the whole ecosystems, both directly and indirectly. Table 2 below lists the main benefits of biodiversity; increasing simplification of biological resources causes a progressive loss of natural services which are essential to agriculture itself.

Table 2 Benefits of biodiversity (Source: Interagency report to the Mexican G20 presidency, 2012; author's elaboration)

Provisioning	Regulating	Supporting	Cultural
Food and nutrients	Pest regulation	Soil formation	Sacred groves as food and water sources
Fuel	Erosion control	Soil protection	Agricultural lifestyle varieties
Animal feed	Climate regulation	Nutrient cycling	Genetic material reservoirs
Medicines	Natural hazard regulation (droughts, floods and fire)	Water cycling	Pollinator sanctuaries
Fibres and cloth	Pollination		
Materials for industry			
Genetic material for improved varieties and yields			
Pest resistance			

³⁵ Smith K. A. *et al.* (1997), "Emissions of N₂O and NO associated with nitrogen fertilization in intensive agriculture, and the potential for mitigation", *Soil Use and Management*, vol. 13 Issue supplement s4, pp. 296-304.

³⁶ OECD (2012), *Sustainable agriculture productivity growth and bridging the gap for small-family farms*, Interagency report to the Mexican G20 presidency, 12 June 2012, internet: www.oecd.org (consulted on July 15th, 2013).

Altieri (1999)³⁷ highlights that biodiversity has many economic advantages for farmers and consumers, namely dietary diversity, income diversification, efficient use of labor and resources, resistance to crop diseases, and efficient exploitation of different soil types; as a consequence, biological simplification hinders natural services, causing environmental damages and higher economic costs due to the growing need for external inputs. Negative impacts of agriculture intensification on biodiversity are due, first of all, to the expansion of cultivated areas; this is causing, especially in developing countries, the loss of many habitats and ecosystems. Beyond expanding areas, intensification of production systems is the main cause for biological simplification. According to Thrupp (2000)³⁸, agrobiodiversity, including not only biodiversity itself but also the skills of farmers to exploit and preserve it, is mostly concentrated in Africa, Asia, and South America, where there is a tradition of cultivation of landraces, i.e. local breeds. Yet, the introduction of many HYV has endangered biodiversity in developing countries: the research mentioned above reports that in the Philippines more than 300 traditional rice varieties have been displaced, while in Senegal a highly nutritive local cereal (fonio) is threatened by the introduction of western-imported HYV monocrop cultivations. Thrupp and Altieri outline that monocrop cultivations are highly vulnerable to pests and diseases, so that farmers resort to chemical pesticides. Besides, a reduction in soil organisms and nutrients leads to the increasing use of chemical fertilizers, with subsequent release of higher quantities of climate changing gas. As previously outlined, one characteristic of intensive agriculture is the use of great quantities of chemical pesticides (there are more or less 1600 pesticides available nowadays), which, although should be projected to attack targeted organisms only, have a disruptive effect on biodiversity: bird wildlife and pollinator insects are the most affected species by poisonous effects of chemical pesticides³⁹. The intensification of production systems and subsequent loss of biodiversity is attributable to livestock activities, too. Baumung and Hoffmann (2010)⁴⁰ state that the increasing demand for animal products, due to dietary shifts, is leading to widespread settlement of (intensive) livestock, even in developing countries where, traditionally, animals were not kept for food. Widening livestock areas cause the loss of ecosystems due to land-use change, and spreading intensive methods cause environmental depletion. Most often, the adoption of intensive livestock systems couples with the increasing use of cross-breeding and non-local breeds, largely coming from developed countries, at the expenses of local resources (Campbell, Noonan-Mooney, and Mulongoy (2010)⁴¹). Baumung and Hoffmann outline that animal genetic resources loss is happening both at a specific and sub-specific level; for instance, only four out of forty domesticated avian and mammalian species are raised worldwide. Within-breed diversity plays a key role in animal genetic conservation and, like crops, decreasing biological diversity makes livestock more sensitive to diseases.

The third issue mentioned above, soil depletion, is mainly caused by the massive employ-

³⁷ Altieri M. A. (1999), "The ecological role of biodiversity in agroecosystems", *Agriculture, ecosystems, and Environment* vol. 74 (1999), pp. 19-31.

³⁸ Thrupp, L. A. (2000), "Linking agricultural biodiversity and food security: the valuable role of agrobiodiversity for sustainable agriculture", *International Affairs* vol. 76 no.2, pp. 265-281.

³⁹ Angelo M. J. (2009), "Corn, carbon and conservation: rethinking U.S. agricultural policy in a changing global environment" ExpressO Available at: <http://works.bepress.com>.

⁴⁰ Baumung R. and Hoffmann I. (2010) "Animal genetic diversity and sustainable diets" in Burlingame B. and Dernini S. (ed.) *Sustainable diet and biodiversity*, FAO – Food and Agriculture Organization, pp. 82-93.

⁴¹ Campbell K., Noonan-Mooney K., Mulongoy K. J. (2010), "Biodiversity, nutrition, and human wellbeing in the context of the Convention on Biological Diversity" in Burlingame B. and Dernini S. (ed.) *Sustainable diet and biodiversity*, FAO – Food and Agriculture Organization, pp. 36-43.

ment of chemical fertilizers and pesticides. According to Tilman *et al.* (2002)⁴², these practices damage heavily the environment, as only a part of chemicals is taken up by crops, while the rest is released in the ecosystem; besides, growing resistance to pesticides generates extra need for external inputs, causing further disruption of the environment, and so on. Evidence shows that the result of this vicious cycle is a growing expenditure of farmers to buy more fertilizers, while the progressive reduction in chemicals efficiency generates decreasing yields' growth anyways. In a study on developing countries, Scherr and Yadav (1996)⁴³ state that this process is highly risky, since not all land degradation phenomena are reversible, at least not in the short-medium run. Without appropriate policies, land degradation due to overexploitation will result in a serious threat to yields and food security, especially in regions with higher population density and growing demand for food. One example of disruptive land degradation effect has occurred in the Indian state of Haryana, according to the research delivered by Singh (2000)⁴⁴. Haryana has undergone a first process of cropland expansion, prior to the '60s, then an intensification of practices through the introduction of HYV (rice and wheat, replacing pulses, bajra, sorghum), chemicals, and irrigation facilities. Yields improved so much that Haryana, together with Punjab, provided for 20% of national grain production. Growing population and pressures on land has led to soil degradation and extreme climatic events, as floods and droughts, becoming more evident and worrying since the '80s. Phenomena of environmental depletion described above are a serious risk for food security. The conventional model of food production has not developed in a way suitable to climate change adaptation and is vulnerable to extreme climatic events, especially in developing countries. Biodiversity loss and environmental depletion expose farming to diseases and external shocks, due to a lower threshold of resilience compared to that guaranteed by a healthy ecosystem. This means that the more intensive methods will be protracted, the more the environment will be endangered, and productivity may start to decline over time.

5. Concluding remarks

Developing countries are undergoing the same nutrition transition that developed countries have experienced decades ago. There is a widespread shift in dietary habits from traditional diets towards the so called western diet, rich in red meat, animal products, edible oils, fats, and, polished grains. Even though each country and each region is experiencing a different path, between 1970 and 1995-1997 the world calories intake from meat and vegetable oils has increased by 33% and 46% respectively, while energy intake from starch roots and pulses has decreased by 30%; although cereals still make up the largest share of the world's diet, the energy intake from fat and sugar is increasing everywhere, especially in Asia. The nutrition transition is caused by a multitude of interconnected dynamics. Economic growth and rising income levels in developing countries make energy-dense products far more accessible than before, while urbanization causes a "urban effect" on dietary habits, resulting in a shift of urban dwellers' dietary habits towards the North-American diet. Moreover, globalization and

⁴² Tilman D. *et al.* (2002), "Agricultural sustainability and intensive production practices", *Nature* vol. 418, 8 August 2002, pp. 671-677.

⁴³ Scherr S. J. and Yadav S. (1996), "Land Degradation in the Developing World: Implications for Food, Agriculture, and the Environment to 2020", *Food, Agriculture, and the Environment Discussion Paper 14*, May 1996, Washington D.C.: International Food Policy Research Institute.

⁴⁴ Singh R. B. (2000), "Environmental consequences of agricultural development: a case study from the Green Revolution state of Haryana, India", *Agriculture, Ecosystem, and Environment*, vol. 82 (2002), pp. 97-103.

the spread of mass media seem to affect the perception of food tradition, favoring the nutrition transition, even though evidence on the role of globalization is still controversial.

Thus, the nutrition transition entails an increasing production of energy-dense foods (meat, animal products, fats, edible oils). Cross country studies demonstrate that such change is happening at lower income levels than before, because the industrialization of agriculture and livestock has caused a general reduction in western food prices. As a consequence, the transition is happening today at a much faster pace than a few decades ago, so that in the short run there will be a further, significant increase in the demand for energy-dense foods. However, in conventional industrial agriculture processes, energy-dense foods require production methods having a deep impact on the environment.

Due to population growth and, consequently, soaring demand for nutritious food, conventional agriculture methods have been adopted in developing countries during the green revolution. The improvement of yields occurred in the last decades has been reached through the physical expansion of agricultural land and, above all, through intensification of production. The main features of the so-called conventional farming are: mechanization, greater use of fossil fuels, chemical fertilizers and pesticides, intensive monocrop cultivations. Although, in the short run, the industrialization of agriculture and livestock provided for higher production, in the long run damages to the environment are a serious issue. Beef livestock, as well as the use of agrochemicals result in a large share of climate-changing gas emissions; the introduction of HYV and monocropping practices threaten biodiversity; soils are depleted due to the massive employment of chemical fertilizers. Given that the high demand for foodstuff produced by industrial farming is expected to rise sharply, and that such methods are causing greenhouse gas emissions, loss of biodiversity, and soil degradation, there is a growing concern for the environment and for food security. Such considerations have raised interest in sustainable farming practices, based on traditional knowledge and new technology in a locally-specific approach, environmentally and socio-economically sustainable, representing a possible response to the increase in food demand.

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Sri Lanka Development Drivers: The Cooperation with European Union and China

Yuan Miao

Abstract The European Union and China have established a deep relationship and the demand to expand the cooperation has been felt more strongly. To establish cooperation at a worldwide level will be a good choice. Under this condition, Sri Lanka will be the next place to be the new engine of the Sino-European Union cooperation.

Sri Lanka was colonized successively by the Portuguese, the Dutch and the British and during this period the plantation economy developed which has occupied the most important position in the national economy of Sri Lanka for a long time. After independence, Sri Lanka was seeking a driver for its development, thus its attention gradually moved to the textile industry. Its economy still relies heavily on exports which provides for China and the EU the opportunity to develop further their trade with Sri Lanka and to enhance their reciprocal cooperation.

After Sri Lanka's independence, China traded with Sri Lanka and provided assistance while Sri Lanka gave political support to China. Thus, China has the experience to work with Sri Lanka. During the colonial era, European countries had a large effect on the culture of Sri Lanka. Until now many tourist cities are still famous for the fortifications built by the colonial powers and the percentage of English speakers is higher than in many other countries in Asia. Then we have not to forget the chapter of the long ethnic civil war with its high cost in terms of human life and de facto a transfer of resources from development to military expenditure. While in the past the main products exported to the EU were gems and tea, Sri Lanka now has switched to the garment trade, which leads to a sense of closeness not only in culture but also in economy. In the future, if the EU and China could take advantages of each other, Sri Lanka could be the next point of cooperation.

Keywords Sri Lanka - Tea export - Textile export - European Union and China cooperation

1. Introduction of Sri Lanka economy

1.1 The tea industry

Sri Lanka is famous all over the world for its attractive red tea production. The sales of red tea have occupied an important position in the national economic development for a very long time thanks to the suitable climate of Sri Lanka. The island, located at southern tip of the

subcontinent, belongs to tropical monsoon climate that provides for the wet and hot weather required for the planting of economic crops.

Since 1505, Portuguese, Dutch and British colonists successively came to the island and that was the beginning of Sri Lanka's plantation economy. Afterwards the Kandy Kingdom began with planting coffee, but production collapsed by the 1870s because of the slump of the price and the coffee tree disease. This situation provided a good opportunity for tea planting and the economic development has been very prosperous. However, from the beginning Sri Lanka's economic system established a highly foreign dependence model. Until the eve of independence, the annual output reached 271 million pounds, accounting for 68% of the total export amount.

After that, by expanding the percentage of national capital put into the production of tea, Ceylon's government still fostered the domestic tea industry. However, with the not entrepreneurial and efficient development of the tea industry (export-oriented and strong dependence), the government needed to explore the ways to build a more compatible if not self-sufficient economic system. Although the tea industry is still playing an important role in the national economic system, the textile industry has now become the driving force for exports.

1.2 The textile industry

Since the 1970s, the development of the textile industry has experienced a booming trend. The share of garments in total exports rose from 27% in 1986 to 52% in 2002¹. Even during the economic crisis in 2009, the export amounts of first quarter still rose by 8.8% compared to the same period of 2008.² The garment industry has become the new economic growth point in the national economic system and gradually replaced the leading position of the tea industry.

The European Union and the United States are the main international markets for the garments of Sri Lanka. The manufacturers of Sri Lanka have established a friendly cooperation with many famous brands of these countries and they also created their own brands in 2003. Thus, after the decline of the tea industry, the textile industry will become the new highlight of Sri Lanka's development.

2. Sino-Sri Lanka economic relationships

Earlier in the 1-6 centuries AD, Chinese ambassadors stopped for several months in Ceylon when they went to India. During the Han Dynasty, China's eminent monks had spent two years in Ceylon, from where they brought the Buddhist Scriptures back to China which helped the development of China's Buddhism. After the foundation of new China, Ceylon was one of the first countries that established diplomatic relationships with China.

The economic cooperation between China and Sri Lanka began with the rubber industry. At that time China badly needed a great amount of rubber and Sri Lanka had a heavy backlog that could not be sold. As a result, despite of the economic sanctions and embargo against China, Sri Lanka still traded with China. By 1956 Sri Lanka was China's second largest trading partner among Asian and African countries, and the trade back to China occupied the third largest position of Sri Lanka's foreign trade amount, followed the British and India.

¹ "Ready -made Garment Industry in Sri Lanka: preparing to face the Global Challenge", Asia-Pacific Trade and Investment Review, Vol.1, No.1, April 2005, p 53.

² "Apparel Industry Records 2013 Percent Growth", <http://www.lankatimes.com/fullstory.php? Id=17469>.

In the 21st century, the Sino-Sri Lankan economic relationship has developed into a new stage. On June 6, 2012, the first deep harbor in Hambantota supported by China was enabled and in the same year Sri Lanka decided to accept military training from China lacking of the military interaction with India³. In addition, the financial assistance provided to Sri Lanka has gradually increased gradually since the 1950s. By the end of 2010, the total financial support provided to Sri Lanka has reached 3.04 billion dollars. The bilateral relations experienced a positive development since the establishment of diplomatic relations and it can be said that the Sino-Sri Lanka cooperation has become one of the most valuable relationships of Sri Lanka's international relations.

But we have not to forget the chapter of the long ethnic civil war, with a high cost in terms of human life and *de facto* a huge absorption of resources from development to military expenditure.

3. Economic relationships between EU and Sri Lanka

Due to historical reasons, Sri Lanka has important ties with Europe on the traditional cultural level. The Dutch and British culture is reflected in the ancient castles and hospitals, which were built during the colonial era. They are still famous and attract a great number of tourists from all over the world every year. As the model law for many developing countries, the law system of Sri Lanka is composed of Roman-Dutch Law, British Law and Kandy Law. In addition, the comprehensive welfare system providing free medical care and education which supported the formation of a high-quality workforce and the high percentage of English-speaking people also originated from the colonists' regime. Thus, people in Sri Lanka have the sense of closeness with the countries in UN.

The plantation of red tea began in the era of British colony, so the British became not only the biggest buyer but were also controlling the tea industry. A great amount of tea was exported to the Europe. Even during World War II, tea still accounted for 68% of the total export⁴. As a result, though it has been a long time since Sri Lanka's independence, the market in Europe is still one of the biggest markets for its exports and this trend of the trade will still be remained in the future.

Sri Lanka

Top 10 Export Partners in 2013

US Dollars, Millions

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
United States	1869.29	1988.09	2005.48	1969.98	1869.39	1576.05	1701.24	2144.85	2070.70	2228.49
United Kingdom	779.17	777.26	880.10	1018.04	1090.38	1023.58	989.72	1112.19	1006.52	869.83
India	391.51	566.41	489.46	515.28	418.33	321.92	473.95	519.04	586.11	611.68
Germany	274.06	271.83	328.81	437.85	405.26	346.85	400.16	509.99	432.58	438.89
Belgium	0.00	0.00	0.00	406.60	408.70	368.05	270.89	546.32	437.03	411.97
Italy	152.86	199.62	258.02	394.88	445.06	437.53	466.01	610.07	476.84	382.91
Russian Federation	150.98	157.66	188.18	202.60	220.74	192.41	243.26	281.46	275.79	365.87
United Arab Emirates	137.78	170.29	174.77	209.17	252.64	211.35	287.77	298.21	243.44	272.57
Japan	157.60	144.61	163.56	159.64	159.00	139.27	170.96	222.97	218.56	269.43
Iran, Islamic Republic of	57.89	74.14	83.39	117.15	154.50	145.63	165.31	180.38	200.62	224.62

Source: Direction of Trade Statistics (DOTS)

Data extracted from IMF Data Warehouse on: 9/30/2014 2:46:51 AM

³ "We are ready to train Sri Lanka Army: Chinese Defense Minister", Lanka C News, Sep. 2, 2012.

⁴ "Tea industry and the Sri Lanka economy", Xiao Wen, South Asian Studies, 1988, No.4.

The charts above illustrate that in 2013, the biggest international market for the export products of Sri Lanka are the United States, the United Kingdom and India. Germany, Belgium and Italy followed as the fourth, fifth, and sixth. Apart from the United States and India all other countries are from the European Union. It should be noticed that trade increased rapidly with many European countries while the amount of the United States remained stable. Among the trade products garments occupied the most important position. In the process of establishing a self-sufficient economic system, Sri Lanka gave priority to the development of the textile industry. Most of its production is exported to the United States and European Union, 63% and 30% respectively⁵. In return, the European Union also granted a preferential policy to Sri Lanka in order to support the development of the garment industry. For a long time, Sri Lanka enjoyed the GSP+ given by the European Union which made Sri Lanka more competitive than other countries. Though it experienced the challenge in 2009, it still pursued the same policy in 2010 with the promise to develop the poor northern villages supported by the European Union. This could be a further point for the cooperation of EU and Sri Lanka.

4. Sino-EU cooperation drives by Sri Lanka

Top 10 Import Partners in 2013

US Dollars, Millions

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
India	1439.15	1835.43	2172.85	2610.14	3447.21	1819.82	2569.53	4430.70	3869.45	4650.01
China, P.R.: Mainland	454.04	630.56	779.74	923.81	1114.49	1028.91	1240.09	2092.06	1188.94	3781.00
Singapore	698.45	736.86	992.75	1118.54	1245.71	1065.61	1566.65	2123.95	1502.66	2161.14
United Arab Emirates	202.69	296.31	219.58	333.22	427.14	408.10	493.97	656.03	1311.11	1318.13
Iran, Islamic Republic of	418.75	523.86	758.93	844.20	1194.29	897.00	906.34	1602.40	1042.19	1047.77
Oman	3.00	3.59	6.68	61.44	10.09	12.51	90.03	204.44	269.79	751.61
Japan	411.71	379.69	449.58	413.17	425.97	223.93	584.11	1024.60	547.12	637.83
Malaysia	329.18	393.50	444.81	283.49	358.61	287.91	384.62	684.51	769.73	631.75
China, P.R.: Hong Kong	619.40	648.19	659.05	724.81	694.60	517.19	579.66	631.95	165.64	531.11
Taiwan Province of China	290.84	278.66	274.83	263.60	251.26	201.47	264.08	352.17	409.32	470.13

Source: Direction of Trade Statistics (DOTS)

Data extracted from IMF Data Warehouse on: 9/30/2014 2:46:51 AM

As the charts above demonstrate the most important import partners are India, China, P.R., and Singapore while none of the EU countries was mentioned in the list. Thus, EU and China play different roles in the foreign trade of Sri Lanka. EU-the main export partner and China-the main import partner have not benefited from the crisis in this area, which could lead to the cooperation of both side.

China has gained much experience in providing assistance in the past years. During the political crisis in Sri Lanka, China has provided large supplies to the refugees from the war; in the seaquake of the Indian Ocean, China's Red Cross Society offered assistance in many

⁵ "The development of garments industry in the crisis and challenges", Tang Qipeng, Southern Asia Studies, 2010, No.2

ways. Nowadays, the EU is thinking of supporting the development of poor northern villages in Sri Lanka and that could be the line China can work with. In the assistance area, the EU has the natural superiority over other countries due to the close cultural relationship and one of the biggest export markets with a high demand for textiles in Sri Lanka. There will be no language barrier for them, because most of the people in Sri Lanka speak English and some of them speak French. These are all advantages for the EU to begin the assistance in the country. As China has a long history to work with Sri Lanka, it could provide valuable experience for EU.

Cooperation could not only happen in the assistance area but also in the economic area. Although Sri Lanka is still a lower-middle-income country, the development could be seen noticed the world. In this trend, Sri Lanka will provide more suitable market conditions for foreign investment. On the political scene, Sri Lanka is gradually expanding the degree of opening of the local market and that will be a good opportunity for foreign investment. China has already supported Sri Lanka with building the deep port and that will be an important link in China's ocean trade and the step for China to develop more independent international trade with the EU. As a result, Sri Lanka could be, even if in the small scale, the connection of the trade between China and EU.

Infrastructure projects in Sri Lanka might be another area for the cooperation of EU and China. Many cities in Sri Lanka are lacking of the basic infrastructure, such as traffic lights and taxis. These might be concluded in the next step of assistance given to by China.

At the same time, the EU is thinking of enlarging the assistance range in Sri Lanka. If they could work together in this line, it would lead to deep cooperation not only in trade but also in technology and even culture. Facing the problems of urban construction, China could use the wisdom of Europe for good reference.

In conclusion, EU has the cultural advantages to Sri Lanka and China has the tradition to trading with Sri Lanka. If these favorable conditions could be utilized properly and in a long term approach Sri Lanka could be new factor for further Sino-EU cooperation.

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Journal Transition Studies Review (JTSR) *Aims and Scopes*

Transition Studies Research Network was founded in 2002 as CEEUN-Central Eastern European University Cooperation, with the aim to connect a group of experts and university faculty in a program of cooperation devoted to research programs and specialized international postgraduate and doctoral courses. The Network has grown fast and soon after the scientific “voice” was established with the Journal Transition Studies Review, published initially by the CEEUN, then by Egea - Bocconi University Press, and finally by Springer Wien-New York.

At the beginning, JTSR was focusing on transition in Central and Southeast Europe, interpreting CEEUN purely as a European network. Soon afterwards, the EU enlargement was achieved extending the aims and scope to differentiated forms of partnership with Russia, Ukraine, Caucasus, the Black Sea and Caspian Seas, Mediterranean regions and Near East. Today this approach has dramatically changed following a serious violation of the international laws and agreements by the Russian backed insurgency and later invasion of Crimea and Eastern Ukraine. Today we are facing the most severe crisis of security and confidence between European Union countries and Russia since the Second World War and the reunification of Germany. The future is unpredictable and certainly nothing will return to be as before in the relations with Russia.

CEEUN was launched in Vienna and its first meeting took place at the Institution that was founded by Friedrich August von Hayek and Ludwig von Mises, two great thinkers and economists: the Austrian Institute for Economic Research.

Now the scenario is completely different. From 2005 on, a worldwide regional approach looking to Asia, Latin America, Eurasia and Great Middle East has been implemented. TSN-Transition Studies Research Network has inherited from the previous CEEUN the “aims and scope” which were recently integrated. In the last ten years Transition Studies Research Network has progressively involved more than 400 internationally well known members and 95 university departments, institutes and research centers and is engaged in many areas and programs.

The scientific interests and fields covered are: Europe and the World, future approach to EU enlargement, global governance economic, financial and policy framework and impact, where the focus would be mainly on growth theories, innovation and human capital, cultural and intellectual heritage, main advanced industrial sectors technologies, investments, international

affairs, foreign policy choices and security, monetary policy and main currency areas, banking and insurance, development and area studies, social policies, environment and climate, culture and society, juridical and law studies, regional approach to global governance, peculiarities and critical challenges.

The future transition to an open economy and institutional reforms, political and strategic issues and challenges, governance, European, Mediterranean, Asia-Pacific, Middle Eastern, Latin America and Africa perspectives are key topics of this high ranking journal.

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