The Importance of EU Cohesion Policy in Central and Eastern Europe
A. Kengyel

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I. Harechko

Natural Resources: Could Ever Be a Blessing? The Russian Case
G. Cori

Inter-Firm Trust and Access to Financing
E. Alardh; M. Kermani

Beyond Size: The Rise in Power of the Transaction Sector in Post-Liberalization India
R. Nihakant; D. Iyengar

Are we set for Electric Cars? Questioning the environmental Readiness of India
P.P. Dewani; P. Roy; M. Motiani

The Identitarian Re-Interpretation of Italians from Istria
L. Bergnach; A. Pocecco

REPORTS & DOSSIERS
Participation of Developing Countries in Global Value Chains
OECD

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Green shoots of recovery in a reform-oriented environment

Paolo Mameli
Senior Economist
Macroeconomic & FI Research, Intesa Sanpaolo
Papers

A. Kengyel The Importance of EU Cohesion Policy in Central and Eastern Europe 3

M.B. Zolin; M. Braggion Emerging Economies and Large Land Investments 21

X. Wei; J. Wang An Empirical Investigation of Impact Factors for the Profit Performance of Regional Life Insurance Market in China 39

D. Daradkah; S. Miani The Banking Industry in Morocco 55

I. Shaikh, P. Padhi A Study of Market Efficiency from Option Prices: Evidence from the National Stock Exchange of India 69

L. Chemli Financial Development and Poverty Short and Long Run Causality in Tunisia 89

Q. Munir; K.S. Ching; H. Harvey Testing for Unemployment Hysteresis in Selected Transition Economies 103

I. Harechko Implementation of Electronic Democracy in Ukraine 121

G. Covi Natural Resources: Could Ever Be a Blessing? The Russian Case 133

E. Afandi; M. Kermani Inter-Firm Trust and Access to Financing 159

Reports & Dossiers

OECD Participation of Developing Countries in Global Value Chains Available Online
The Importance of EU Cohesion Policy in Central and Eastern Europe

Ákos Kengyel

Abstract The successful operation of EU level regional development – or cohesion – policy has a strategic importance from the point of view of the whole integration process. Strengthening economic, social and territorial cohesion and decreasing disparities between EU member states and regions are not only one of the main priorities of the integration, but at the same time these are justified expectations of the people living in the member states of the union. The cohesion policy transfers should be spent on those factors which have the biggest contribution to the improvement of development prospects and competitiveness in the given regions. After a decade of the “Eastern enlargement” it is important to have a look at the experiences of the new member states in relation to EU transfers and their effects on convergence. This article focuses on the impacts of cohesion policy transfers on catching up and the experience of the new member states. In the first part of the study the main reasons in favour of an intervention at EU level will be explained. After the theoretical background, the next part will present the importance of EU funds in financing public investments in Central and Eastern Europe. The last part will focus on the effects of EU regional policy on catching up: macro-econometric model results will be analysed and the “qualitative” effects of EU level regulatory frameworks will be explained. The main goal is to give an explanation about the “added value” of EU cohesion policy in the process of catching up in Central and Eastern European member states.

Keywords EU cohesion policy - Convergence - Catching up - New member states

JEL Classification F15 - F63 - O11 - R11
Introduction
All countries from Central and Eastern Europe joined the EU with a per capita GDP below the EU average (around 50 per cent of the old EU15 average) and even below the least developed old member states. However, GDP per capita at purchasing power parity of some new members (Slovenia, Czech Republic) was close to that of some old member states. The number of applicant countries and the differences between them were greater than ever before, and it was clear that they will all be net recipients of the EU common budget. An effective cohesion policy and European solidarity had to become more important than ever in achieving the major goal of reducing disparities in levels of development explicitly set by the EU founding treaty.

The new members wanted to get access to the Structural and Cohesion Funds as major instruments to support their modernisation process. Although future resource transfer was not the only reason to become a full member of the EU, this field played a very important role for the Central and Eastern European countries (CEECs). There is no doubt that it was of high importance for the historically undercapitalised countries to accelerate their modernisation process, among others, also by having access to EU funds. It should be emphasized that EU regional policy support is, of course, only part of the explanation for these processes, several other factors (increasing openness to the world economy, integration into the single market of the EU, national economic policies and the structural adaptation of the national economies) have also contributed to the catching up processes. At the same time, subsidies from the EU could play a decisive role in improving economic performance and convergence.

1. Theoretical Considerations about Convergence and Regional Transfers
Because of decreasing returns, in the neo-classical growth theories real convergence is expected. The marginal productivity of capital falls with accumulation, in turn reducing the incentive to save. As a result, growth slows down in richer countries and regions and the initially poorer countries will grow faster and converge. Divergence can be explained by endogenous growth model based on increasing returns of human capital and innovation; by the new economic geography based on the economics of agglomeration; and by institutionally oriented economic theories including social capital (Pelkmans, 2006. pp. 339-342).

Among the factors determining regional inequalities, differences in infrastructure and human resources largely contribute to the competitiveness of individual regions. The historically low level of infrastructural investment has undoubtedly hindered the improvement of productivity and employment levels in the least developed member
states of the EU. The infrastructural background, the quality of human resources, the levels attained in research and development activities, and, as a consequence of all the above, the region’s ability to attract investments, are all factors determining competitiveness, which clearly reflect the development level and prospects of a region (Kengyel, 2008).

The new way of approaches based on the endogenous growth model tries to employ measures that enhance domestic capacity and capability to improve competitiveness. According to this model endogenously created improvements in the level of technological knowledge or in human capital generation and accumulation present the driving force of the long-term development and growth (Romer, 1990). Thus, the endogenous approach highlights the resources of the region, such as human capital, entrepreneurship, innovation, capacity to adopt new technologies, leadership and institutional capability, as well as trust based local relations as fundamental drivers of regional growth. Actually, these are the factors which increase the resource endowments and knowledge base of a region (Stimson, 2009).

The endogenous model argues that technological progress and human resources are the main factors in increasing the standard of living. The dynamics of development is not equal in different regions, because it depends on the qualification of human resources and additionally, the rate of human and physical capital involved in research and development activities, and efficiency in adopting new technologies. Accordingly, by investing in R&D activities and education, the region has ability to catch up with the developed regions or those that are technologically advanced and so, it will easily adopt the new technologies and innovations. In this context institutional system has a crucial role in moving the region up to the technology frontier considering that the utilization of the local resources depends on the institutional development and capability.

The new concept makes shift from the comparative and competitive advantage to collaborative advantage of the region. Along with the rising role of the endogenous growth model in the last decades, collaborative advantage was in the focus with an aim to support the partnership and cooperation between the different local agents: governmental institutions, private sector, educational institutions, NGOs. The good strategic planning and policy programming require the input from local agents. Indeed, the regional “assets” are underlined as the source of development. Competitive growth needs to be based on the endogenous model supporting not only the tangible infrastructure, but also the “soft” or less tangible factors. Furthermore, the collective approach including cooperation and partnership between all stakeholders in the region needs to be strongly supported.

Hence, efficiency of the whole institutional system is relevant, however when speaking about growth, institutions and networks that assist knowledge creation –
R&D, cooperation between the public, private and research sector, SMEs support and access to finance – are vital and therefore called “systems of innovation” (Lundvall, 1992; Nelson, 1993). Experience suggests that there is a low growth in the regions where ineffective institutions operate and especially, if the learning process is not supported in these regions. This makes a clearer understanding of how processes such as physical and human capital accumulation, innovation, knowledge impact long run economic growth.

Wintjes and Hollanders (2011) emphasize that regional diversity and pathways and models of innovation calls for differentiated policies. In many regions, new technologies originate outside the region, innovation should therefore be considered in a broader sense, beyond the research- or science-based approach. Non-technological innovations (organisational and marketing processes, new forms of collaborative arrangements) also should be taken into account. Farole et al. (2011) stress that combating underdevelopment to enhance growth requires a mixture of multi-level governance and true subsidiarity. They call attention on the existence of technological and other types of frontiers which need a highly tailored set of interventions that are designed to address specific regional contexts of underdevelopment and to promote growth.

2. Necessity and Importance of an EU Level Regional Development Policy

The commitment to reduce economic disparities within the European Union has strengthened as the number of EU member states has grown and as integration has deepened, since both processes have resulted in an increase in regional problems. An effective regional policy is crucial to the development of an integrated EU. If the EU does not have a commitment to reduce the disparities in income differences and living standards, the future of the integrative process would be undermined. It would be unacceptable for citizens in differing parts of the Union to be subject to significantly different standards. The most important argument in favour of an EU policy is the necessity to have an active device by which the welfare benefits of economic integration are spread throughout the European Union. There is no guarantee that this will occur if market forces are allowed to operate freely. Evidence would suggest that the opposite effect might result and that development would become even more concentrated in the centre of the EU. It is, however, unrealistic to attempt to equalise all conditions throughout the EU, which are the result of different resource endowments and historical factors.

The EU’s regional policy has to improve the conditions that influence competitiveness in such a way that the given region becomes more attractive to investors, the spirit of enterprise is stimulated, and, as a result, economic growth takes off. It should be emphasized that “domestic factors – such as strong
development of a financial sector, prudent macroeconomic policy, strengthened institutional frameworks, improved public and corporate governance – correlate with external capital inflows. Depending on causality, these factors are considered either as conditions/thresholds needed to achieve growth benefits or as additional benefits/collaterals to growth.” (Wilczynski, 2011. p. 5.)

In order to achieve these objectives, financial assistance is made available, through Structural and Cohesion Funds, for regions in need. EU funds aim to promote a better economic and social balance across the European Union and to reduce regional disparities, by co-financing with member states development actions in their regions. After the subsidies spent on the common agricultural policy, expenditure on cohesion policy is the most significant part of the EU budget and accounts for about one third of total EU common budget. The nature and distribution of the support has become a politically sensitive issue within the EU. For some states, in which the poorest regions are located, payments have come to be considered as the means to ensure their national government’s support for potentially damaging EU actions. For other states, which are net contributors to the EU budget, payments from the Structural Funds are seen as a way of “clawing back” some of those contributions.

Cohesion policy has much to tell about how a more competitive EU can be achieved. Competitiveness, more jobs, growth, innovation and a balanced development of the EU’s territory are not only at the heart of the Europe 2020 Strategy but also the major concern of European citizens. Cohesion instruments contribute to the endogenous growth potential of regions, to investments in human capital and physical infrastructure (transport and energy), to telecommunications and information technology infrastructure, and to research and innovation activities. This is not about charity, but for the benefit of all.

It has sometimes been argued that cohesion policy is and should be essentially a tool to redistribute resources from richer to poorer areas. If this route is taken, the next step is to call for measures aimed at compensating very backward areas by providing unconditional support, possibly through automatic devices. This characterization not only looks like a misrepresentation of what cohesion policy today is about, but it actually misses the point of the very meaning of cohesion target in both EU history and its Treaty. Cohesion policy is not about redistribution, is about growth. There are mutual benefits for all member states.

3. Budgetary Importance of EU Transfers for CEECs

The amount of EU level budgetary expenditure on regional policy had ever-increasing weight between the late 1980s and 2000 reaching 0.24% up to 0.4% of GDP (European Commission, 2004). Since that time the ratio has remained at the same level. From the
point of view of the beneficiary countries the maximum level of transfers was fixed at 4% of GDP since 2000, for the period 2007-2013 the capping rate was between 3.2% and 3.8% of GDP for those countries whose per capita GNI was between 75% and 40% of the EU average (Council of the European Union, 2006). For the period 2014-2020, as a general rule, the ceiling is fixed at 2.35% of GDP (there are only some exceptional cases to increase this ratio by 10 per cent).

These levels reflect relatively low degree of solidarity, although experience has shown that the great proportion of the amounts flows toward the developed regions of the net contributor countries in the form of purchases of finished products, machinery and investment goods. The evidence suggests that, on average, around a quarter of structural expenditure returns to the rest of the Union in form of increased imports. According to model estimations EUR 75 billion benefits are generated for the old EU15 countries as an impact of EUR 140 billion cohesion policy transfers for the Visegrad Countries during the period 2004-2015 (Zawistowski et al., 2011).

Cohesion policy transfers for the first 3 years of membership were laid down in the accession treaties: the 10 new members were entitled for EUR 21.8 billion (EUR 14.256 billion from the Structural Funds and EUR 7.591 billion from the Cohesion Fund) for the period 2004-2006. They were quite modest in size compared to what the less developed old member states received. The official reason was the expected limited absorption capacity in the first years of membership. Structural aid to the new member states amounted to around 0.5% of GDP in 2004, and increased to around 1.3% of GDP by 2006. (The similar figures were between 3.5-4% in Greece or Portugal.) In the period 2007-2013, the 11 CEECs were eligible for EUR 174.72 billion from the Structural and Cohesion Funds. This total transfer amounted to 16.2% of an average annual GDP of the region, which means an annual transfer around 2.3% without national contribution and private co-financing. It means that equal treatment was guaranteed for the new members and the level of funding has become a really important source of modernization. (*Table 1*)

**Table 1** EU funds in Central and Eastern European countries (2007-2013)

<table>
<thead>
<tr>
<th>EU funds 2007-2013 (EUR billion)</th>
<th>EU funds per capita (EUR)</th>
<th>Total EU funds for 7 years compared with an average annual GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>6.67</td>
<td>917</td>
</tr>
<tr>
<td>Croatia</td>
<td>1.00</td>
<td>234</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>26.30</td>
<td>2 501</td>
</tr>
<tr>
<td>Estonia</td>
<td>3.40</td>
<td>2 595</td>
</tr>
<tr>
<td>Poland</td>
<td>67.19</td>
<td>1 743</td>
</tr>
<tr>
<td>Latvia</td>
<td>4.54</td>
<td>2 243</td>
</tr>
</tbody>
</table>
The Importance of EU Cohesion Policy in Central and Eastern Europe

EU funds 2007-2013 | EU funds per capita | Total EU funds for 7 years compared with an average annual GDP
---|---|---
| (EUR billion) | (EUR) | (%)
Hungary | 24.92 | 2 515 | 25.4
Romania | 19.18 | 956 | 13.4
Slovakia | 11.65 | 2 154 | 16.2
Slovenia | 4.10 | 1 993 | 11.6
CEECs total | 175.72 | 1 830 | 16.2

Source: KPMG (2014)

In addition, as a result of the crisis, national budgetary expenditures have been seriously restricted. The crisis has had a dramatic impact on national budgets. Public investment measured as gross fixed capital formation in the EU28 declined by 20 per cent in real terms between 2008 and 2013. In Greece, Spain and Ireland, the decline was around 60 per cent. Public investment fell by a third in the CEECs. Without EU cohesion transfers, investments in the EU member states most affected by the crisis would have collapsed by an additional 50 per cent. This could depress growth rates over the medium-term. (**Figure 1**)

**Figure 1** Impact of cohesion policy transfers on public investment trends during the crisis (2007-2013)

![Figure 1](image_url)

There is increased reliance on cohesion policy transfers to finance growth-enhancing public investment. During the past period cohesion policy transfers accounted for a significant proportion of public investment in the EU member states. In 2010–2012, cohesion policy funding represented more than 60 per cent of the investment budget in CEECs – in countries like Slovakia and Hungary the ratio reached around 90 per cent. (Figure 2)

**Figure 2** Cohesion policy and national co-financing as % of total public investment (average 2010-2012)

4. **The Added Value of EU Level Transfers**

The eastern enlargement presented an unprecedented challenge to the competitiveness and internal cohesion of the EU. After May of 2004, the EU’s average GDP per head decreased by almost 13 per cent, because the GDP of most of the regions in the new member states were between 30-40% of the former EU15 average. If we calculate with the 12 new countries, including Romania and Bulgaria, the statistical effect was to reduce the EU15 average GDP per head by 18% (European Commission, 2004).

However, contrary to the extremely bad general environment resulted by the international financial and economic crisis, the majority of the new member states
were able to converge toward the EU average: within one decade the relative level of development of the region measured in GDP per capita terms compared to the EU average increased by 15 per cent. It should be stressed that among several advantages of EU membership direct transfers from the EU level budget played a crucial role in improving competitiveness through investments supported by these resources. (Figure 3)

**Figure 3** Changes in relative positions between 2004 and 2013 (GDP per capita, PPS, EU28=100)


According to the latest available data published by the statistical office of the European Union the dispersion in GDP per capita across the EU member states remained remarkable, however the new member states’ situation improved impressively. Between 2004 and 2013 the relative position of the CEECs compared with the EU28 average increased by 21 per cent in Lithuania and Romania, by 18 per cent in Slovakia, by 17 per cent in Latvia, by 16 per cent in Poland, by 14 per cent in Estonia, by 10 per cent in Bulgaria, by 5 per cent in Croatia, by 4 per cent in the Czech Republic, and by 3 per cent in Hungary. The relative position declined only in the case of Slovenia where the relative position decreased by 5 per cent.

The generally favourable performance of the new member states compared with the EU28 average can be partly explained by the implementation of EU funded programmes.

### 4.1. Contribution to Catching Up

There are several studies about the impacts and results of EU transfers on catching up. Some authors concluded that there is no evidence that the assisted regions display any form of systematic catching up (Boldrin – Canova, 2001). Others concluded that the success is very much dependent on national economic policy incentives which promote structural changes and research and development activities. There is evidence that EU supports are more effective in countries with the right institutions...

Significant progress has been achieved in terms of qualifying the impact of interventions, especially in large less developed regions, where the overall effects can be measured by using macroeconomic models. The HERMIN model is one of the most well-known econometric model for analysing the impacts of EU level intervention (Bradley–O’Donnell–Sheridan–Whelan, 1995, Bradley, 2006). HERMIN is a macro econometric model that combines both neo-classical and Keynesian elements to analyse in one framework both short-run (demand) and long-run (supply side) effects. The model takes into account that the transfers have the effect of enabling the least wealthy regions to achieve higher levels of investment in human and physical capital than would otherwise be the case, so helping to improve their long-term competitiveness. Some of the gains are due to short-run demand effects, in the form, for example, of a temporary boost to construction. However, around half of the increase in GDP is attributable to supply-side effects, which are important to sustain higher growth rates over long-term. These take the form of increases in physical and human capital and R&D, which serve to push productivity and growth potential. The projected effects of EU transfers differ between countries, partly because of variations in the scale of funding, partly because of differences in the structure of the economy. In general, the countries with large agriculture and basic industry sectors gaining less than those with more services and higher-tech sectors.

Results of the HERMIN model provide quantitative evidence of the positive effects of EU support, in terms, for example, of job saved, created or redistributed. Model estimations for the period 2007-2013 show that cohesion policy has a significantly positive effect, with absolute GDP being some 5-10% higher in most of the new member states than in the absence of intervention. The job content is high, with 2 million net additional jobs predicted by 2015. (Table 2) It is important to note that the simulations incorporate only the effects of the EU contribution. The pattern of national spending is assumed to remain unchanged, which seems plausible given that most co-financing will come from money already earmarked for the spending in question.

Table 2 Results of the HERMIN model: Effects of EU transfers for 2007-2013 on national GDP and employment in 2015 (per cent, person)
The Importance of EU Cohesion Policy in Central and Eastern Europe

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP gain (% above baseline)</th>
<th>Employment gain (% above baseline)</th>
<th>Employment gain (1000s above baseline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>5.9</td>
<td>3.2</td>
<td>90.4</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>9.1</td>
<td>7.1</td>
<td>327.8</td>
</tr>
<tr>
<td>Estonia</td>
<td>8.6</td>
<td>5.4</td>
<td>31.0</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.6</td>
<td>0.4</td>
<td>8.2</td>
</tr>
<tr>
<td>Greece</td>
<td>3.5</td>
<td>2.3</td>
<td>95.0</td>
</tr>
<tr>
<td>Spain</td>
<td>1.2</td>
<td>0.8</td>
<td>156.7</td>
</tr>
<tr>
<td>Cyprus</td>
<td>1.1</td>
<td>0.9</td>
<td>3.1</td>
</tr>
<tr>
<td>Latvia</td>
<td>9.3</td>
<td>6.0</td>
<td>55.4</td>
</tr>
<tr>
<td>Lithuania</td>
<td>8.3</td>
<td>4.8</td>
<td>67.7</td>
</tr>
<tr>
<td>Hungary</td>
<td>5.4</td>
<td>3.7</td>
<td>147.3</td>
</tr>
<tr>
<td>Malta</td>
<td>4.5</td>
<td>4.0</td>
<td>6.9</td>
</tr>
<tr>
<td>Poland</td>
<td>5.4</td>
<td>2.8</td>
<td>384.2</td>
</tr>
<tr>
<td>Portugal</td>
<td>3.1</td>
<td>2.1</td>
<td>104.8</td>
</tr>
<tr>
<td>Romania</td>
<td>7.6</td>
<td>3.2</td>
<td>267.5</td>
</tr>
<tr>
<td>Slovakia</td>
<td>6.1</td>
<td>4.0</td>
<td>87.9</td>
</tr>
<tr>
<td>Slovenia</td>
<td>2.5</td>
<td>1.7</td>
<td>15.7</td>
</tr>
<tr>
<td>Eastern Germany</td>
<td>1.1</td>
<td>0.9</td>
<td>60.0</td>
</tr>
<tr>
<td>Italian Mezzogiorno</td>
<td>1.5</td>
<td>0.9</td>
<td>60.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>1969.7</strong></td>
</tr>
</tbody>
</table>


Another model on the impacts of EU transfers in the period 2007-2013 shows impressive results of EU assistance in the long run (Varga - in’t Veld, 2010). This micro-founded dynamic general equilibrium model is a standard DSGE model but with human capital accumulation and endogenous technological change. Cohesion policy interventions were simulated in this model through shocks given to corresponding model variables: 86 interventions were identified which were grouped into 5 main categories (infrastructure, agriculture-industry-services, R&D, human resources, technical assistance). A comparison across countries shows GDP effect proportional to the funds received when the financing of EU contributions is also taken into account.

The model results show that the cumulative net cohesion receipts will reach 17% of the supported countries’ GDP and their impact on GDP will reach 14.68% by
2016. For a longer run by 2025, the cumulative GDP effects will approach 45%, which means that the cumulative multiplier will increase from 0.86 in 2016 to 2.63 by 2025. (Table 3) The cumulative multiplier was calculated as the cumulative sum of GDP effects divided over the cumulative sum of net cohesion receipts. The multiplier is close to one in the last year of the programming period and increases further in the following years. The multiplier is largest in Spain and Portugal and becomes also large for Slovakia and Poland. Germany and Italy are net contributors and cumulative GDP effects are negative or negligible. It should be emphasized that the multiplier differs according to the different spending categories. The cumulative multiplier for research and development is larger than that for infrastructure. The multiplier of investment in human capital increases sharply in the long run, this type of intervention has long delayed benefits, but the largest long run output effects of all categories.

Table 3 Results of the micro-founded DSGE model: Cumulative GDP effects of cohesion spending in 2007-2013 (in per cent of GDP, in 2016 and 2025)

<table>
<thead>
<tr>
<th>Country</th>
<th>Cumulative net cohesion receipt</th>
<th>Cumulative GDP effect</th>
<th>Cumulative multipler</th>
<th>Cumulative multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016</td>
<td>2016</td>
<td>2025</td>
<td>2016</td>
</tr>
<tr>
<td>BG</td>
<td>17.42</td>
<td>13.12</td>
<td>40.30</td>
<td>0.75</td>
</tr>
<tr>
<td>CY</td>
<td>3.05</td>
<td>2.49</td>
<td>6.97</td>
<td>0.82</td>
</tr>
<tr>
<td>CZ</td>
<td>16.84</td>
<td>8.95</td>
<td>32.19</td>
<td>0.53</td>
</tr>
<tr>
<td>EE</td>
<td>22.49</td>
<td>17.23</td>
<td>45.30</td>
<td>0.77</td>
</tr>
<tr>
<td>PL</td>
<td>16.85</td>
<td>17.29</td>
<td>54.10</td>
<td>1.03</td>
</tr>
<tr>
<td>LT</td>
<td>25.08</td>
<td>18.19</td>
<td>55.23</td>
<td>0.73</td>
</tr>
<tr>
<td>LV</td>
<td>24.88</td>
<td>21.33</td>
<td>65.20</td>
<td>0.86</td>
</tr>
<tr>
<td>HU</td>
<td>23.36</td>
<td>19.28</td>
<td>57.14</td>
<td>0.83</td>
</tr>
<tr>
<td>MT</td>
<td>13.35</td>
<td>7.86</td>
<td>20.11</td>
<td>0.59</td>
</tr>
<tr>
<td>RO</td>
<td>13.25</td>
<td>13.00</td>
<td>34.30</td>
<td>0.98</td>
</tr>
<tr>
<td>SK</td>
<td>14.44</td>
<td>15.79</td>
<td>47.61</td>
<td>1.09</td>
</tr>
<tr>
<td>SI</td>
<td>10.10</td>
<td>7.82</td>
<td>21.78</td>
<td>0.77</td>
</tr>
<tr>
<td>GR</td>
<td>5.86</td>
<td>5.49</td>
<td>15.35</td>
<td>0.94</td>
</tr>
<tr>
<td>PT</td>
<td>10.19</td>
<td>11.42</td>
<td>32.19</td>
<td>1.12</td>
</tr>
<tr>
<td>SP</td>
<td>1.29</td>
<td>1.50</td>
<td>4.75</td>
<td>1.16</td>
</tr>
<tr>
<td>DE</td>
<td>-1.24</td>
<td>-0.28</td>
<td>-0.06</td>
<td>-</td>
</tr>
</tbody>
</table>
The Importance of EU Cohesion Policy in Central and Eastern Europe

<table>
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<th>Cumulative GDP effect</th>
<th>Cumulative GDP effect</th>
<th>Cumulative multiplier</th>
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<tr>
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</tr>
<tr>
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<td>-0.62</td>
<td>-0.78</td>
<td>-</td>
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</tr>
</tbody>
</table>


According to the latest cohesion report prepared by the European Commission “Cohesion Policy in the 2007–2013 period made a substantial contribution to growth and jobs. It is estimated to have increased GDP by 2.1% a year on average in Latvia, 1.8% a year in Lithuania and 1.7% a year in Poland in relation to what it would have been without the investment it has funded. It is also estimated to have increased the level of employment, by 1% a year in Poland, 0.6% in Hungary, and 0.4% in Slovakia and Lithuania. The estimates of the longer-term effects are larger because of the impact on the development potential of economies. In both Lithuania and Poland, GDP in 2020 is estimated to be over 4% above what it would be without the investment concerned and in Latvia, 5% higher. Over the same period, Cohesion Policy has been important in sustaining public expenditure in vital areas, such as R&D, support for SMEs, sustainable energy, human resource development and social inclusion.” (European Commission, 2014. p. 9)

4.2. Qualitative Changes in National Development Policies

Most of the effects of cohesion policy cannot readily be expressed just in quantitative terms (Bachtler – Taylor, 2003; Kengyel, 2008). Beyond the net impact of EU transfers on GDP or employment, its added value arises from other aspects, like the contribution made to regional development policies by factors such as:

- multi-annual programming (strategic planning, integrated development policies);
- partnership;
- evaluation;
- co-operation between regions (exchange of experience and good practice);
- political added value.

Multi-annual programming has been one of the main successes of the Structural Funds method and the benefits of this approach have become clearer over time as member states capacity to plan programmes over a number of years has
developed. This approach has facilitated longer term and more strategic planning in CEECs. The EU programming approach has promoted strategic dimension in regional development policy making. From a financial perspective, multi-annual programming gives rise to a greater degree of certainty and stability as regards the availability of funding than annual budgeting. This is particularly relevant in the context of major infrastructure investment which takes years to complete.

Partnership has widened and deepened and has extended in some cases beyond the Structural Funds into other areas of national and regional administration. Originally, partnership was conceived primarily as vertical relationship between the Commission and national, regional or local authorities, the horizontal dimension of partnership, including a wider range of stakeholders at local, regional and national level, has grown stronger over time. When it works effectively, partnership adds value in many ways. It stimulates ideas for projects, through partners communicating opportunities in relation to Structural Funds requirements. In programme design, it helps to focus interventions on the needs of the region or particular target group. Partnership has brought enhanced transparency, co-operation and co-ordination to the design and delivery of regional development policy.

Evaluation of cohesion policy programmes developed and improved during the past programming periods, leading to greater transparency and accountability in the management of the funds. The strong emphasis placed on monitoring and evaluation has been one of the most important effects in the field of public expenditures. As a direct result of the EU level rules, considerable progress has been made in terms of integrating monitoring and evaluation into regional development programming across the member states. In Central and Eastern European countries, there was little or no culture of evaluation in economic development prior to the Structural Funds being introduced. Evaluations are now required to be undertaken at an ex ante stage by member states, at mid-term by member states in co-operation with the Commission and ex post by the Commission.

The EU level regional development policy rules provide a common international policy framework and timetable for regional development programming. As a result, a class of experts has progressively developed across Europe with a common background, culture and competences, delivering programmes which, while they vary significantly, have a core of common features. This provides scope for cross-national networking, which broadens horizons and facilitates the dissemination of the best practice.

There is also a clear “political added value” of the cohesion policy. An important intangible effect is to make the EU more visible to citizens, enterprises, communities and public authorities. Among the perceived benefits is stronger support for European integration. “The cohesion policy makes the EU visible for citizens. Projects supported by the Structural Funds show in regions and cities of all
member states that Europe cares and matters. Structural Funds are the vivid proof of the EU’s solidarity with poor and those in difficulties.” (Hübner, 2005. p. 1.) There are tangible outcomes in terms of the encouragement given to regional and local organisations to become involved in European political and policy debates and to internationalise their operations.

Concluding Remarks

According to the long-term experiences and the latest available data published by the Eurostat, it can be seen that there has been considerable approximation between the performance of less developed Central and Eastern European member states and the EU average level of development. EU regional policy support is, of course, only part of the explanation for this process, and several other factors have also contributed to the catching up processes. The most important factors that support cohesion are the improvement of the conditions of employment and the strengthening of the economic potential of the more backward regions. The crucial element in accelerating the process of catching up in these regions is to improve the conditions of economic development, since these regions are in a disadvantageous position in every respect. It should be noted that the measures promoting cohesion are not meant to replace the EU policies driven by free market principles, but are applied parallel with and in harmony with them: the cohesion measures are a concession to interventionism, but within the general framework of the market.

The priorities and actions defined by the member states should strengthen the regions’ capacity by supporting R&D and knowledge-intensive investment. The key challenge of the EU and member states is to improve the innovation capacity and R&D in the regions and encourage environment of strong regional networks between the industry, universities and research institution. Innovation and processes of learning, as well as institutions have a key role in fostering development of the regions, ensuring the root for sustainable growth.

However, it is a complex and permanent process that requires finances. Despite significant increase in the levels of funding, the steps being taken by the EU to support economic and social cohesion are still relatively modest. Overall levels of funding for regional development have remained low in comparison with the GNI of the EU. On the other hand, these transfers could play an important role in the catching up processes of the beneficiary countries. Because of enlargement and increased disparities among member states, there is no reason why cuts the budget of the cohesion instruments could be justified. The costs of non-cohesion would easily outweigh any budgetary savings in the long term. Cohesion policy should play a crucial role in boosting Europe’s economic competitiveness, fostering social cohesion, and creating more jobs.
According to several model estimations, the macroeconomic effects of the subsidies have proved to be far-reaching. There is evidence of significant growth in GDP and a considerable reduction in unemployment compared with the case without subsidies. EU regional policy transfers have the effect of enabling the least wealthy regions to achieve higher levels of investment in human and physical capital than would otherwise be the case, so helping to improve their long-term competitiveness. The main priority of the EU regional policy is to create conditions which allow self-sustaining development of the regions. Consequently, mobilisation of the human capital is taken as main driver engine in achieving this with the increasing rate of innovation.

Beyond its quantitative effects, the added value of the policy arises from other aspects, like the contribution made to national regional development policies by factors such as multi-annual programming frameworks, partnership, evaluation, co-operation between regions, and its political added value. These impacts have clearly contributed to the “Europeanization” of objectives, contents and operation of national development policies. The structure of EU cohesion policy – based on co-financing by the member states, partnership among all interested actors, and multi-annual programming – describes a policy set which is unique, when the whole spectrum of EU policies is taken into account. Indeed, it provides a framework to finance investments for sustaining development of regions based on coherent long-term programmes, conditional on a set of enforceable rules. It has become clear, that cohesion can be better achieved if it is implemented within a multi-level governance system. Several economic reasons back this statement. Firstly, the EU policy provides the incentive for institution building and empowerment of public administrations. The achievement of some common institutional features can allow a degree of communication and co-operation among development administrations of EU member states. Secondly, the EU cohesion policy provides the adequate framework for the implementation of major EU network projects in the areas of material and immaterial infrastructure, namely transport and research, which are essential to increase EU competitiveness.

In the future, greater care must be put into creating adequate framework for national and regional authorities to design the appropriate governance of the policy, to strongly invest in institution and capacity building, to improve evaluation systems, to create true partnership with social and economic actors. Subsidiarity must be more effectively implemented, through a more clear-cut separation of responsibilities with central and regional governments playing a focal role in establishing implementation rules, allocating resources among targets, areas and projects, running monitoring and control. In this reformed scheme, the Commission could play a higher strategic role in guaranteeing for the governance system, in supervising national rules and monitoring and control systems, and in co-ordinating
the horizontal co-operation among regions and member states.

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Emerging Economies and Large Land Investments

Maria Bruna Zolin • Marco Braggion

Abstract Since 2008, and following dramatic increases in prices, international commodities markets systems have begun changing after decades of relative indifference. The reasons for high, volatile food prices are manifold and widely analyzed by the abundance of literature on the subject, that deals essentially with imbalances in demand and supply. On the global demand for food, a factor with a huge impact is the change in diet, especially in emerging countries where, an increase of per capita income corresponds to an increase in the demand for animal-based foods. As the demand for food increases, demand for land increases and pushes prices up, thus fuelling speculation that mainly affects countries where land prices are lower. The paper aims to highlight the behaviour of China and India – which are among the most important emerging countries in terms of economic growth, concentration of population and surface area – with regard to the large-scale land investment phenomenon. We have aimed to identify those macroeconomic indicators (such as biofuels production, food price index, GDP per capita, cereals production and crude oil prices, usually referred to in order to explain the trend) which best exemplify how they can affect the two countries analyzed in the rush for land. The paper is divided into sections. Following a brief presentation of adopted methodology, an overall picture is presented of agriculture, renewable energy and land investment in China and India and, by means of a correlation matrix, the impact that some macroeconomic variables have on the phenomenon have been described.

Keywords Agricultural economics - Land investments - Food security - Energy security - Emerging economies

JEL Classification O13 - P28 - Q15 - Q18 - Q41 - Q42

Maria Bruna Zolin (✉) • Marco Braggion
Department of Economics, Ca’ Foscari University, Venice, Italy
e-mail: zolin@unive.it; marco.braggion@unive.it
1. Introduction

Since 2008, and following dramatic increases in prices, international commodities markets systems have begun changing after decades of relative indifference. According to Engel’s law, high food trends have a major impact on the food security of the world’s poorest people (McMichael and Schneider 2011; Nelson et al. 2010; FAO 2009a; Headey and Fan 2008; Zolin 2012; Doeward 2013).

The reasons for high, volatile food prices are manifold and widely analyzed by the abundance of literature on the subject (Gilbert 2010; Andreosso-O’Callaghan and Zolin 2010a; FAO 2009b; World Bank 2010a), that deals essentially with imbalances in demand and supply. On the demand side, a factor with a huge impact on the global demand for food, is the change in diet, especially in emerging countries where, an increase of per capita income corresponds to an increase in the demand for animal-based foods. Also on the demand side, the production of biofuels, aimed at compensating for the limited resources of non-renewable energy, has helped to push up the requests for energy resources production. In recent years, among the supply determinants in developing countries, such as low and stagnating productivity, weak rural and agricultural infrastructure together with market and trade restrictions, speculation based on food, financial instruments and rising oil prices, land has come to the fore because of its quantity scarce productive factor.

As the demand for food increases, demand for land increases and pushes prices up, thus fuelling speculation that mainly affects countries where land prices are lower. The African continent has seen a rapid increase in foreign investment in fertile and less expensive lands. Investments could be perceived positively, because of the introduction of technical innovations (World Bank 2010b), but the phenomenon has few selected enthusiasts. As a result of the impact it has on local populations, it forces small farmers to compete with companies/organizations (public or private) with highly professional skills and plentiful financial resources putting the former at an extreme disadvantage.

Our analysis of land investment, and its implications on food and/or energy security, focuses on China and India. China ranks first (or in some cases second) as the world’s largest consumer of agricultural products, mainly owing to its large population. China is also experiencing a shift in its eating patterns where the consumption of traditional staples (such as rice, wheat) is decreasing in favour of other products such as meat, fruit and processed food. India is an important consumer of agricultural commodities, also because of its sizeable population; it is one of the world’s largest consumers of tea, sugar, wheat, rice, cotton and palm oil. From a general point of view, the economic rise of these countries is creating a growing demand for raw materials and commodities. It is predicted (FAO 2009c) that demand for cereals will increase by 3 billion tons by 2050 (about 2,1 billion tons in 2009) and for other food products (livestock, dairy products, vegetable oils) the demand is expected to grow even faster mainly as a result of higher incomes in developing
countries.

The paper aims to highlight the behaviour of China and India—which are among the most important emerging countries in terms of economic growth, concentration of population and surface area—with regard to the large-scale land investment phenomenon. We have aimed to identify those macroeconomic indicators (such as biofuels production, food price index, GDP per capita, cereals production and crude oil prices, usually referred to in order to explain the trend) which best exemplify how they can affect the two countries analyzed in the rush for land.

The paper is divided into sections. Following a brief presentation of adopted methodology, an overall picture is presented of agriculture, renewable energy and land investment in China and India and, by means of a correlation matrix, the impact that some macroeconomic variables have on the phenomenon have been described. The findings and conclusions sum up our research.

2. Material and Methods

To our knowledge, the most reliable data sets available for the measurement of the phenomenon of land large investment are GRAIN (www.grain.org), Matrix Land (International Land Coalition 2012), FAOSTAT and the World Bank Data Catalog.

The GRAIN data set, started in 2006, considers the food crops deals, involving large areas, signed by foreign investors (it does not take into consideration the production of jatropha and cotton). The data set displayed, at the end of 2011, regards 416 deals involving 35 million hectares in 66 countries.

The FAOSTAT database (FAOSTAT 2013) collects data on agricultural land-use, including country area, land area, agricultural area, arable land and permanent crops and other descriptive measures of how the land is used. It does not, however, report records of land acquisition between countries. The same is true for the World Bank Data Catalog (World Bank 2013). As reported in a recent review on the topic, “there is no consensus on the methodologies of identifying, counting, and quantifying land grabs” (Borras Jr. et al. 2013).

The Land Matrix public online database was activated in 2000, when the value of the FAO real food price index was at its lowest. Between 2000-2011, 924 deals (both domestic and foreign investments) were signed, involving about 50 million hectares. Records derive from a variety of sources (Land Matrix website, media reports, reports by international and local organisations and NGOs, and field-based research projects, company websites and government records). In some parts of the world land investment partnership networks are strong, while in others they are very weak (as in Eastern Europe and Central Asia). There is a time lag between the deal taking place and its being recorded in the database. The initial dataset was revised in September 2011, thus, recent deals are poorly represented and in some
cases incomplete. Taking into account all the critical issues, and with a view to examining the phenomenon of large-scale land investment as a whole (therefore also including domestic investments, in our analysis), we used the Matrix Land data set and Stata 12 software to compute statistics.

Domestic and foreign land investments are now investigated. International investments usually create more concerns and tend to attract the attention of researchers. National and foreign investments generally have different purposes: internal investment strategies tend to respond to domestic public policies, while private companies (domestic or multinational) tend to focus on profit maximization, regardless of the nationality of the investor country. If not compensated, however, in both cases, the negative impacts on the local population could be larger than the positive ones. Regarding the structure of local farms they also seem to be inversely proportional to the size: the smaller they are, the greater the negative externalities from the acquisition (of any kind, domestic or international) of large portions of land. The paper, therefore, considers all deals regardless of the nationality or the legal status of the investor.

In order to calculate correlations between the amount of large-scale land investment and the indexes (commodity food price index, world biodiesel production, world ethanol production, crude oil price, Gross Domestic Product (GDP) per capita and cereals production), we used a pairwise correlation coefficient. We also applied Bonferroni and Sidak corrections to take into account multiple testing issues; p-values are calculated with a significance level $\alpha=0.05$. Time series behaviours of the data were analyzed using autocorrelation and partial autocorrelation functions.

The yearly commodity food price index, world biodiesel and ethanol production and crude oil petroleum price indexes were calculated as an average of the respective monthly indexes from the Indexmundi (www.indexmundi.com) database. The crude oil (petroleum) price is measured in US Dollars per barrel and it is calculated as a simple average of three spot prices: Dated Brent, West Texas Intermediate, and the Dubai Fateh. The Commodity Food Price Index (2005=100) includes the cereal, vegetable oils, meat, seafood, sugar, banana and orange price indices. World ethanol fuel production is measured in thousands of barrels per day, and it is intended solely for use as fuel. World biodiesel production is measured in thousands of barrels per day; biodiesel is derived from soybean, canola or other vegetable oils, animal fats and recycled grease. We used GDP per capita on a purchasing power parity basis divided by population as of 1 July for the same year (CIA World Factbook and Indexmundi). With regard to cereals production (measured in metric tons), we used the definition and the database of the World Bank (production data on cereals relate to crops harvested for dry grain only. Cereal crops harvested for hay or harvested green for food, feed, or silage and those used for grazing have been excluded).
3. Land Investment: The Role of China and India

The current boom in the global investment of land has been defined in many ways, but the label ‘land grabbing’ appears to have gained a sort of official status when describing the phenomenon (Borras Jr. et al. 2011). One of the most concise and informative definitions of land grabbing can be found in a report by Daniel and Mittal (2009); for these two authors, the grab “refers to the purchase or lease of vast areas of land by wealthier, food-insecure nations and private investors from mostly poor, developing countries with a view to producing crops for export”.

This practice has gained momentum over the last ten years, especially after the so-called world food price crisis in 2006-2008. In those years, average world prices for rice rose by 217%, wheat by 136%, corn by 125% and soybeans by 107% (Steinberg 2008). This phenomenon was extensively analyzed by: international organizations (Anseeuw et al. 2012; IFPRI 2012; World Bank 2010b; Cotula et al. 2009), journalists (Pearce 2012; Neuman 2011; Blas 2010), and academia, as well (Matondi et al. 2011). In the majority of cases the purchase regards land water (Rulli and D’Odorico 2012), alternative energy (mainly crops for biofuel production, see Matondi et al. 2011) and labour (Li 2011).

This peculiar form of neo-colonialism is deeply influencing the food security policies of underdeveloped countries. To date, official reports by the World Bank (2010b) and the International Food Policy Research Institute (IFPRI, 2012), have described a ‘win-win’ scenario: land grabbing could be a pro, both for purchaser and seller alike. For the former, there should be an increase in food security, for the latter, an increase in knowledge about new agrarian technologies and in rural development. This last analysis has been criticised by Borras Jr. and Franco (2010).

Even if, the main efforts in land grabbing analysis have taken place in Africa and South America, over the last twenty years however, two of the biggest countries involved in large-scale land investment have been China and India (GRAIN 2012; Baka 2011).

Economic growth is usually accompanied by improvements in the production and consumption of food and in the gradual reduction of food shortages. The phenomenon of urbanization that accompanies such paths affects consumption patterns by itself. Income growth generally changes the demand for food that moves from vegetables to animal proteins. The growth in demand for meat, however, has a more than proportional increase in the demand for cereals as feed for animals. These trends are reflected in the emerging countries.

According to a recent research report (IGD 2012), China has become the largest global food market, thanks to its population size, its economic growth and the consequent modification of the diet. The liberalization of the Chinese economy by Deng Xiaoping and the opening of the soybean market for animal feed in the late 90s, deeply altered the balance between the domestic and the transnational agro-
business. In the last five years, China has been the biggest importer of oilseeds compared to the rest of the world. From a general point of view, imports are constantly rising as well as the country’s domestic consumption of major protein meals.

Because of the scarcity of arable land, China has always used labour-intensive methods; nevertheless it has periodically suffered from interludes of severe food shortages. Since 1978, Family Production Responsibility has resulted in more power and autonomy for family businesses. As a result of the pressure of population size and limited arable land per household, land availability shrunk (less than one hectare per household). A large share of the land is used for growing crops. Rice occupies the most significant portion, followed by corn and wheat. Among other important Chinese food crops are oil seeds. The livestock (swine) population is large. Indeed, according to FAOSTAT (2012), China’s agricultural production in 2010 saw pork at the top of the list (in terms of value of production), followed by rice, vegetables, eggs, tomatoes, beef and chicken, wheat and apples (in line with the Chinese diet). China is also the world’s leading producer of cotton. There is homogeneity in the production of commodities, at least as far as the first four top commodities are concerned; these maintained the same ranking between 2008 and 2010.

According to FAOSTAT, China’s agricultural trade (imports and exports) have shown a deficit over the last ten years. In 2010, China imported commodities for 81,415,408 (1000 US $) with a ten-year growth of 530%. At the top of the list of agricultural products imported by China are soybeans (their value is more than fourfold that of the second highest ranked commodity), palm oil (raw materials that can be used for the production of renewable energy), cotton (China is the world’s largest importer, followed by other products classified as raw materials for the manufacturing or food industry. Chinese exports are mainly processed products. In the period under review, there were no significant changes in the top five products on the list, with the exception of garlic when high market prices boosted its production in 2009 and 2010.

**Figure 1** Import and Export of Agricultural Products (Totals per year), China: 1961-2010. Values in 1000 US $.

Source: Authors’ elaboration of FAOSTAT Database (FAOSTAT, 2013).
Following the Green Revolution, India has been self-sufficient in food production since the mid seventies. Agriculture is an important sector with a workforce equal to about 50% of the total (including forestry and fisheries), with a percentage of GDP at 16.6% in 2009 (CIA Factbook 2008).

**Figure 2** Import and Export of Agricultural Products (Totals per year), India: 1961-2010. Values in 1000 US $.

In 2010 the agricultural trade surplus was almost US $ 9.527 million. The agricultural structure consists mainly of small farms based on subsistence levels. In addition to these small family businesses, there are large, highly specialized companies, which are able to compete on international markets.

The most important domestic productions are rice and milk (from buffalo and cows), followed by wheat, sugar and tropical fruits. Palm oil is the by far the most imported product. If other oilseeds (soybean oil, sunflower oil) are included, it can be inferred that the requests for Indian agricultural commodities are essentially linked to the dependence of raw materials destined to the production of renewable energies. When ranking the most exported Indian products, rice occupied first place between 2008-2009 and slipped to second place in 2010. Rice was followed by: cotton (with an upward trend), soybean cake, buffalo meat and tobacco.

In 2009 a fall in exports corresponded to an increase in imports (palm oil). The drop in exports was mainly due to a fall-off in rice exports. In the period being considered, high rice prices led the Indian Government to adopt protectionist measures, due to the decline in exportable quantities. However, the balance has generally been positive since the start of the Green Revolution.
Figure 3 Cereals yields (Q/ha) time series for China, India, Asia and World.

Because of its surging economic activity, China has accelerated its energy demand. In India, energy supplies are also growing, albeit at a slower rate than in China. The main energy source in India is coal, which is non-renewable and is poorly energy efficient. As far as renewable energy is concerned, China is the third largest ethanol producer in the world. In 2002, it produced 76 million gallons; in 2010 the figure was almost eight times higher (according to the Earth Policy Institute, it produced 555 million gallons that year). However, China does not figure among the five top producers of biodiesel (Licht 2010). India has a marginal role when considering the more important worldwide renewable energy producers.

Considering the land run as a positive aspect - agriculture needs investment to increase productivity- we analyzed the yield per hectare both in China and India, comparing it with the Asian continent and world averages. The selected crops are cereals and oils.

The trend of cereals was upward across the board, except in 2009, despite the high prices reached by cereals in 2008 which, in theory, should have resulted in an increase in productivity (according to the cobweb model, production plans are dictated by the prices prevailing at the time when decisions are made to produce). China yields per hectare were by far higher than world and Asian continent averages, while India reached much lower levels (about half those of China). Oil crops showed China at a disadvantage. The yields were slightly lower than the world yields, but far below the average of the Asian countries. India’s productivity was half that of China, and reduced, according to productivity indices during the beginning of the food crisis, however, production rebounded in 2010-2011.

One possible reason for India’s low productivity may be the limited size of individual farm holdings, however, comparison with China is crucial. China’s private farms are on average much smaller than those in India, but their agricultural productivity is higher. Both countries have a high concentration of the workforce employed in agriculture, uncultivated land is in short supply and the primary sector...
continues to be a strong contributor to the economy.

The relationship between land and its productivity generally obeys the law of diminishing returns. The fixed factor in agriculture is the land itself, and labour is assumed to be a variable factor. Output can be increased by raising the number of workers, however, if the number of workers continues to increase it will eventually produce proportionally less in relation to the original workforce. Small businesses tend to have an abundance of labor and the ability to work outside the agricultural sector is rather low. This implies that small firms tend to remunerate family labor with low wages, probably below the market wage. For small businesses, however, the cost of additional land is high and this prevents loss of labour due to the capital outlay. This is not the case in China, where, according to Bosworth and Collins (2008), productivity growth is due to an increase in capital per worker and inputs applied to a Chinese agricultural worker are almost twice those of Indian ones.

**Figure 4** Oil crops yields (Ql/Ha) time series for China, India, Asia and World.

Source: Authors’ elaboration of FAOSTAT Database (FAOSTAT, 2013).

With regard to India, the analysis of yields highlights the opportunity for a sizeable enhancement of productivity, both in the case of cereal grains and oil crops. In China, where intensive productivity methods were applied to the cultivation of cereals, the improvement in yields seems less likely. China, instead, can still improve yields. According to the Land Matrix Database, the total amount of hectares involved in large land investment between 2000 and 2011 totalled 48,829 thousand hectares, with 924 deals in total.
Table 1 Large Land Investments (in hectares) and percentages on world total.

<table>
<thead>
<tr>
<th>Target Continent</th>
<th>Hectares</th>
<th>%</th>
<th>Investor Continent</th>
<th>Hectares</th>
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<td>Total</td>
<td>44.135.624</td>
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<th>Target Countries</th>
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<th>(on world total)</th>
<th>Investor countries</th>
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</table>

Source: Authors’ elaboration of Land Matrix Database (International Land Coalition, 2012).

The major targeted continents in terms of hectares are Asia (47.3% of the world amount), and Africa (34.6%). In terms of targeted regions in Eastern Africa, deals for 8,822 thousand hectares were made; in South-East Asia for 17,340 thousand hectares; in South America for 6,417 thousand hectares; in South Asia for 4,652 thousand hectares; in Western Africa for 3,829 thousand hectares. South-East Asia and South Asia are the main targeted regions involved in land large land investment in terms of hectares. China and India -as targets- account for 2.3% and 9.5% respectively of world land grabbed.

Among the top 10 investor regions South-East Asia, South-Asia and Eastern Asia are respectively in first, second and fourth place (in third place is the Middle East), with 18,599,295 Ha of investments (125 deals), 4,554,772 Ha (36 deals) and 3,911,580 Ha (87 deals) respectively. The land grab of these regions is mainly directed towards inbound investments: of the 27.080.206 of total Asian land grab, only 14% made deals with non-Asian regions.

The main investors in terms of surface area are Asia (61.4% of total amount of world land grabbed), Europe (15.4%) and America (13.6%). In terms of hectares, the investors grabbed land for a total of 6,402 thousand hectares in South Asia; 13,891 thousand hectares in South-East Asia; 2,799 thousand hectares in Eastern Asia; 1,544 thousand hectares in Western Europe; 1,888 thousand hectares in South America. Asia is still the main driver for large land investment also from the point of view of and investments in general (South Asia and South-East Asia are the two biggest investors). China pours 3.5% of world investments into large land investment, while India invests a much higher 14.3%.
According to the Land Matrix Database, in terms of numbers of deals, the land grabbing phenomenon boomed between 2005 and 2009: the majority of deals were signed during this period (71.5% of the 235 deals recorded in the database), while the number of deals in the following two years (2010 and 2011) was 26 (11.06% of the total number of deals that were recorded in the database for that year).

As an investor, China made 43 deals between 2000 and 2009. The mean size of each deal was 35,984 Ha (median: 7,000 Ha). India instead made a total of 120 deals between 2001 and 2010. The mean size of each deal was of 52,758 hectares (median: 1,023 Ha). The mean size of each Land Matrix database deal was of 52845 Ha (median: 9,742 Ha). Detailed statistics are reported in Table 2.

### Table 2 Descriptive statistics of land deals (Ha)

<table>
<thead>
<tr>
<th>Area</th>
<th>Mean (Ha)</th>
<th>Standard Error of Mean (Ha)</th>
<th>Coefficient of variation (sd/mean)</th>
<th>Median (Ha)</th>
<th>Interquartile Range (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>52,845</td>
<td>5,654</td>
<td>3.3</td>
<td>9,742</td>
<td>27,989</td>
</tr>
<tr>
<td>China</td>
<td>35,984</td>
<td>17,472</td>
<td>3.2</td>
<td>7</td>
<td>8,8</td>
</tr>
<tr>
<td>India</td>
<td>52,758</td>
<td>21,403</td>
<td>4.4</td>
<td>1,023</td>
<td>9,184</td>
</tr>
</tbody>
</table>

Source: Authors’ elaboration of Land Matrix Database (International Land Coalition, 2012).

China invested in East Asian lands (1,547 thousand hectares total land investments) specifically for agricultural purposes. Conversely, India invested only in South Asia (6,331 thousand hectares: total land investments) mainly for industrial purposes. The transactions are mainly in-country, i.e. China and India are investing in Chinese and Indian lands for most of their deals; India reinvests in Indian land for 69.6% of the total budget of its large land investment, China reinvests 59.7% in Chinese lands.

Outbound Chinese investments are mainly made by private actors, while inbound investments are public. The same is true for India: outbound investments are private, but the inbound ones are public. China and India dedicate the majority of their cultivated lands to the production of jatropha (46.9% of total agriculture investments for China, and 70.9% for India).

As far as targeted land is concerned, India has been involved in 4,617 thousand hectares of large land investment deals; China instead made deals for a total of 1,108 thousand hectares, transactions are introverted since the only non-Asian investor is Finland (with a 3.6% of the total of land investments). The main investor in China (except for China itself) is the Hong Kong Special Administrative Region, represented by just one deal for 100 thousand hectares.
4. Findings

In China the phenomenon of large land investment appeared in 2006 and reached a peak in 2008. In India, the concentration of the deals, in terms of area was observed in the period 2008-2010, in the midst of the economic crisis.

In order to better estimate the magnitude of the connection between large land investment and main food and energy indexes, a correlation matrix was calculated (Table 3).

Table 3 Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>Worldwide</th>
<th>China</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large land investment</td>
<td>Large land investment</td>
<td>Large land investment</td>
</tr>
<tr>
<td>Energy</td>
<td>World bio-diesel production</td>
<td>75.8*</td>
<td>29.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.007)</td>
<td>(0.377)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.146)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.136)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td>World ethanol production</td>
<td>74.1*</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.009)</td>
<td>(0.196)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.191)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.175)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td>Crude oil price</td>
<td>76.9*</td>
<td>42.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.006)</td>
<td>(0.196)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.119)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.112)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td>Commodity food price index</td>
<td>74.5*</td>
<td>37.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.009)</td>
<td>(0.258)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.179)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.165)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td>GDP per capita</td>
<td>70.7*</td>
<td>-5.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.015)</td>
<td>(0.890)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.313)</td>
<td>(0.999)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.271)</td>
<td>(0.999)</td>
</tr>
</tbody>
</table>

1 Large land investment and indexes: total amount of land deals (in hectares) for world, China and India. For each cell we reported the correlation index, with the uncorrected, the Bonferroni’s and the Sidak’s corrections respective p-values. We starred statistically significant values.
Positive and relatively high correlation was detected (around 75%) between world bio-diesel production, world ethanol production, the commodity food price index, oil prices, GDP per capita, cereals production and worldwide large land investment (for the significant amounts see Table 3). There is also a relatively low (or negative) correlation between the six indexes and the quantity of Chinese large land investment. The correlations for China’s large land investment are not significant. Conversely for India the correlation values are quite high (around 50%) and positive. The correlations between world bio-diesel (71.1%) and ethanol (75.3%) production with India’s land investment are significant.

Finally, the main drivers of worldwide land investment are cereal production (food security), followed by the production of renewable energy and the price of oil (energy security), the prices of food and GDP (for changing diets). China has low correlation indices in the considered variables and a negative sign in the case of GDP. India, however, has significant correlation indices in the case of renewable energy, in support of the fact that the energy problem is still far from being resolved, even if this country has achieved food self-sufficiency.

5. Conclusion

According to updated official sources, the population of China and India in 2011 represented 36.20% of the world population. According to The World Factbook, the total area of China covers 9,707 thousands km$^2$ (UN 2010) and 6.7% of total world land mass; the total surface area of India is 3,287 thousands km$^2$ (US Library of Congress, 2004), 2.2% of total world land mass. China is a net food importing country, India, became self-sufficient in the mid-seventies, and is facing a problem of scarcity of energy sources and supply difficulties. Population growth, changes in consumption, fears over greenhouse gas emissions and the awareness of the scarcity of non-renewable energy resources, increased the pressure on food prices and their volatility, after years of relative stability. In countries where the availability of land has reached saturation level, other solutions have been considered in order to increase production and ensure food self-sufficiency.
With regard to the land run, Asian countries rank at the top of the list of investor and target countries and, among them, India and China share the highest positions. Unlike African countries, the percentage of total domestic investment is very high in Asian countries. Both Chinese and Indian investments are concentrated mostly in the countries themselves with a total of 59.7% of total land investments in China and 69.6% in India”. China invested in more than 1.5 million hectares in East Asian countries for agricultural purposes. Conversely, India invested mainly in South Asia (6.3 million hectares), essentially for industrial purposes.

Our calculations have identified other drivers who are affecting the phenomenon of land investment in the world and have compared them with China and India. The results are interesting at the worldwide level. They confirm expectations and, at the same time, reveal deep differences between China and India and between those driving countries and the phenomenon as a whole. In China, the determinants appear to be related to the index of food prices and the price of crude oil. This is not surprising since China is a net importer of food. The scenario changes in India, where the phenomenon of large land investment seems to be induced by the production of energy from renewable sources and is closely related to (lagged) prices of food and oil. During the global economic crisis the variables showed a similar trend. Large land investment appears to be driven by a variety of factors that are destined to augment in the long run (population growth, changing food consumption and growing demand for energy).

While Chinese and Indian outbound investments are largely underwritten by private actors, the inbound investments are public. These countries utilize most of their lands for the cultivation of jatropha (46.9% of the total agriculture investments for China and 70.9% for India). Jatropha oil can be used as bio-diesel for energy, as cake for fish or animal feed or for high-quality organic fertiliser and bio-pesticide production. Large land investment, food security and energy security appear to be extremely closely related (Andreosso-O’Callaghan and Zolin 2010b). Therefore, the variables that affect the price of food and energy products also influence the extent of land acquisition.

In the assessment of positivity or negativity of the phenomenon, relevant issues have to be considered. Is the land subjected to large land investment fertile, marginal or unproductive? If the second case is true, can domestic investment in abandoned lands provide, at an aggregate level, an increase in production that may help achieve food security or energy security? Can they offer new job opportunities, facilitate the introduction of new technologies and improve the poor quality of life in rural areas? Regardless of the circumstances, the land rights of the local population should be insured. In India and China farms are extremely small and unable to compete with major investors (public and/or private). Among the three positions listed in the Transnational Institute’s Primer on The Global Land Grab (pages 21-23 of Franco et al. 2013) the first calls for regulation to facilitate investment (attributable to the World Bank), the second proposes the enforcement of new
regulations to mitigate the negative impacts on the population and to maximize opportunities (FAO, civil society) and the third is based on regulation to abolish large land investment (social movements and peasant groups). The authors support the second position.

Additional research is needed. An initial approach should measure and analyze situations in different countries and the impact of large land investment on the local population. Pinpointing these negative externalities would identify whether or not intervention was required and, subsequently which would be the appropriate tools for correcting and mitigating the impact on local populations. Other tools that already exist should be increased, for example, Oxfam Behind the Brands Initiative (2013) which, of the seven themes identified, includes: “land, both rights and access to land and sustainable use of it” or the role that international organizations could play in raising awareness in the world population, while waiting for more in-depth assessments with a higher degree of detail.

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An Empirical Investigation of Impact Factors for the Profit Performance of Regional Life Insurance Market in China

Xiao Wei • Jun Yang

Abstract  Due to several factors different regions in China have formed a diversified life insurance market. We employ a panel data of 30 provinces and municipalities from 2005 to 2011 and apply a model based on the structure-conduct-performance (SCP) hypothesis to analysis the factors that influence the performance of making profit for life insurance companies. The result reveals that the SCP hypothesis is not supported in the life insurance market of China. Although the SCP Hypothesis is not supported, the factors that influence the profit performance in different provinces are GDP, the return rate of investment and the policy reform variable.

Keywords  Structure-Conduct-Performance Hypothesis, Market Structure, Profit Analysis, Impact Factors, China life insurance market.

JEL Classification  C31, D42, G22, L25

Introduction

The structure-conduct-performance (SCP) hypothesis is the main theoretical framework in the industrial organization theory, and it is mainly applied to analyze the relationships shared by the market structure, enterprise conduct and performance.

Xiao Wei (✉) Jun Yang
China Institute for Actuarial Science & School of Insurance, Central University of Finance and Economics, Beijing, China
e-mail: weixiao@cufe.edu.cn; yjthxq@163.com
The industrial organization theory is included in the applied economic theory. It is generated in the 1930’s and gradually developed. The main idea of this theory is applying microeconomic theory to analyze the relationships of competition as well as monopoly among the market, industry and enterprises. Since generated, the SCP hypothesis has gained much attention from international scholars, and it has been applied in insurance market. However, using this theory to analyze the relation of insurance market structure and performance in China is still under development, and there are still many valuable researches to do.

As the world’s biggest developing country, China has experienced a rapid development in the life insurance industry in recent decades. However, in the progress of this rapid development, many problems have been exposed. One of the most important problems is that the low degree of performance of making profit for life insurance companies is not consistent with the rapid development. Another important problem is that the life insurance market has some apparent regional characteristics that the degree of development of life insurance companies is quite different from province to province. This significant difference may result from several impact factors, such as economy, policy, population, geography and so on. We want to find the factors that causing this phenomenon. Therefore, the purpose of this paper is to analyze the impact factors for the performance of making profit, especially to check the relation of market structure and performance in life insurance market of China from the perspective of industry organization theory. If there exists such a logical relation, then we can improve the performance of life insurance companies in China by optimizing the market structure. Also we can explain the significance difference among provinces by analyzing the impact factors. Although there is some research about the validity of SCP hypothesis, but almost all using data of some companies or some provinces, while the analysis of the effects of the whole market structure on the performance is neglected. Therefore we will fill this gap and test the validity of the SCP hypothesis in the range of whole China systematically with all the provinces.

To test the validity of SCP hypothesis systematically and find out the impact factors for the performance of making profit of regional insurance market in China, we employ a panel data including records of all the life insurance companies in 30 provinces and municipalities in China1 from 2005 to 2011. The result shows that the SCP hypothesis is not supported in the life insurance market of China. The life insurance market in China is highly centralized but it is not the consequence of competition. The performance of making profit for life insurance companies has an obvious regional character and it is significant influenced by several factors.

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1 We don’t include Hong Kong, Taiwan and Macao because of the characteristic which comes from some regulations difference in those markets. Besides we exclude Tibet because of the incompleteness of the data.
Literature Review

The development of the SCP hypothesis can be summarized as two main stages: one is the traditional industrial organization theory that is supported by researchers of the Harvard school, Chicago school, Neo-Austrian school, etc. The other one is the new industrial organization theory generated after the 1970s. As the representatives of the Harvard school, Bain (1951) completely and systematically discussed the theoretical frame of the industrial organization theory for the first time and put forward three basic concepts of the modern industrial organization theory: market structure, conduct and performance. The Harvard school and Chicago school hold different opinions on the relationship of market structure, conduct and performance. The Harvard school emphasized the effect of market structure on conduct and performance, and concluded that there exists a one-way causal relationship of the structure, conduct and performance. The internal mechanism is that the degree of market concentration determines the conduct of enterprises, and the latter determines the performance of enterprises. The representatives of the Chicago school are Stigler, Demset and Brozen. They believe that the performance of enterprise itself plays the crucial role: different performance of enterprises has formed the various market structures and it is concluded as the Efficient-structure (ES) hypothesis. The enterprises with highly efficient performance can constantly enlarge their market share, and eventually lead to the market structure of high degree of concentration. Therefore, no matter the Harvard school or the Chicago school, they both regard the SCP hypothesis as the main theoretical framework, and the divergence is that they review the causal relationship between S, C and P differently.

In the aspect of empirical researches, both international and domestic literatures have enlightened our idea and methodology. Choi and Weiss (2005) analyzed the relationships of structure, conduct and performance in the US property-liability insurance market and they found support for the ES hypothesis of the Chicago school. They believed that the regulation agency should pay more attention to the performance of enterprises instead of the market structure. Pope and Ma (2008) tested the applicability of the SCP hypothesis in the international non-life insurance sector. They found that the expectations associated with the SCP hypothesis were supported when the level of liberalization were low. However, if the markets were highly liberalized, the presence of foreign competitors significantly changed the dynamics of nonlife insurance markets.

In the domestic literatures, Chen (2007) analyzed the relationship between market structure and performance in insurance market, both life insurance market and property insurance market using data of 15 life insurance companies and 14 prop-

2 As Nat Pope and Yu-Luen Ma (2008) suggested the ES hypothesis had enjoyed significant support in the banking literature and to a lesser degree in the insurance literature. Thus, we limit our discussion in this article to test the SCP hypothesis but would further investigate the ES hypothesis in the later research.
property insurance companies which have the biggest market shares in the time period from 2002 to 2005. She drawn the conclusions that the insurance markets in China were high monopoly markets, and the high degree of concentration and low efficiency of performance were the main characteristics of the industries. Thus the SCP hypothesis was not supported in both life and property insurance market in China. Because of some political factors, the ES hypothesis was not supported either. Wang (2007) also proved that neither the SCP hypothesis nor the ES hypothesis was supported in the insurance market of China applying data of 22 companies with the biggest market shares in the time period from 1999 to 2004. Zhong (2009) tested the applicability of the SCP hypothesis thesis in the life insurance market of China including data of all the life insurance companies in 2006 and data of three life insurance companies in the time period from 1998 to 2007. The first conclusions he got was that life insurance market of China was classified into the highest degree of monopoly market, and it was the high degree of monopoly market that caused the imbalance of development in different provinces in China. Secondly, the relation between market structure and performance was a two-way interactive relationship, and the core of this relation was the market structure. Finally, from the macro level, market structure was the main factor that influenced the public performance in life insurance market in China; from the micro level, the ES hypothesis was supported in China’s life insurance market. The above articles focus on the analysis for several insurance companies in the range of whole country; there are no researches consider the case with all provinces in China. Therefore, we fill the gap of in this area.

The rest of this paper is organized as follows. We introduce the basic model in SCP hypothesis and explain the variables in this paper in Section 2. Section 3 is about the data and empirical model, and Section 4 is the result of empirical analysis. At last, we summarize this paper in Section 5.

**Variable Declaration**

A regression model introduced by Berger (1995) can be used to test both the SCP hypothesis and ES hypothesis, which is given as follows:

\[
\Pi_i = f(\text{CONC}_n, MS_i, X-EFF_i, S-EFF_i, Z_i) + u_i
\]  

where \(\Pi_i\) is the dependent variable representing the performance and usually measured by return on asset (ROA), return on equity (ROE), or price, etc. \(\text{CONC}_n\) is an index measures the degree of market concentration. \(MS_i\) stands for the market share of each market participant. \(X-EFF_i\) and \(S-EFF_i\) are efficient variables, and the former one is the efficient variable that is influenced by management, techniques and such factors of an enterprise, the latter one is determined by the scale of the enterprise. \(Z_i\) represents a group of control variables related to the market, such as
the statue of market demands, the operation cost, the barriers to entry the market, etc. To test the SCP hypothesis analysis in the international insurance market, the paper of Pope and Ma (2008) proposed an adapted version based on model (1). They use the profit margin, which is proposed by Cowling and Waterson (1976), as a new variable for measuring the performance of insurance companies. The profit margin is defined as:

\[
PROFIT = \frac{\text{Premiums} - \text{Losses} - \text{Expenses} + \text{Investment}}{\text{Premiums}}
\]

Pope and Ma (2008) used the \((1 - \text{loss ratio})\) to measure the profit because of the data deficient since lack of data for expense ratio and return on investment. Besides, they added several control variables: degree of liberal, level of regulation, threat of substitution, economic factor and book of business to the basic model and delete the variable of MS for market share of each market participant for their model is market based but not companies based. Based on the model of Pope and Ma (2008) and the available data of Chinese case, we delete the variable representing the threat of substitution. And since we focus on life insurance companies, the variable for books of business is deleted as well. Also since the whole insurance market in China is under the same regulation, we will not include this part. Meanwhile we add the variable of the population structure for representing the demand of life insurance, as well as the investment control variables, which we think it might have effect on the profit of life insurance market. Therefore we will use the profit margin as the dependent variable for measuring the performance, and use Herfindahl-Hirschman Index, Degree of Liberal, Economy, Population Structure, Investment control variables and a dummy variable for policy as the independent variables. The detail explanation of the variables is given as follows.

**PROFIT**: Performance of making profit

Following Pope and Ma (2008), we also use the profit margin for measuring the performance of the life insurance companies. Since we can have the data for the expenses and investment, we will include the expenses and investment part in the calculation of the profit margin. Here we give the definition of the dependent variable: profit margin for the life insurance company and it is calculated as follow:

\[
\text{Profit} = \frac{\text{premiums} - \text{Losses} - \text{Expenses} + \text{Investment}}{\text{premiums}}
\]

\[
= 1 - \text{loss ratio} - \text{expense ratio} + \text{return on investment}
\]
We calculate the profit margin for each life insurance company in every regional market, and apply the weighted mean for measuring the profit of each market. The reason for using weighted mean is that the life insurance companies with different premium incomes contribute differently to the whole market profit margin. The weight we use is calculated as following:

$$\text{Weight} = \frac{\text{Premium income of each life insurance}}{\text{Total premium income of all life insurance companies}}$$  \hspace{1cm} (4)

Herfindahl-Hirschman Index (HHI): Degree of market concentration

The degree of market concentration is the fundamental factor of the market structure, and it reflects the degree of competition and monopoly of the market. There are several commonly used indicators, such as the concentration ration (CR), HHI, Lorenz curve, etc. In this paper, we choose HHI to reflect the market structure as it is a good index to measure the market concentration and usually adopted by the government department and economists. HHI is calculated as follows:

$$\text{HHI} = \sum_{i=1}^{N} \left( \frac{X_i}{X} \right)^2 = \sum_{i=1}^{N} S_i^2, \quad S_i = \frac{X_i}{\sum_{i=1}^{N} X_i}$$  \hspace{1cm} (5)

where $X_i$ stands for premium income for each life insurance company of each province; $N$ stands for the number of all life insurance companies of each market. $S_i$ means the premium income share of each life insurance company. HHI varies from 0 to 1, and the bigger the index is, the deeper the degree of concentration and monopoly is.

Foreign competitors (FC): Degree of liberal

As a factor of reflecting the degree of liberal of the market, Pope and Ma (2008) found that the presence of foreign competitors significantly influences the performance of insurance market. In China, although the foreign life insurance companies showed poor performance compared to local companies in the past ten years, they had a certain degree of impact on the domestic market. Therefore, we introduce an independent variable that is measured by the proportion of premium income earned by foreign competitors (full foreign invested insurance companies) to the total premium income of each market and it is calculated as follows:

$$\text{FC} = \frac{\text{Premium income of foreign life insurance companies}}{\text{Total premium income of all life insurance companies}}$$  \hspace{1cm} (6)

---

3 Herfindahl-Hirschman Index calculates 50 competitors with the largest market share. If the number of competitors in the market is less than 50, then $N$ is the number of the actual competitors.
Economy (ECON)
Economy is one of the most important factors that determines the consumption capacity and insurance demand of people. In general, the more developed the economy of a region is, the greater the life insurance demand. In this paper, we choose the logarithmic form of GDP (Econ) to measure this variable. The reason of taking the logarithmic form is to normalize the data and make the explanation more meaningful.

Population Structure (PS)
As we know, China has stepped into the aging society, and the burden of the aging population will continue to increase in the following decades. People of old age will face the risk of losing the income resource, which stimulates the demand for life insurance in some degree. Therefore, in this paper, we add a variable measuring the structure of population (PS), which can be considered as the source of demand for the life insurance. The computation of this variable is as follows:

\[
\text{Population} = \frac{\text{Population over the age of 65}}{\text{Total population}}
\]  

Deposit Rate (DR) and Investment Return Rate (IRR)
A significant portion of profits in life insurance companies comes from the investment, especially the long-term fund of life insurance companies that lead to the investment income accounts for a large part of their total profit. In China, the main channels for insurance fund to invest are stock market and bond market. Also bank deposit is another method for life insurance companies to deal with their premium incomes. As a result, therefore the control variables which measure the return rate of stock market, bond market as well as bank deposit should be included in the model. But the return rate of bond market has strong correlation with the return rate of the bank deposit, so we do not include it in the model. Therefore we use one-year deposit interest rate of central bank and the average price earnings ratios of Shanghai Composite Index to measure return rate of deposit and investment respectively.

Dummy Variable (DUM): Policy Reform
In 2006, the China’s Ministry of Finance promulgated The New Accounting Standards\(^4\), and the range of application covers insurance industry. According to the new standards, some important accounting issues have been changed, such as the confirmation of premium incomes. Therefore we introduce a dummy variable representing policy reform for the consideration that the New Accounting standards may have influence on the performance of making profit of life insurance compa-

\[^4\] All the public companies in China are required to execute the New Accounting Standards. It is noteworthy that The New Accounting Standards basically realized the convergence with International Financial Reporting Standards.
Data and Empirical Methodology

The data we have are from various resources. The data of premium, losses, expenses, investment income are obtained from the website of insurance regulation commission in each province and Insurance Statistic Yearbook. We acquire the population data from the Demographic Yearbook. The data of GDP is gained from the website of National Bureau of Statistics. And the return rate related data comes from some relevant articles. We have the data of 30 provinces and municipalities over the time period from 2005 to 2011. For some missing data, we use the interpolation method to generate them. In the stage of data preprocessing and analysis, we make the descriptive statistics of the data. There are total 210 observations and the descriptive statistically analysis of the original panel data is showed in Table 1 below.

Table 1 Descriptive Statistic of original panel data

<table>
<thead>
<tr>
<th></th>
<th>PROFIT</th>
<th>HHI</th>
<th>FC</th>
<th>ECON</th>
<th>PS</th>
<th>DR</th>
<th>IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-0.022707</td>
<td>0.282517</td>
<td>0.027185</td>
<td>8.961.524</td>
<td>0.090781</td>
<td>0.027129</td>
<td>0.267714</td>
</tr>
<tr>
<td>Median</td>
<td>0.061200</td>
<td>0.258400</td>
<td>0.000400</td>
<td>9.052.700</td>
<td>0.089000</td>
<td>0.025200</td>
<td>0.216000</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.351900</td>
<td>0.694000</td>
<td>0.297900</td>
<td>1.088.200</td>
<td>0.144000</td>
<td>0.035000</td>
<td>0.592000</td>
</tr>
<tr>
<td>Minimum</td>
<td>-3.481.100</td>
<td>0.091200</td>
<td>0.000000</td>
<td>6.297.700</td>
<td>0.053000</td>
<td>0.022500</td>
<td>0.134000</td>
</tr>
<tr>
<td>Observations</td>
<td>210</td>
<td>210</td>
<td>210</td>
<td>210</td>
<td>210</td>
<td>210</td>
<td>210</td>
</tr>
<tr>
<td>CrossSections</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 1 shows the descriptive statistic of the data of all the provinces from 2005 to 2011. As we can see, the value of profits margin for some provinces range from negative value to positive value, and the values are quite different from province to province, as well as the tendency during the study period. The largest value of profit margin from 2005 to 2011 among 30 provinces and municipalities is that of Xinjiang province with 35.19% in 2007, while the smallest value is that of Shandong province with -348.11% in 2006. Besides, the largest average value of profit margin from 2005 to 2011 is that of Ningxia province with 21.28%, while the smallest average value is that of Shandong province with -141.97%.

5 The data of profit margin for Qinghai province in 2009 is missing for the reason that the website of insurance regulation commission of Qinghai does not provide the data for that year, we could not find them in other ways, neither. Therefore we use the interpolation method to generate them.
Figure 1 above is weighted mean profit margin dynamic data of 6 chosen provinces and the principles of choosing those 6 provinces are based on the ranking of GDP: Guangdong, Jiangsu and Shandong provinces are the top 3 of highest GDP, while Hainan, Ningxia and Qinghai are the last 3 in GDP. As we can see in Figure 1, from 2005 to 2006 provinces with lower GDP all show an increase of the value, while provinces with higher GDP all show a decrease. Also after 2006 the value of provinces with lower GDP all have tendency of decreasing and the decreasing rate is relatively stable, while the value of other three provinces are fluctuate. Consider other provinces, contrary to our expectation, the value of profit margin in some other economically developed provinces, such as Beijing and Shanghai, is also relatively low and fluctuate compared to some economically less developed provinces. Therefore, we speculate that there exists a relation between the degree of performance and degree of economic development and the correlation is negative.
As the most important independent variable, from Table 1 and Figure 2 we can see that the values of HHI continue to decline during the time period from 2005 to 2011 for almost all the provinces. The greatest value of HHI from 2005 to 2011 is 69.40% of Inner Mongolia and the smallest mean is 9.12% of Beijing. Although the decline trend is similar, the value of HHI for provinces is quite different. As we can see in Figure 3, the value of Qinghai province in 2011 is even greater than that of Guangdong province in 2005. According to the criterion set by Department of Justice of United State to judge the degree of concentration for a certain industry, the life insurance markets of China are classified into high oligopolistic type II and low oligopoly type I. The data show that the life insurance market of China is highly centralized, especially in the economically less developed provinces. Also the degree of concentration varies from province to province, and the difference is quite big which means obvious difference exists among market structure of life insurance.

6 Department of Justice of United State set the criterion to judge the degree of concentration as: if HHI=1, the market is classified into high oligopolistic type I; if 0.3≤HHI<1, the market is classified into high oligopolistic type II; if 0.3≤HHI<0.18, the market is classified into low oligopoly type I; if 0.1≤HHI<0.18, the market is classified into low oligopoly type II; if 0.1≤HHI<0.14, the market is classified into competitive market type I; if HHI<0.1, the market is classified into competitive market type II.
An Empirical Investigation of Impact Factors for the Profit Performance of Regional Life Insurance Market in China

From Table 1, we can also get the information that the variable FC, the degree of liberal is generally low and also varies from province to province. There are 19 provinces with 0 premium income earned by foreign companies in 2005, and 11 provinces with 0 premium income earned by foreign companies in 2011. The provinces without foreign life insurance companies are generally distributed in the Midwest and Southwest. These provinces have not been opened to foreign insurance companies for as long as some southeast provinces have, and the markets of these provinces seem have less attraction to foreign investment. In conclusion, the life insurance of regional market in China is highly centralized and lowly liberally, especially in the economically less developed provinces.

The model in this paper can be written as follows:

$$ PROFIT_{p,t} = \alpha_p + \beta_1(HHI)_{p,t} + \beta_2(FC)_{p,t} + \beta_3(ECON)_{p,t} + \beta_4(PS)_{p,t} + \beta_5(DR)_{t} + \beta_6(IRR)_{t} + \beta_7(DUM)_{t} + \epsilon_{p,t} $$

where PROFIT_{p,t} is the profit of companies of province p at year t as defined in (3), HHI stands for the concentration rate of each market; FC is the proportion of premium income earned by foreign life insurance companies to the total premium income earned by all life insurance companies in each market; ECON is the natural logarithm of GDP for each province; PS measures the proportion of population over 65 years old; DR and IRR are the control variables for return rate of bank deposit and stock market: one-year deposit interest rate of central bank and average price earnings ratios of Shanghai Composite Index respectively. According to the preliminary analysis and economic common sense, we speculate the relation of variables as follows:

<table>
<thead>
<tr>
<th>Variable</th>
<th>HHI</th>
<th>FC</th>
<th>ECON</th>
<th>POPULATION</th>
<th>DR</th>
<th>IRR</th>
<th>DUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIT</td>
<td>+</td>
<td>±</td>
<td>−</td>
<td>±</td>
<td>−</td>
<td>±</td>
<td>+</td>
</tr>
</tbody>
</table>

Empirical Results

Before doing regression, several tests of panel data model are taken. First of all, in order to avoid the problem of multi-collinearity, we do the correlation analysis of the independent variables. The results show that the coefficients of independent variables are not statistically significant at 5% level, which indicate that there are no statistically significant relations among them. Secondly, since our data includes both time series data as well as panel data, so we should use the cross-section fixed
model theoretically. We do the test of Redundant Fixed Effect, and the result verifies that cross-section fixed model is preferable than pooled model. The results of the empirical analysis are report in Table 3 below. Besides, since generally there exists heteroscedasticity in cross-section data, therefore we apply cross-section weights method to eliminate it.

The results of the empirical analysis are report in Table 3 where two models are presented. Model 2 makes the assumption that an AR (1) as a covariance structure of error terms, while Model 1 does not make that assumption. As we see, the value of Durbin-Watson test for model 2 is acceptable which means no autocorrelation exists. Also the coefficient of AR (1) is statistically significant. Therefore, we use the coefficients from Model 2 to illustrate the regression results. The weighted goodness of fit for Model 2 is 0.787278, which means the goodness of fit in this paper is acceptable. The significance of equation is tested by F-statistic and its value is 14.20369 as showed. And the equation is statistically significant at the level of 1%. The significance of coefficient is measured by t- statistic. As we see, variables of ECON, DI, IRR and DUM are statistically significant at the level of 1%.

**Table 3** Parameters Estimates from the Cross-section fixed panel data model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cross-Section Fixed Effect</td>
<td>Cross-Section Fixed Effect with AR(1) Error Structure</td>
</tr>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-test Prob.</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>0.9056</td>
<td>0.0158</td>
</tr>
<tr>
<td>HHI</td>
<td>0.1378</td>
<td>0.1950</td>
</tr>
<tr>
<td>FC</td>
<td>0.9024</td>
<td>0.9588</td>
</tr>
<tr>
<td>ECON</td>
<td>0.7939</td>
<td>0.0185</td>
</tr>
<tr>
<td>PS</td>
<td>0.4158</td>
<td>0.1944</td>
</tr>
<tr>
<td>DR</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>IRR</td>
<td>0.0000</td>
<td>0.0002</td>
</tr>
<tr>
<td>DUM</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>AR(1)</td>
<td>0.0000</td>
<td>0.0017</td>
</tr>
<tr>
<td>Weighted R-squared</td>
<td>0.723061</td>
<td>0.787278</td>
</tr>
<tr>
<td>Unweighted R-squared</td>
<td>0.537295</td>
<td>0.705395</td>
</tr>
<tr>
<td>F-statistic</td>
<td>12.54687</td>
<td>14.20369</td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>2.143853</td>
<td>1.843164</td>
</tr>
</tbody>
</table>

*Note: Cross-section fixed intercepts are omitted from the table. ***indicates statistically significance at 1% level.*
As we can see in Table 4, the coefficient of HHI is not statistically significant which means that the degree of concentration has no significant relation with profit, therefore the SCP hypothesis is not supported in the life insurance market of China. We can explain this result that the highly concentration rate of life insurance market in China is not the consequence of competition, but the result of some political reasons and phenomenon left over from the past. Therefore, the highly centralized market structure does not lead to a high profit rate of enterprises.

The coefficient of FC is not statistically significant. Although Pope and Ma (2008) found that when the market is highly liberalized, the presence of foreign competitors significantly influence the domestic market, in this paper, the result show that the presence of foreign competitors has no remarkable impact on the life insurance market of China.

The coefficient of ECON is statistically significant and the coefficient is negative. The result is consistent with the analysis of the descriptive statistic, which shows that the markets with lower GDP have a better performance of making profit. The reason for explaining this result may be that the markets with lower GDP have a bigger space for developing and a relative faster speed of development in recently years, therefore, they show a better performance of making profit compared to those relatively high developed markets such as Beijing, Shanghai and Guangzhou which have constructed for many more years. What’s more, the more developed markets may undertake much more risk either domestic or international, which leads to the bigger fluctuation in the performance of making profit. Thus this may be a clue for the insurance companies who want to open new business in some region of China, and it also confirms that the west and north of China have a great market potential for insurance.

The coefficient of PS is not statistically significant. The variable of PS measures the proportion of population over 65 years old and we thought the population structure might affect the demand for life insurance products, and then affect the performance of making profit. However, the results show that no significant relation exists between population structure and performance.

The coefficient of DR is statistically significant and it represents one-year deposit interest rate of central bank. As we know, the insurance fund is usually divided into two main parts: deposit and investment, and investment incomes account for a large part of profit for life insurance companies in China. The coefficient of DR is negative which conforms to principles of economics. The more insurance fund life insurance companies deposit into banks, the less they could invest in stock market. Also the interest rate of bank has a positive relation with the amount of deposit. Therefore, it is reasonable that the one-year deposit interest rate of central bank has a negative relation with the performance of making profit for life insurance companies. The coefficient of IRR is statistically significant and the coefficient is positive. It represents the average price earnings ratios of Shanghai Composite Index. It has
a positive influence on profit and the result is quite consistent with the reality that the stock market is a main channel for long-term life insurance fund to invest. The higher the return rate is, the better the performance of making profit.

The coefficient of Dummy variable for policy reform is statistically significant and the coefficient is positive. The result means that the New Accounting Standards do have some positive effect on domestic insurance market. Therefore, it is better for the Regulatory Administration to establish normative standards in order to regulate the industry as well as improve performance of making profit for enterprises.

In conclusion, the result of regression shows that the SCP hypothesis is not supported in the life insurance market of China. As it is verified in other scholars’ articles, for example, Chen (2007) and Wang (2007) proved in their thesis that the SCP hypothesis was not supported in the insurance market of China by test with data of insurance companies of top market share. The reasonable explanation may be that the highly centralized life insurance market in China is not the consequence of competition, but the result of some politic reasons and phenomenon left over from the past. And also the highly centralized market structure does not lead to a high profit rate of enterprises. Besides, according to the result of regression, several factors influence the profit: the logarithmic form of GDP, one-year deposit interest rate of central bank, the average price earnings ratios of Shanghai Composite Index as well as the dummy variable for policy reform. Since one-year deposit interest rate of central bank, the average price earnings ratios of Shanghai Composite Index as well as the dummy variable for policy reform are all time series data, according to the results of regression, the main factor that influence the performance of making profit for life insurance companies in different provinces is economy. However, contrary to our expectation, the degree of economic development has negative relation with performance of making profit. The result can be explained, but it may also be influenced by the time period we choose.

Conclusion

This paper tests the validity of the SCP hypothesis in the life insurance market of different provinces in China. We apply the model based on the SCP hypothesis and employ a panel data that includes data of 30 provinces and municipalities over the time period of 2005 to 2011 to analysis the factors that influence performance of making profit for life insurance companies. The results reveal that the SCP hypothesis is not supported in life insurance market of China. The life insurance market in China is highly centralized, while it is not the consequence of competition. The performance of making profit for life insurance companies also has an obvious regional character and they are significant influenced by several factors: the logarithmic form of GDP, one-year deposit interest rate of central bank, the average price earnings ratios of Shanghai Composite Index as well as the dummy variable
for policy reform.

It would be interesting to introduce the variable of efficiency to test whether the ES hypothesis is supported in China’s market or not. However, it needs to choose deliberately to generate a proper proxy variable to measure the operate efficiency of the insurance companies. Our future work will continue to explore this topic and try to include the efficiency variable in the model. Hopefully the result of this paper may have the inspiration for subsequent studies and ideas for both regulators and operators of enterprises.

Acknowledgement The authors would like to thank Yujia He for her contributions on collecting the data and thanks to the valuable comments and suggestions from the participants of the 2014 Annual conference of APRIA in Moscow.

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The Banking Industry in Morocco

Demeh Daradkah • Stefano Miani

Abstract This paper aims to shed some lights and document the activity of the banking industry in Morocco and to highlight areas where problem arises during the period from 2007-2012, by examining the structure, and performance of the Moroccan banking industry as a whole. It was found that the outlook for the Moroccan banking sector is positive, where total banks’ assets reached a balance of Moroccan Dirhaim 1,040,648,449, presenting 126 percent of Gross Domestic Product at current prices at the end of 2012. On the other hand, there are still a lot of opportunities in the industry, such as retail segment, lending to SME’s and the Islamic banking segment.

Keywords Banking Industry – Performance – Morocco

JEL Classification G21 - L25 - N15

Introduction

A large number of developing countries have adopted the International Monetary Fund(IMF) and/or the World Bank programs to improve and enhance their financial system, where the financial system in most developing countries is dominated by banking sector (Ben Naceur et.al. 2011).
Middle Eastern and North African (MENA) countries as other developing countries have deregulated their banking system; one of these countries is Morocco.

Morocco is a unique Arab country in North Africa and has a population of over 33 million and it is classified as lower middle income country, where Gross Domestic Product (GDP) per capita was US $ 3.09206 in 2013 (World Bank, World Development Indicators (WDI)). Morocco has been successful in achieving rapid economic growth benefiting from social and political stability (Mansour and Castel 2014), where the GDP (base year 1998) has grown from Moroccan Dirham (MAD) 802 607 million Dirham in 2011 to MAD 828 169 million in 2012, with a growth rate of 3.2 percent (Bank Al-Maghrib, 2012). This paper aims to shed some light on and document the activity of the banking industry in Morocco and to highlight areas where problems arise during the period from 2007-2012, by examining the structure, and performance of the Moroccan banking industry as a whole.

The rest of the paper is organized as follows. Section two, reviews the extend of the development of the banking industry and its institutional structure. The following three sections offer a review of the development of total assets, total loans outstanding and total deposits of Moroccan banks. Then we examine the performance and concentration of the Moroccan banks. The paper concludes with a summary and conclusions.

**Development and Structure**

This section presents an analysis of the Development and Institutional Structure of the Banking Industry in Morocco.

**Development of the Moroccan Banking System:**

The history of banks in Morocco goes back to the early 19th century, exactly in 1906 where the act of Algeciras was signed, with the participation of 13 countries (12 European countries, the united state of America and Morocco) which introduced the establishment of (State Bank of Morocco) in 1907 to perform the duties of financial agent of Moroccan government and issuing banknotes (Bank Al-Maghrib website).

During the French protectorate many European banks established subsidiaries in Morocco, such as (Banque Commerciale du Maroc). The Attijari Bank was established in 1911, where it was merged in 2003 with (Wafa Bank) to be called (Attijariwafa Bank). Two Spanish banks was established (Societe Generale) in 1915 and (Bancosabadell) in 1940.

In the 20’s, many banks was established to finance particular field, such as (Credit Immobiler et Hotelier) to finance real estate. In 1926, (Al Barid bank)
was established and in 1929 a Moroccan commercial bank (Credit du Maroc) was established. Before 1943, there were no particular law to organize the banking industry until they laid a law under the supervision of the director of finance (Bank Al-Maghrib website) and in the same year another commercial bank was established (Banque Marocaine du Commerce et L’industrie). The 50’s was an important and critical period for Morocco; another supplement law was issued in 15 January 1954 and 17 January and 16 April 1955. After the independence of Morocco in 1956, in 30 June 1959 by Dihir number 1-59-233 the (Bank of Morocco) was established to serve as a Central bank of Morocco, as a stated-owned institution to maintain and supervise the monetary policy in the country(Bank Al-Maghrib website). In 1959 (Banque Marocaine du Commerce Exterieur) was established and (Fondos D’Equipment Communal) was established to finance territorial communities.

Three banks was established in the 60’s, in 1961 (Banque Populaire Du Maroc) was established and (Credit Agricole du Maroc) was established to finance agricultural field while in the 90’s it stared to finance comprehensive services. In 1967 (CitiBank Maghreb) was established. In 1987, the name of the Central Bank of Morocco (Bank of Morocco) was changed to (BankAL-Maghrib)(Bank Al-Maghrib website). The (Mediafinance) was established in 1996. In 2006 a Moroccans investment bank was established (CDG Capital S.A), and two banks were established in 2009 (Bank Al Amal), which is a non-profit organization to finance microfinance projects and a Spanish saving bank (Caja De Ahorros Y Pensionws De Barcelona).¹

**Institutional Structure**

There are many credit institutions in Morocco, such as banks, finance companies, offshore banks, microcredit associations, funds transfer companies and other institutions that provide credit. In 2012, the banks represent 22.1 percent of the total number of credit institutions, under Dahir number 1.05.38,23 November 2005, the banking industry in Morocco is supervised by the central bank of Morocco(Bank Al-Maghrib), it is a stated owned institution with a capital of MAD 500,000,000 and managed by a board of directors under chairmanship of the governor(Credit Institutions and Similar Bodies Laws and Regulation Report,2005).

As it is indicated in Table (1), the number of banks increased from 16 banks (5 of them are foreign owned banks and 5 of them are public owned banks) in 2007 to 19 banks (7 of them are foreign owned banks and 5 of them are public owned banks) in 2012.

¹ The list of banks operating in Morocco were obtained from Bank Al-Maghrib, 2012, while their data were obtained from banks’ website.
Table 1 Number of Credit Institution and Similar Entities in Morocco during the period (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banks</td>
<td>16</td>
<td>18</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Including</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign-Owned Banks</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Public-Owned Banks</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Finance Companies</td>
<td>37</td>
<td>37</td>
<td>36</td>
<td>36</td>
<td>35</td>
<td>36</td>
</tr>
<tr>
<td>Offshore Banks</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Microcredit Association</td>
<td>14</td>
<td>13</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Funds Transfer Companies</td>
<td>0</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Other Institutions</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>84</td>
<td>84</td>
<td>83</td>
<td>85</td>
<td>86</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).

As it is indicated in Table (2), the banking services in 2007 was conducted through 4,474 branches in 2007 and it increased to reach 5,447 branches in 2012, where 24 percent of branches were in Grand Casablanca, 11 percent of branches were in Rabat-Sale’-Zemmour_Zae’r and 9 percent of branches were in Oriental region, which indicates the enhancement of banks density in Morocco, where it was one branch per 6,700 inhabitants in 2007 and it reached one branch per 5,900 inhabitants in 2012. The use of credit cards in transaction increases during the period from 2007 to 2012, were ATM numbers increases by 2,353 machines to reach 5,476 in 2012. This will ensure the delivery and spread of banking services all over Morocco.

Table 2 Moroccan Banking Network during (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank Branches(number)</td>
<td>4,474</td>
<td>4,9</td>
<td>4,425</td>
<td>4,787</td>
<td>5,113</td>
<td>5,447</td>
</tr>
<tr>
<td>Inhabitant per branch</td>
<td>6,7</td>
<td>6,3</td>
<td>7,1</td>
<td>6,6</td>
<td>6,3</td>
<td>5,9</td>
</tr>
<tr>
<td>ATM(number)</td>
<td>3,123</td>
<td>3,629</td>
<td>4,144</td>
<td>4,545</td>
<td>5,024</td>
<td>5,476</td>
</tr>
<tr>
<td>Staff of credit Institution and Similar Entities</td>
<td>35</td>
<td>39,2</td>
<td>41,2</td>
<td>42</td>
<td>46,9</td>
<td>48,6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Banks Abroad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsidiaries(number)</td>
</tr>
<tr>
<td>Branches(number)</td>
</tr>
<tr>
<td>Representative Offices</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).
On the other hand, the network of Moroccan branches abroad increases over the period from 2007-2012, taking into account that mostly of broad branches are in Sub-Saharan Africa, Middle East and in Euro area. Moroccan network abroad continued to expand, which allowed Moroccan banks to benefit from exploring new markets, increase their growth opportunities and take advantage of diversifications. The number of subsidiaries increased to reach 25 in 2012 compared with 10 in 2007. The number of branches reached 10 in 2012 compared with 13 in 2007. The representative offices reached 59 offices in 2012 compared with 70 in 2007, which can be explained by the enhancement of banks operation abroad. The number of staff of credit institutions and similar entities increased from 35,000 employees (27,435 of them works in banks) in 2007 compared with 48,600 employees in 2012(36,262 of them works in banks).

The Development of Total Assets

Total assets of the banks operating in Morocco increased remarkably during the period from 2007 to 2012, where it increased by MAD 384,049 million approximately grows by 58.50 percent. Total assets increased from MAD 656,599 million at the end of 2007 to MAD 1,040,648 million at the end of 2012.

Total assets as a percentage of GDP at current prices continued to increase during the period from 2007 to 2012 representing 106, 111, 113, 112, 121, and 126 percent of GDP, respectively. Reflecting the importance that the banking industry plays in Moroccan’s economy. When analyzing the structure of the banks assets’, it has been noticed that loans dominant the structure of banks’ assets in Morocco, followed by investment in Security Portfolio, “Cash Values, Central Banks, Treasury and Postal Checks Service”, Fixed assets and finally Other Assets. In 2012, “Cash Values, Central Banks, Treasury and Postal Checks Service”, Loans, Security Portfolio, Fixed Assets and Other Assets represent 2.74, 73.73, 19.87, 2.02, and 1.64 percent of total assets, respectively (Table 3).

Table 3 The Structure of Banks’ Assets in and It’s Ratio to GDP(2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets(TA)(million Dirham)</td>
<td>656,599</td>
<td>763,092</td>
<td>828,117</td>
<td>885,616</td>
<td>970,935</td>
<td>1,040,648</td>
</tr>
<tr>
<td>Growth of TA (%)</td>
<td>-</td>
<td>16.22</td>
<td>8.52</td>
<td>6.94</td>
<td>9.63</td>
<td>7.18</td>
</tr>
<tr>
<td>TA/GDP current price (%)</td>
<td>106</td>
<td>111</td>
<td>113</td>
<td>112</td>
<td>121</td>
<td>126</td>
</tr>
<tr>
<td>Cash Values, Central Banks, Treasury and Postal Checks Service of TA (%)</td>
<td>9.47</td>
<td>8.10</td>
<td>5.32</td>
<td>4.16</td>
<td>3.47</td>
<td>2.74</td>
</tr>
</tbody>
</table>
The Development of Total Loans Outstanding

As it is indicated in Table (4), the total loans outstanding extended by the Moroccan banks increased remarkably, where it increased from MAD 454,016 million at the end of 2007 to MAD 767,310 million at the end of 2012.

Table 4 The Development of Total Loans Outstanding in million Dirham and its Ratio to GDP (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Loans</td>
<td>454,016</td>
<td>547,796</td>
<td>607,597</td>
<td>639,479</td>
<td>731,152</td>
<td>767,310</td>
</tr>
<tr>
<td>Growth Rate (%)</td>
<td>-</td>
<td>20.66</td>
<td>10.92</td>
<td>5.25</td>
<td>14.34</td>
<td>4.95</td>
</tr>
<tr>
<td>Total Loans/GDP current price (%)</td>
<td>69</td>
<td>75</td>
<td>78</td>
<td>81</td>
<td>86</td>
<td>87</td>
</tr>
<tr>
<td>Loans to Costumers of Total Loan (%)</td>
<td>79.35</td>
<td>81.83</td>
<td>82.36</td>
<td>82.69</td>
<td>84.44</td>
<td>85.54</td>
</tr>
<tr>
<td>Loans to Credit Institution and Similar Bodies of Total Loan(%)</td>
<td>20.65</td>
<td>18.17</td>
<td>17.64</td>
<td>17.31</td>
<td>15.56</td>
<td>14.46</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).

The total loans outstanding as a percentage of GDP at current prices ranged between 69-87 percent during the period from 2007-2012, indicating the crucial role that the banks in Morocco plays to finance investment in Morocco.

Also it is indicated that banks in Morocco extended more total loans to customers than credit institutions and similar bodies. In 2012, the rate of total loans to customers of total loans represent 85.54 percent, while the rate of total loans to customers of total loans represent 14.46 percent. On the other hand, when analyzing the distribution of total loans extended by banks in Morocco according to terms it is noted that the non-performing loans to total loans outstanding decreased from 7.9 percent in 2007 to 5 percent in 2012 indicating the enhancement in the banking industry in Morocco. The long-term loans to total loans outstanding ranged from 25.2 -27.5 percent during 2007-2012. The medium-term loans to total loans outstanding ranged from 25.7 -27.6 percent during 2007-2012. The short-term
loans to total loans outstanding ranged from 41.2 -39.9 percent during 2007-2012 (Table 5).

Table 5 Distribution of Total Loans Outstanding According to Term (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Performing Loans (%)</td>
<td>7.90</td>
<td>6.00</td>
<td>5.50</td>
<td>4.80</td>
<td>4.80</td>
<td>5.00</td>
</tr>
<tr>
<td>Long-term Loans (%)</td>
<td>25.20</td>
<td>25.40</td>
<td>25.10</td>
<td>29.00</td>
<td>26.70</td>
<td>27.50</td>
</tr>
<tr>
<td>Medium-term Loans (%)</td>
<td>25.70</td>
<td>28.20</td>
<td>31.20</td>
<td>31.30</td>
<td>29.60</td>
<td>27.60</td>
</tr>
<tr>
<td>Short-term Loans (%)</td>
<td>41.20</td>
<td>40.40</td>
<td>38.20</td>
<td>34.90</td>
<td>38.90</td>
<td>39.90</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).

Analyzing the distribution of total loans extended by banks in Morocco according to economic sector it is noted that most of loans are extended to household, industry and financial activity sectors, respectively. In 2012, Households, Industry, Financial activity, Building and public works, Trade, Agriculture and Fisher, Transport and Communications, Hotel Industry and other sectors represent 28.4, 18.7, 14, 10.1, 6.4, 5.8, 5.2, 2.5, 8.9 percent, respectively from total loan outstanding.(Table 6)

Table 6 Distribution of Total Loans Outstanding According to Economic Sectors (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and Fisher (%)</td>
<td>5.80</td>
<td>4.10</td>
<td>3.40</td>
<td>4.10</td>
<td>4.10</td>
<td>4.10</td>
</tr>
<tr>
<td>Transport and Communication (%)</td>
<td>5.20</td>
<td>4.50</td>
<td>4.30</td>
<td>4.00</td>
<td>4.10</td>
<td>4.00</td>
</tr>
<tr>
<td>Industry (%)</td>
<td>18.70</td>
<td>18.70</td>
<td>18.30</td>
<td>18.40</td>
<td>18.40</td>
<td>18.10</td>
</tr>
<tr>
<td>Financial Activity (%)</td>
<td>14.00</td>
<td>13.10</td>
<td>12.50</td>
<td>12.10</td>
<td>11.90</td>
<td>11.00</td>
</tr>
<tr>
<td>Building and Public Works (%)</td>
<td>10.10</td>
<td>12.50</td>
<td>14.10</td>
<td>13.30</td>
<td>13.90</td>
<td>12.60</td>
</tr>
<tr>
<td>Households (%)</td>
<td>28.40</td>
<td>26.50</td>
<td>27.60</td>
<td>28.10</td>
<td>27.60</td>
<td>28.90</td>
</tr>
<tr>
<td>Trade (%)</td>
<td>6.40</td>
<td>6.50</td>
<td>6.50</td>
<td>6.70</td>
<td>6.60</td>
<td>7.00</td>
</tr>
<tr>
<td>Hotel Industry (%)</td>
<td>2.50</td>
<td>2.60</td>
<td>3.30</td>
<td>2.90</td>
<td>2.80</td>
<td>2.90</td>
</tr>
<tr>
<td>Other sectors (%)</td>
<td>8.90</td>
<td>11.50</td>
<td>10.00</td>
<td>10.40</td>
<td>10.60</td>
<td>11.40</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).

On the other hand, when analyzing total loans to customers in detail as Table(7), indicated one can noticed that total loans to customers increased from MAD 360
249 million at the end of 2007 to MAD 656 371 million at the end of 2012. In 2012, Overdrafts facilities and consumer loans, Equipment, Real-Estate, Factoring and Other Loans represent 35.24, 24.14, 33.23, 1.02 and 6.38 percent of total loans to customers, respectively.

**Table 7** Distribution of Total Loans to Customers (Million Dirham) (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Loans (customers)</td>
<td>360 249</td>
<td>448 281</td>
<td>500 396</td>
<td>553 622</td>
<td>617 391</td>
<td>656 371</td>
</tr>
<tr>
<td>Growth Rate (%)</td>
<td>-</td>
<td>24.44</td>
<td>11.63</td>
<td>10.64</td>
<td>11.52</td>
<td>6.31</td>
</tr>
<tr>
<td>Overdrafts Facilities and Consumer Loans of Total Loans Customers (%)</td>
<td>42.68</td>
<td>40.05</td>
<td>34.79</td>
<td>33.45</td>
<td>34.39</td>
<td>35.24</td>
</tr>
<tr>
<td>Equipment Loans of Total Loans Customers (%)</td>
<td>23.43</td>
<td>22.46</td>
<td>26.24</td>
<td>27.08</td>
<td>25.88</td>
<td>24.14</td>
</tr>
<tr>
<td>Real-Estate Loans of Total Loans Customers (%)</td>
<td>29.24</td>
<td>32.03</td>
<td>34.32</td>
<td>34.00</td>
<td>33.25</td>
<td>33.23</td>
</tr>
<tr>
<td>Factoring Loans of Total Loans Customers (%)</td>
<td>0.31</td>
<td>0.39</td>
<td>0.21</td>
<td>0.19</td>
<td>0.56</td>
<td>1.02</td>
</tr>
<tr>
<td>Other Loans of Total Loans Customers (%)</td>
<td>4.35</td>
<td>5.08</td>
<td>4.43</td>
<td>5.27</td>
<td>5.93</td>
<td>6.38</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).

**The Development of Total Deposits**

Total deposits of banks in Morocco increased by 12.48 percent in 2008 reaching a balance of MAD 559 767 million. Theses deposits grew by 5.47, 6.49, 8.53, and 6.36 percent in 2009, 2010, 2011 and 2012, where it reached MAD 816 232 million in 2012. Indicating the confidence in these banks. When analyzing total deposits according to the depositors, one can noticed that most of the depositors are customers even though its rate of total deposits are decreasing overtime, it was 92.25 percent in 2007 and went down to reach 85.35 percent in 2012. on the other hand, the rate of credit institutions deposits to total deposits are raising from 7.75 percent in 2007 to 14.65 percent in 2012(Table 8).
The Banking Industry in Morocco

Table 8 The Development of Total Deposits in million Dirham (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Deposit</td>
<td>559 767</td>
<td>629 598</td>
<td>664 010</td>
<td>707 079</td>
<td>767 399</td>
<td>816 232</td>
</tr>
<tr>
<td>Growth Rate(%)</td>
<td>-</td>
<td>12.48</td>
<td>5.47</td>
<td>6.49</td>
<td>8.53</td>
<td>6.36</td>
</tr>
<tr>
<td>Deposits of Credit Institutions of Total Deposit (%)</td>
<td>7.75</td>
<td>9.04</td>
<td>9.45</td>
<td>8.38</td>
<td>11.75</td>
<td>14.65</td>
</tr>
<tr>
<td>Deposits of Customers to Total Deposit (%)</td>
<td>92.25</td>
<td>90.96</td>
<td>90.55</td>
<td>91.62</td>
<td>88.25</td>
<td>85.35</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).

The structure of deposits of credit institutions in term of type, changed significantly during the period from 2007-2012. The rate of demand deposit to total deposit went down from 25.72 percent in 2007 to 7.99 percent in 2012. Meanwhile, the rate of time deposit to total deposits went up from 74.28 percent in 2007 to 92.01 percent in 2012 (Table 9).

Table 9 Distribution of Total Credit Institution Deposits (Million Dirham) (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Credit Institution Deposit</td>
<td>43 362</td>
<td>56 915</td>
<td>62 742</td>
<td>59 226</td>
<td>90 151</td>
<td>119 592</td>
</tr>
<tr>
<td>Growth Rate(%)</td>
<td>-</td>
<td>31.26</td>
<td>10.24</td>
<td>-5.60</td>
<td>52.21</td>
<td>32.66</td>
</tr>
<tr>
<td>Demand Deposit of total credit institution deposit (%)</td>
<td>25.72</td>
<td>16.70</td>
<td>9.62</td>
<td>21.43</td>
<td>12.93</td>
<td>7.99</td>
</tr>
<tr>
<td>Time Deposit of total credit institution deposit (%)</td>
<td>74.28</td>
<td>83.30</td>
<td>90.38</td>
<td>78.57</td>
<td>87.07</td>
<td>92.01</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).

As for structure of deposits of customers, one would note that in 2012, demand deposit represents 57.86 percent of total deposits, while saving, time deposits represent 18.84, 23.06 percent of total deposit, respectively and other accounts represent 5.24 percent of total deposits (Table 10).

Table 10 Distribution of Total Customers’ Deposits (Million Dirham) (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Customers’ Deposits</td>
<td>516 405</td>
<td>572 683</td>
<td>601 268</td>
<td>647 852</td>
<td>677 248</td>
<td>696 640</td>
</tr>
</tbody>
</table>
The Performance of Moroccan Banks

As it was introduced earlier, Figure(1) indicted that total assets, total loans outstanding and total deposits have shown a progressive upward trend growing at 12.97, 11.07, and 7.84 percent per annum, respectively during the period from 2007-2012. Indicating an improvement of the Moroccan banking industry.

Moroccan banks performed well compared to other countries in the region. As AttijariWafa bank was the top of the North African banks and the fifth of the African bank at the end of 2013. There were 8 Moroccan banks in the North African top 25, 3 from Tunisia, 3 from Algeria and 11 from Egypt (Table 11).
The Banking Industry in Morocco

Table 11 Moroccon Banks Ranking at the end of 2013

<table>
<thead>
<tr>
<th>Title</th>
<th>Rank of Africa</th>
<th>Rank of North Africa</th>
<th>Capital (Million $)</th>
<th>Total Assets (Million $)</th>
<th>Profits (Million $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attijariwafa Bank</td>
<td>5</td>
<td>1</td>
<td>4,136</td>
<td>47,17</td>
<td>620</td>
</tr>
<tr>
<td>Banque Centrale Populaire</td>
<td>6</td>
<td>2</td>
<td>3,662</td>
<td>35,514</td>
<td>392</td>
</tr>
<tr>
<td>BMCE Bank Group</td>
<td>9</td>
<td>3</td>
<td>2,191</td>
<td>28,956</td>
<td>230</td>
</tr>
<tr>
<td>Societe Generale Morocco</td>
<td>25</td>
<td>12</td>
<td>1,042</td>
<td>10,012</td>
<td>70</td>
</tr>
<tr>
<td>Banque Marocaine du Commerce et de L’industrie (BMCI)</td>
<td>28</td>
<td>13</td>
<td>961</td>
<td>8,198</td>
<td>78</td>
</tr>
<tr>
<td>Credit Agricole du Maroc</td>
<td>46</td>
<td>19</td>
<td>529</td>
<td>8,678</td>
<td>38</td>
</tr>
<tr>
<td>CreditImmobilier et Hotelier (CIH)</td>
<td>47</td>
<td>20</td>
<td>523</td>
<td>5,071</td>
<td>63</td>
</tr>
<tr>
<td>Credit du Maroc</td>
<td>51</td>
<td>21</td>
<td>484</td>
<td>6,147</td>
<td>35</td>
</tr>
</tbody>
</table>


As it is indicated in Table (12), banks’ solvency ratio on the basis of equity improved during the period from 2007 to 2012. It increased from 10.60 percent in 2007 to 12.30 percent in 2012. Also tier (1), increased from 9.20 percent to 10.10 percent in 2012. In the late 2010, Bank Al-Maghrib provided banks with all the technical notes needed to conduct the advanced Basel II (Bank Al-Maghrib, 2012). The improvement of solvency and tier (1) ratios complies with the new prudential requirement, which was introduced in June 2013.

Table 12 Financial Indicators of Banks in Morocco (in %) (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvency ratio</td>
<td>10.60</td>
<td>11.20</td>
<td>11.80</td>
<td>12.30</td>
<td>11.70</td>
<td>12.30</td>
</tr>
<tr>
<td>Core Equity/Total weighted risk(Tier 1)</td>
<td>9.20</td>
<td>9.60</td>
<td>9.20</td>
<td>9.70</td>
<td>9.60</td>
<td>10.10</td>
</tr>
<tr>
<td>Non-Performance Loans/Total loans</td>
<td>7.90</td>
<td>6.00</td>
<td>5.50</td>
<td>4.80</td>
<td>4.80</td>
<td>5.00</td>
</tr>
<tr>
<td>Return on Assets(ROA)</td>
<td>1.50</td>
<td>1.20</td>
<td>1.20</td>
<td>1.20</td>
<td>1.10</td>
<td>1.00</td>
</tr>
<tr>
<td>Return on Equity(ROE)</td>
<td>20.6</td>
<td>16.7</td>
<td>15.2</td>
<td>14.2</td>
<td>13.4</td>
<td>11.8</td>
</tr>
</tbody>
</table>

Source: Bank Al-Maghrib (different years).

The percentage of non-performing loans to total loans is low in Morocco (Mansour and Castel 2014). The rate of non-performing loans to total loans decreased
from 7.90 percent in 2007 to 5.00 percent in 2012, indicating the enhancement and improvement of managing risks in banks in Morocco. Unfortunately, the profitability ratios is decreasing during the period from 2007 to 2012, were ROA dropped from 1.50 percent in 2007 to 1.00 percent in 2012 and ROE went down from 20.60 percent in 2007 to 11.80 percent in 2012, as indicated by bank Al-Maghrib(2012), this was a result of the difficult surrounding economic environment(Figure 2).

**Figure 2** Profitability Ratios of Moroccan Banks during (2007-2012).

Comparing Morocco with other MENA countries, such as Egypt and Jordan (all these countries share a common economic structure (Ben Nasear et.al. 2011), Morocco outperform Egypt and Jordan in terms of the percentage of non-performing loans to total loans and Profitability ratio, were the percentage of non-performing loans to total loans, ROA and ROE for Egyptian banks were 9.8, 1, and 13.9 percent, respectively (Central Bank of Egypt, 2012). And the percentage of non-performing loans to total loans, ROA and ROE for Jordanian banks were 8.4, 1.14, and 8.24 percent, respectively (Association of Bank in Jordan 2013).

As it is indicated in Table (13), the banking industry in Morocco suffers from concentration. The share of the biggest three banks in Morocco (Attijariwafa Bank, Banque Centrale Populaire, and BMCE Bank Group) from total assets; total deposits and total loans outstanding represent 65.60, 65.40, and 64.50 percent of the total market, respectively in 2012.

**Table 13** Concentration of Banks in Morocco (in %) (2007-2012)

<table>
<thead>
<tr>
<th>Title</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets Concentration (3 first banks)</td>
<td>63.40</td>
<td>65.00</td>
<td>66.00</td>
<td>63.60</td>
<td>64.60</td>
<td>65.60</td>
</tr>
<tr>
<td>Total Assets Concentration (5 first banks)</td>
<td>81.1</td>
<td>80.9</td>
<td>81.8</td>
<td>79.10</td>
<td>79.20</td>
<td>79.40</td>
</tr>
</tbody>
</table>
The Banking Industry in Morocco

| Total Deposit Concentration (3 first banks) | 67.00 | 68.00 | 67.90 | 64.70 | 65.70 | 65.40 |
| Total Deposit Concentration (5 first banks) | 83.30 | 83.40 | 83.50 | 79.90 | 80.50 | 80.20 |
| Total Loans Outstanding Concentration (3 first banks) | 59.20 | 60.90 | 61.40 | 62.70 | 64.10 | 64.50 |
| Total Loans Outstanding Concentration (5 first banks) | 77.70 | 78.70 | 78.80 | 79.70 | 80.60 | 80.70 |

Source: Bank Al-Maghrib (different years).

On the other hand, the share of the biggest five banks in Morocco (Attijariwafa Bank, Banque Centrale Populaire, BMCE Bank Group, Societe Generale Morocco, and Banque Marocaine du Commerce et de L’industrie (BMCI)) from total assets; total deposits and total loans outstanding represent 79.40, 80.20, and 80.70 percent of the total market, respectively in 2012. This high concentration ratio may be an indicator of a lack of competition (Ben Naceur et. al. 2011). It should be noted that 38 percent of total deposits and 63 percent of total loans outstanding were in the city “Grand Casablanca”, 13 percent of total deposits and 13 percent of total loans outstanding were in the city “Rabat-Sale’-Zemmour-Zaer” and 9 percent of total deposits and 2 percent of total loans outstanding were in the “Oriental Region” (Bank Al-Maghrib, 2012).

In order for the banking industry of Morocco to reform after the financial crisis, Bank Al-Maghrib conducted internationally reforms such as conducting Basel III. For financial information they continued to reform the International Financial Reporting Standards (IFRS). They also adopted the financial education program, which will increase the awareness about financial products and investment. In March, 2012 Bank Al-Maghrib collaborated with different stakeholders for the first financial education action targeting young people from 8-17 ages (Bank Al-Maghrib, 2012).

Summary and Conclusion

This paper aims to shed some light on and document the activity of the banking industry in Morocco and to highlight areas where problem arises during the period from 2007-2012, by examining the structure and performance of the Moroccan banking industry as a whole. It was found that the outlook for the Moroccan banking sector is positive, stable, and well capitalized (Mansour and Castel 2014). Total banks’ assets grew at a CAGR of 12.97 percent during 2007–2012, reaching MAD
1,040,648,449 at the end of 2012. Total Loans Outstanding increased at a CAGR of 11.07 percent, reaching MAD 767,309,858. While their total deposit increased at a CAGR of 7.84 percent, reaching MAD 816,231,717 at the end of 2012.

On the other hand, there are still a lot of opportunities in the industry specially in the retail segment, where the bancarization rate (total number of accounts opened with banks divided by total population) is still low in rural and suburban areas, were it was 57 percent in 2012 (Bank Al-Maghrib, 2012). Together with the segment of lending to SME’s, were Moroccan banks provide poor financing to SME’s even though SME’s represent 93 percent of all companies in the country (Mansour and Castel 2014). Finally it should be noted that the most important and biggest development for banking industry in Morocco is the introduction of Islamic banks (Ford Neil, 2014).

References:

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World Bank. World Development Indicators.
Bank Al-Maghrib Website: www.bkam.ma
A Study of Market Efficiency from Option Prices
Evidence from the National Stock Exchange of India

Imlak Shaikh • Puja Padhi

Abstract This paper investigates the market efficiency of S&P CNX Nifty equity index options for at-the-money non-overlapping monthly implied volatilities. Under the rational expectation hypothesis, call and put implied volatilities are calculated using Black and Scholes option pricing-model for the period June, 2001 to May, 2011. The ordinary least squares estimation clearly shows that implied volatility is the best estimate of future realized volatility. An empirical result on Granger causality shows that there is only unidirectional causality prevails in the Indian options market. Granger causality test (Sims and Geweke) indicates that call and put implied volatility causes the realized volatility but realized volatility cannot cause implied volatility. Granger causality test also confirms that for Indian options market historical volatility does not subsume useful information what already contained in the option price (i.e. implied volatility). The study concludes that volatility estimates based on the option’s price are the best estimate for the future volatility and useful in the pricing of derivatives and portfolio-risk-management.

Keywords Implied Volatility - Realized Volatility - Market Efficiency Information Content - Granger causality - Index options BSOPM.

JEL Classification G14
Introduction

In the financial economics, the concept of volatility is very critical. Some author defines it as the measure of uncertainty of the financial assets or instruments traded in the capital market. In simple words it is the simple standard deviation of the returns, realized on a particular financial instrument for a given set of time. Why volatility should be studied? It is a matter of interest among the investors, financial institutions, government agency and practitioners. Generally investor analyzes the volatility for risk management, portfolio selection, valuation purpose, for designing trading strategies (such as volatility arbitrage). After the noble work of Black and Scholes in 1973 option pricing model for CBOE volatility study become more systematic for academics and practitioners. Investors generally rely on the estimates of volatility such as historical volatility also known as realized volatility, implied volatility. Historical volatility is directly observable and can be calculated daily, monthly or annually for the given financial instruments, while implied volatility cannot be observed directly, it can be inverted from the option prices, based on the Options pricing model.

In the study of superiority of historical and implied volatility (Christensen and Prabhala, 1998; Hansen, 2001; Kumar, 2008; Panda et. al. 2008 and Li and Yang, 2009) it is found that implied volatility outperforms the historical volatility. According to mean-reversion principle (Mandelbrot and Hudson, 2004) historical volatility forecast the future volatility under rational expectation that the past tends to be repeated. Historical volatility is the unconditional volatility forecast which ignores the most recent publicly available information. Therefore, historical volatility does not reveal the true volatility. Under the efficient market hypothesis it is found that implied volatility contains all the information that contained in the historical volatility. This study well explained by the superiority of implied volatility over the historical volatility by Bodie and Merton (1995).

Implied volatility is a transformation of a standard European option\textsuperscript{1} price. It is the volatility that, when input into the Black-Scholes option pricing model (BSOPM), yields the price of the option. In other words, it is the constant volatility of the underlying process that is implicit in the price of the option. For this reason, some authors refer to implied volatility as implicit volatility. Implied volatility is an alternative way to estimate volatility to be inferred from the options market, i.e. the current volatility of a stock as reflected by its option price.

The innovative work of Black and Scholes (1973) in the line of option pricing has made possible to study implied volatility and it became most popular among the academician and practitioners. According to Black and Scholes option pricing model if the market is efficient, then implied volatility should be an unbiased and

\textsuperscript{1} European style options cannot be exercised before its maturity date. For the present study OPTIDX options of CNX Nifty index are of European style and cash settled.
efficient predictor of future \textit{ex–post} realized volatility. Under the assumption of market efficiency and Black and Scholes option pricing model, it gives the expected volatility known as implied volatility, this implied volatility should be an unbiased and efficient predictor of future \textit{ex–post} realized return volatility. Implied volatility should subsume the information contained in all other variable used to explain future realized volatility.

The efficiency of implied volatility as predictor of realized return volatility was discussed at great extent in the last three decades. When looking on the literature still some inconclusive evidence are present that makes this topic more contentious. There are some groups of academician and practitioners (Latané and Rendleman, 1976; Chiras and Manaster, 1978; Beckers, 1981; Day and Lewis, 1992; Jorion, 1995; Christensen and Prabhala, 1998; Hansen, 2001; Christensen and Hansen, 2002; Szakmary et al., 2003; Corrado and Miller, 2005; Kumar, 2008; Panda et al., 2008 and Li and Yang, 2009) are in the favor of implied volatility as a best predictor of future realized return volatility. While on the other hand some group of scholars they are little suspicious about market efficiency and the predictive power of implied volatility. Lamoureux and Lastrapes (1993), Canina and Figlewski (1993), Gwilym and Buckle (1999) and Filis (2009) gave mixed conclusion on the information content of option prices and the predictive power of implied volatility and the historical volatility.

However, some group of scholars Jackwerth and Rubinstein (1996), Chance (2003) and Koopman, et al. (2005) strongly oppose on the information content of implied volatility, they observed that there is no correlation between implied and realized volatility. The empirical work of these people showed that historical volatility outperforms the future realized return volatility, and historical return volatility was the best predictor of future \textit{ex–post} realized return volatility.

The empirical work is presented as: Firstly, non-parametric test that gives the elementary results on market efficiency of implied volatility and applicability of BSOPM for OPTIDX options market. Secondly, by OLS estimation that explains how implied volatility explains the future realized volatility. Thirdly, by causality estimation using three approaches to Granger Causality Granger (1969), Sims (1972), Geweke (1983) this technique has been applied to know the direction of causality for implied and realized volatility.

The main purpose of this paper is to examine the market efficiency of S&P CNX Nifty index options and predictive power of implied volatility, implied in the options premium of OPTIDX options. In this empirical work it is found that call and put implied volatility does contain information about S&P CNX Nifty index options as best predictor of future \textit{ex-post} realized volatility. An empirical result on Granger Causality shows that there is only unidirectional causality prevails in the Indian options market. Granger Causality test (Sims and Geweke ) indicates that
call and put implied volatility causes the realized volatility but realized volatility cannot cause implied volatility. Granger Causality test also confirm that for Indian options market historical volatility does not subsumes useful information what already contained in the Options price.

This paper is written as follows: Section “Data and sampling procedure” deals with data sources and sampling procedure, Section “Variable definition” explains how variables are calculated, Section “Methodology and empirical results” explain methodology and empirical results. Section “Conclusion” ends with conclusion.

**Data and sampling procedure**

The present study is based on the index options for S&P CNX Nifty. NSE introduced trading in index options as on June 4, 2001. The options contracts are of European type and cash settled. The study period starts from June, 2001 to May, 2011, which covers the entire period of introduction of options on derivative segment F&O’s of NSE. OPTIDX S&P CNX Nifty index options are based on the popular market benchmarks S&P CNX Nifty index. Nifty index consist of 50 highly traded stocks and the representation of all industries. The instrument type is OPTIDX and the underlying asset is Nifty. S&P CNX Nifty index options contracts have three consecutive monthly contracts, additionally, three quarterly month of the cycle March/ June/September/December and five following semi-annual months of the cycle January/December. So that at any point in time there would be options contracts with at least 3 years tenure available. On expiration of the near month contract new contracts (monthly/quarterly/half yearly) are introduced at new strikes for both call and put options on the trading day following the expiry of the near month contract. Nifty options contracts expire on the last Thursday of the expiry month. If the last Thursday is a trading holiday, the contracts expire on the previous trading day.

Theoretical prices are calculated by using the BSOPM: The Black and Scholes model for option pricing gives the price of a call and put option as follows:

\[
c = SN(d_1) - Xe^{-r(T-t)}N(d_2)
p = Xe^{-r(T-t)}N(-d_2) - SN(-d_1)
\]

Where
\[
d_1 = \frac{\ln(S/X) + (r + \sigma^2/2)(T-t)\sigma(T-t)^{1/2}}{\sigma(T-t)^{1/2}}
\]
\[
d_2 = d_1 - \sigma(T-t)^{1/2}
\]

The variables are: \(S\) = Index\(^2\) price; \(X\) = strike price; \((T-t)\) = time remaining until expiration, expressed as a percent of a year; \(r\) = current continuously compounded

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2 CNX Nifty index is net of the present value of promised dividend.
risk-free interest rate (MIBOR). \( \sigma \) = annual volatility of stock price (the standard deviation of the short-term returns over one year); \( \ln \) = natural logarithm; \( N(x) \) = standard normal cumulative distribution function; \( e \) = 2.718282. Implied volatility is inverted from the BSOPM under the assumptions that Indian options market is efficient and the options pricing model is valid for options on equity index.

The sampling procedure has been used and different as comparing to the previous study on Indian context. For any options (call/put) to be included in the sample it should be:(a) Traded on business day close to but after on expiry date, and have expiration on the next expiry date. (b) Close to at-the-money i.e. \( (S/X) \in (0.95, 1.05) \) where \( S_t \) is the index level and \( X_t \) is the strike price of the option. (c) Traded actively i.e. have relatively high trading volume. Here criterion (a) was used to avoid the overlapping of data. S&P CNX Nifty index options of NSE are of European style they are expiring on the last Thursday of the month. Every month three contracts are introduced near month, two month, and far month, for the present study only near month (one month) contracts are taken into account for sampling purpose. Therefore every year there will be 12 non-overlapping samples for call and put options. Criterion (b) was used because the option pricing model for calculating implied volatility was more accurate for close to ATM options. Thus, implied volatility obtained from these options may result into less measurement errors. ATM options may have been thinly traded and their prices would not necessarily reflect market price, thus Criterion (c) was required. By taking into account the above three criterion sampling is done for the S&P CNX Nifty index options for the period June, 2001 to May, 2011.

Let \( t \) be the business day that immediately follows an expiry date. On day \( t \), the closing prices of \( (C_t, P_t) \) and strikes \( (X_{t,c}, X_{t,p}) \) were recorded for a call option and put option, each of which expired on the next expiry date \( t + 1 \) and had highest trading volume among the close to ATM options. The corresponding underlying index level \( S_t \) was also recorded and one month Mumbai Inter Bank Offered Rate (MIBOR) from NSE debt segment download as the proxy of risk free rate of interest. The sampling process repeated upto 120 monthly observation for each call and put options.

**Variable definition**

In this section variable definitions and practical issues are discussed:

*Time to Maturity \((T - t)\): In practice, the time for paying interest is based on calendar days while the time for the life of an options is based on trading days. In this study the life of an option was about one month ranging from 27 to 34 days (about 18 to 23 trading days). For the present study one month MIBOR is taken as risk free rate of interest. Here, \((T - t)\) indicates days to expiration was measured by number of days from the \( t \) business day and the day immediately prior to expiry day.
divided by the number of calendar days per year, that was taken as 365 i.e. \( \frac{(T - t)}{365} \). In this study the expiry day is not taken into account because all contracts expire on the day of expiration and the cash settled.

**Implied volatility** \( (\sigma_{CIV, t} \text{ and } \sigma_{PIV, t}) \): Implied volatility is a transformation of a standard European option price. It is the volatility that, when input into the BSOPM formula, yields the price of the option. In other words, it is the constant volatility of the underlying process that is implicit in the price of the option. For this reason some authors refer to implied volatility as implicit volatility. Implied volatility is an alternative way to estimate volatility to be inferred from the options market, i.e. the current volatility of a stock as reflected by its option price. In other words, take the market price of the option, then invert the option pricing formula to determine the volatility implied by the traders in the market. For computing implied volatility commonly BSOPM model is used. Options pricing models cannot be inverted very easily, so implied volatility is calculated numerically. There are number of methods available for options pricing. Implied volatility estimated using BSOPM with method of Bisection as below.

\[
\text{Volatility estimate} = \sigma = \frac{C - C_L}{C_H - C_L}(\sigma_H - \sigma_L)
\]

Where \( \sigma_L \) and \( \sigma_H \) are the low and high volatility values, \( C_L \) and \( C_H \) are the corresponding options values and \( C \) is the market price of the options.

**Average implied volatility:** \( (\sigma_{AVRIV, t} \text{, } i) \) to use the all the months in the present data set, the new implied volatility measures are constructed (Hansen, 2001) as average of both the call and put implied volatility \( \sigma_{AVRIV1, t} \), \( \sigma_{AVRIV2, t} \) and \( \sigma_{AVRIV3, t} \) defined as follows: \([i = 1, 2, 3]\)

\[
\sigma_{AVRIV1, t} = \sqrt{\frac{1}{2} \sigma^2_{c,t} + \frac{1}{2} \sigma^2_{p,t}}
\]

\[
\sigma_{AVRIV2, t} = \frac{1}{2} \sigma_{c,t}^2 + \frac{1}{2} \sigma_{p,t}^2
\]

\[
\sigma_{AVRIV3, t} = \exp\left\{\frac{1}{2} \ln \sigma_{c,t} + \frac{1}{2} \ln \sigma_{p,t}\right\}
\]

Where, the implied volatility measures \( \sigma_{AVRIV1, t} \) is constructed so that \( \sigma^2_{AVRIV1, t} \) is the average of the implied variances, while \( \sigma_{AVRIV2, t} \) is an average of the implied volatilities. The third measure is obtained by averaging the natural logarithm of the implied volatilities. For empirical estimation only Equation (5) is taken into account.

**Realized volatility:** \( (\sigma_{RV, t}) \): Shu and Zhang (2003) suggested that by constructing more suitable measure of realized volatility, the predictive power of implied
volatility can be improved and also minimized the measurement error. Realized volatility is calculated as the standard deviation of the daily index return during the remaining life of the option, the period covered by the implied volatility. Since it is assumed that spot prices are log normally distributed, returns have been calculated according to their log ratios in prices and are therefore continuously compounded. Let \( n \) be the number of trading days before the expiration of an option, \( S_i \) be the index level, and \( R_i \) be the log–return on the \( i^{th} \) day during the remaining life of the option. Then realized volatility defined as follows:

\[
R_i = \ln \left( \frac{S_i}{S_{i-1}} \right) \text{ where } i = 1, 2, 3, ... , n
\]

\[
\sigma_{RV,t} = \sqrt{\frac{252}{n-1} \sum_{i=1}^{n} (R_{i,t} - \bar{R}_t)^2}
\]

where \( \bar{R}_t = \frac{\sum_{i=1}^{n} R_i}{n} \)

[Denotes the mean of daily log return of the index at time \( t \)]

**Historical volatility:** \( (\sigma_{HV,t}) \) In previous studies, historical volatility at time \( t \) was taken often defined as realized volatility at time \( t-1 \). In this study, the time to maturity ranged from 27 to 34 days (about 18 to 23 trading days). If the measurement followed as above, the information contained in the gap between two consecutive contracts would have been ignored (Hansen, 2001). It is often held that more recent data contains more relevant information about the future. Thus for the present study different definition of historical volatility is used as followed by (Hansen, 2001; Christensen and Hansen, 2002 and Li and Yang, 2009) for a given contract with \( T \) days to maturity at time \( t \), the corresponding historical volatility was calculated by using the daily return of the period going back \( T \) days from time \( t \). Then historical volatility defined as follows:

\[
\sigma_{HV,t} = \sqrt{\frac{252}{T-1} \sum_{i=1}^{T} (R_{i,t-1} - \bar{R}_{t-1})^2}
\]

where \( \bar{R}_{t-1} = \frac{\sum_{i=1}^{T} R_i}{T} \)

[Denotes the mean of daily log return of the index at time \( t-1 \)]

**Methodology and empirical results**

In this section we develop an empirical model to determine the direction of causality using Granger models. In particular, a non-parametric test is also performed to
check the market efficiency of S&P CNX Nifty index options.

Descriptive Statistics

Table 1 shows the descriptive statistics for multivariate time series data. It can be seen clearly that the average realized volatility ($\sigma_{RV,t}$, $\sigma_{HV,t-1}$) they are smaller than the average put implied volatility ($\sigma_{PIV,t}$), the same is found in case of (Panda et al. 2008; Hansen, 2001; Li and Yang, 2009). It may be due to implementation of portfolio insurance as suggested by Harvey and Whaley (1991). But by looking at the call implied volatility ($\sigma_{CIV,t}$) it is less than the all realized volatility that indicate investors least prefer the call index options for their portfolio insurance pertaining to the Indian derivative market. There is no significant difference between all other three averages implied volatility measures, they are found to be higher than all realized volatility.

Table 1 Descriptive statistics

<table>
<thead>
<tr>
<th>Statistic(%)</th>
<th>$\sigma_{CIV,t}$</th>
<th>$\sigma_{PIV,t}$</th>
<th>$\sigma_{RV,t}$</th>
<th>$\sigma_{HV,t-1}$</th>
<th>$\sigma_{AVRIV,1,t}$</th>
<th>$\sigma_{AVRIV,2,t}$</th>
<th>$\sigma_{AVRIV,3,t}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>21</td>
<td>28</td>
<td>23</td>
<td>23</td>
<td>25</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Maximum</td>
<td>66</td>
<td>78</td>
<td>72</td>
<td>77</td>
<td>73</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Minimum</td>
<td>5</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>9</td>
<td>10</td>
<td>13</td>
<td>13</td>
<td>9</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

The maximum (minimum) value of put implied volatility is 78% (10%) while for call the value is 66% (5%). On the comparison of standard deviation reported in the fourth line for all volatility series; both realized volatility series are found to be more volatile as comparing to all other ex–ante volatility series. But, as per the assumption of BSOPM the annualized standard deviation should be constant.

Non-parametric test for market efficiency

To test the market efficiency of OPTIDX (options on index) index options as the predictor of future realized return volatility, a non-parametric test mechanism applied in the following way. Wilcoxon signed rank test is the non-parametric paired data testing procedure. Testing the null hypothesis that the median scores of the two time series population is same. For this reason, this test is applied in two ways: (1) if the market is efficient then; the pairs of non-overlapping at-the-money monthly implied volatility and realized volatility should be same. (2) Under the assumption of constant volatility of BSOPM call and put implied volatility should be same. Violation of this assumption violates the put-call parity theorem for option pricing model. In BSOPM annualized volatility is used to price both call and put
options, therefore implied volatility obtained from market price of call and put options should be same.
To test the above two hypothesis Wilcoxon W-statistic is calculated as follows: The Wilcoxon test statistic $W$ is the sum of the all positive ranks.

$$W - \text{stat} = \sum_{i=1}^{T} R_i^{(*)}$$  \hspace{1cm} (8)

$E(W\text{-statistic}) = \mu_w = T(T+1)/4$  \hspace{1cm} (9)

$\text{Var}(W\text{-statistic}) = \sigma^2_w = T(T+1)(2T+1)/24$  \hspace{1cm} (10)

Standardized $Z$-test statistic defined as

$$Z = \frac{W - \mu_w}{\sqrt{\sigma^2_w}}$$  \hspace{1cm} (11)

The critical valued of $Z$ at 1%, 5% and 10% level of significance are respectively 2.58, 1.96 and 1.64.

In Table 2 variant of null tested using Wilcoxon signed rank test. In Table 2 first two lines shows the test of significance of market efficiency of OPTIDX CNX Nifty Index options. If the options market is efficient and BSOPM good holds then all the call and put implied volatility should conform to the realized volatility. It is seen clearly from Table 2, first line null is accepted, as the p-value is not significant. It signifies that call implied volatility best subsumes the information regarding future realized return volatility. However, at the same time put implied volatility does not conform to the realized volatility. It indicates that put implied volatility does not contain any information about future volatility. A test shown in the third line is the test of superiority of historical volatility against implied volatility as the best predictor of future volatility. It is seen that test statistic is insignificant, therefore, historical volatility subsume the information about the future realized volatility. At the same time, it raises the question regarding the market efficiency of OPTIDX market and applicability of BSOPM.

In the fourth line of Table 2, as per BSOPM an annualized volatility is used to price both the call and put options, therefore call and put implied volatility obtained from call and put price of options should be same. But it is seen from the test null is not accepted, call and put implied volatility are not identical. This is the violation of assumption of BSOPM. This indicates the possibility of mispricing of options (Varma, 2002) in the Indian derivative market. In Table 2 last line is the test of average implied volatility against realized volatility that also found to be significant, we cannot accept the null that average implied volatility is the best estimate of future volatility. To obtain more robust result on the market efficiency we employ the OLS and Granger Causality method as follows.


Table 2 Wilcoxon signed rank test

<table>
<thead>
<tr>
<th>Null</th>
<th>W-statistic</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ho: Median difference between log realized volatility and log call implied volatility is same.</td>
<td>W+ = 3972</td>
<td>0.894</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Null</th>
<th>W-statistic</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ha: Median difference between log realized volatility and log call implied volatility is not same.</td>
<td>W- = 3288</td>
<td>(0.371)</td>
</tr>
</tbody>
</table>

| Ho: Median difference between log realized volatility and log put implied volatility is same. | W+ = 1190   | -6.388 |

| Ho: Median difference between log realized volatility and log put implied volatility is not same. | W- = 6070   | (0.000)* |

| Ho: Median difference between log realized volatility and log historical implied volatility is same. | W+ = 3539   | -0.237 |

| Ho: Median difference between log realized volatility and log historical implied volatility is not same. | W- = 3721   | (0.812) |

| Ho: Median difference between log call implied volatility and log put implied volatility is same. | W+ = 116    | -9.201 |

| Ho: Median difference between log call implied volatility and log put implied volatility is not same. | W- = 7144   | (0.000)* |

| Ho: Median difference between log realized volatility and log average implied volatility is same. | W+ = 1991   | -4.291 |

| Ho: Median difference between log realized volatility and log average implied volatility is not same. | W- = 5269   | (0.000)* |

*1%, ** 5% and ***10% Significant, Note: value in the square bracket shows the p-value.

Simple OLS estimation

This estimation gives the elementary results on the market efficiency of implied volatility as the best forecast of the future realized return volatility. This is based on the traditional measures call and put implied volatility. The following specification has been used for the OLS estimation:

\[
\sigma_{RV,t} = \alpha_0 + \alpha_c \sigma_{CIV,t} + \alpha_p \sigma_{PIV,t} + \alpha_m \sigma_{HV,t-1} + \epsilon_t
\]  \hspace{1cm} (12)

Similarly,

\[
\sigma_{RV,t} = \alpha_0 + \alpha_c \sigma_{CIV,t} + \alpha_i \sigma_{AVRIV,t} + \epsilon_t
\]  \hspace{1cm} (13)

Table 3 OLS estimation
### Dependent Independent variable Other Stat Test of Residual

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intercept</th>
<th>lnσCIV,t</th>
<th>lnσPIV,t</th>
<th>lnσHV,t-1</th>
<th>F-stat</th>
<th>LM-test</th>
<th>JB-stat</th>
<th>White test</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnσRV,t</td>
<td>-0.466</td>
<td>0.675</td>
<td></td>
<td></td>
<td>0.38</td>
<td>74.58*</td>
<td>0.61#</td>
<td>9.86*</td>
</tr>
<tr>
<td></td>
<td>[-3.537]*</td>
<td>[8.63]*</td>
<td></td>
<td></td>
<td>[0.001]</td>
<td>[0.000]</td>
<td>[0.826]</td>
<td>[0.007]</td>
</tr>
<tr>
<td>lnσRV,t</td>
<td>-0.462</td>
<td>0.822</td>
<td></td>
<td></td>
<td>0.38</td>
<td>73.66</td>
<td>0.915#</td>
<td>13.19*</td>
</tr>
<tr>
<td></td>
<td>[-3.471]*</td>
<td>[8.582]*</td>
<td></td>
<td></td>
<td>[0.000]</td>
<td>[0.000]</td>
<td>[0.535]</td>
<td>[0.001]</td>
</tr>
<tr>
<td>lnσRV,t</td>
<td>-0.723</td>
<td>0.535</td>
<td></td>
<td></td>
<td>0.535</td>
<td>50.49*</td>
<td>1.211#</td>
<td>14.52*</td>
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<tr>
<td></td>
<td>[-5.835]*</td>
<td>[7.105]*</td>
<td></td>
<td></td>
<td>[0.000]</td>
<td>[0.000]</td>
<td>[0.285]</td>
<td>[0.001]</td>
</tr>
<tr>
<td>lnσRV,t</td>
<td>-0.415</td>
<td>0.516</td>
<td></td>
<td></td>
<td>0.197</td>
<td>40.04*</td>
<td>0.458#</td>
<td>12.42*</td>
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<tr>
<td></td>
<td>[-3.119]*</td>
<td>[4.526]*</td>
<td></td>
<td></td>
<td>[1.939]***</td>
<td>0.40</td>
<td>[0.935]</td>
<td>[0.002]</td>
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<td></td>
<td>[0.002]</td>
<td>[0.000]</td>
<td>[0.055]</td>
<td>[0.000]</td>
<td>[0.000]</td>
<td>[0.967]</td>
<td>[0.000]</td>
<td>[0.01]</td>
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<tr>
<td>lnσRV,t</td>
<td>-0.437</td>
<td>0.654</td>
<td>0.159</td>
<td></td>
<td>0.38</td>
<td>38.14*</td>
<td>0.770#</td>
<td>14.14*</td>
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<tr>
<td></td>
<td>[-3.272]*</td>
<td>[4.285]*</td>
<td>[1.412]</td>
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<td>[0.001]</td>
<td>[0.000]</td>
<td>[0.679]</td>
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</tr>
<tr>
<td>lnσRV,t</td>
<td>-0.326</td>
<td>0.363</td>
<td>0.411</td>
<td>0.061</td>
<td>0.38</td>
<td>29.70*</td>
<td>0.602#</td>
<td>14.27*</td>
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<td></td>
<td>[-2.409]**</td>
<td>[2.857]*</td>
<td>[2.401]*</td>
<td>[0.529]</td>
<td>[0.017]</td>
<td>[0.005]</td>
<td>[0.836]</td>
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<td>[0.000]</td>
<td>[0.017]</td>
<td>[0.597]</td>
<td>[0.000]</td>
<td>[0.000]</td>
<td>[0.000]</td>
<td>[0.01]</td>
</tr>
<tr>
<td>lnσRV,t</td>
<td>-0.328</td>
<td>0.384</td>
<td>0.456</td>
<td>0.43</td>
<td>0.43</td>
<td>44.69*</td>
<td>0.616#</td>
<td>13.84*</td>
</tr>
<tr>
<td></td>
<td>[-2.436]**</td>
<td>[3.172]*</td>
<td>[3.075]*</td>
<td></td>
<td>[0.016]</td>
<td>[0.002]</td>
<td>[0.824]</td>
<td>[0.001]</td>
</tr>
</tbody>
</table>

[Table 3 shows OLS results of implied, historical and realized volatility based non-overlapping monthly at-the-money samples. LM-stat Ho: “No Serial Correlation” is obtained using Breusch-Godfrey Serial Correlation LM Test follows X2(12) distribution. JB-stat Ho: “Residuals are normally distributed” follows X2(2) distribution. White-stat Ho: “No Heteroskedasticity” using white test that also follows X2 distribution. A value shown in the square bracket shows the t-statistic and corresponding p-value is shown in curly bracket. *1%, **5%, ***10%, Significant]

It is seen from the first line of the Table 3, the coefficient of call implied volatility for log-transformed series 0.675 and it is statistically significant, thus call implied volatility does contain information about the realized volatility. This primary result provides strong base for the options market efficiency and information content of implied volatility for the OPTIDX S&P CNX Nifty index option and also supports the past literature (Christensen and Prabhala, 1998, Hansen, 2001 and Li and Yang, 2009). But, as per hypothesis that $\alpha_o = 0$ and $\alpha_c = 1$, this results are different from it. The slope of call implied volatility is less than unity and the intercept is different from zero this indicates that call implied volatility is a biased estimator of future realized return volatility.

It is of inquisitiveness to know the predictive power of put implied volatility;
therefore univariate regression is performed in the second line of Table 3. For log-transformed value of put implied volatility slope coefficient found to be 0.822 and statistically significant. While comparing the two slope coefficient of call and put implied volatility, the coefficient of put implied is greater than the call implied volatility, this signifies that for Nifty Index option put implied volatility is the best forecast of the future volatility than call implied volatility. Put implied volatility is a biased estimate of future ex-post realized volatility because of the slope is less than one and intercept is non-zero.

By estimating a univariate regression with historical volatility as shown in third line of Table 3 it is analyzed that the slope coefficient for log-transformed series is 0.535 and found to be statistically significant. Historical volatility appears to contain additional information about the future realized return volatility, at the same time as intercept is not zero and significant. It signifies that historical volatility is biased estimate of subsequent realized volatility. But while comparing the explanatory power of call/put implied volatility with historical volatility it is too low 0.29 as in case of first two regressions adjusted R^2 reported in Table 3. The possible reason for additional information content of historical volatility may be the fact that historical volatility does contain more information beyond that in call/put implied volatility. One more contradictory conclusion come out that it violates the joint hypothesis of market efficiency and applicability of BSOPM.

It is essential to compare the call implied volatility with historical volatility; therefore some more regression shown in the fourth line of Table 3. In multiple regression the slope coefficient of call and historical volatility for log-transformed series is estimated respectively 0.516 and 0.197 and found to be statistically significant, still call implied volatility is more powerful than historical volatility as a predictor of future realized volatility. For univariate regression the adjusted R^2 was 0.38 while including historical volatility as an additional regressor adjusted R^2 increases 0.40, this signifies that for multiple regression; model remain less miss-specified and there is no problem of autocorrelation and heteroskedasticity. By estimating a regression of put implied volatility with historical volatility, the coefficient of log-transformed series found to be respectively 0.654 and 0.159 and statistically significant. In this multiple regression put implied volatility appears significant as the forecast realized volatility while historical volatility found to be insignificant. This indicates that put implied volatility does contain more information what already contained in the historical volatility. In the sixth line of Table 3 multiple regressions by taking call/put and historical volatility together as regressors. The slope of these three regressors found to be respectively 0.363, 0.411 and 0.061. In this regression call and put implied volatility appears to be positive significant as best forecast of future realized volatility. One interesting fact is that historical volatility does not appear significantly, that signifies historical volatility does not contain additional
information what already contained in the options price.

One more interesting outcome of the study is that the Indian options market are efficient and call and put implied volatility are the best estimate of future volatility. By estimating a one more regression only with call and put implied volatility (reported in the last line of Table 3). The slope found to be respectively 0.384 and 0.455 still put implied volatility dominates the call implied volatility as a predictor of future realized volatility. For the present study it is strongly suggested for the Indian OPTIDX S&P CNX Nifty index options market is an efficient market and historical volatility does not subsume any information about future volatility what already contained in the implied volatility\(^3\).

**Granger Causality**

Testing for the causality between two variables implies the specification of the dynamic relationship which links them. The test of causality between two economic variables it was proposed by Granger (1969) and extended by Sims (1972). This test is useful in determining a variable \(y\) can help in predicting another variable. If it cannot, then we say that \(y\) does not caused \(x\) and vice versa. One application of ad-hoc distributed lag models is to test the direction of causality in economic relationship. Such a test is useful when we know that two variables are related but we don’t know which variable causes the other to move. Granger causality is a circumstance in which one time series variable consistently and predictably changes before another variable does (Granger, 1969). If one variable “causes” the other to change but we can be fairly sure that the opposite is not the case. Granger causality is important because it allows us to analyze which variable precedes or leads the other and such leading variables are extremely useful for forecasting purposes. Therefore, Granger causality allows us to prove economic causality in any rigorous way. The most commonly used Granger causality test are Granger (1969), Sims (1972) and Geweke . (1983) is discussed below\(^4\):

*Granger Direct Causality Method*

As the name implies Granger Causality is performed by taking lagged values of regressor and lagged value of dependent variable:

\[
\sigma_{RV,t} = \alpha_1 + \sum_{i=1}^{p} \beta_t \sigma_{RV,t-i} + \sum_{j=1}^{q} \gamma_j \sigma_{RV,t-j} + u_t
\]  
\[
\sigma_{IV,t} = \alpha_1 + \sum_{i=1}^{p} \beta_t \sigma_{IV,t-i} + \sum_{j=1}^{q} \gamma_j \sigma_{RV,t-j} + u_t
\]

To estimate Equation (14) & (15) for the given lag length n is estimated using OLS

---

3 The results on combined implied volatility are identical with previous regressions.
4 For more detailed methodological recent application of Granger causality see Nair (2012) and Aslan, (2012).
and F-test performed to test the null $\gamma_j = 0$

$$F\text{-}stat = \frac{(RRSS - URSS) / q}{URSS / (T - 2q - 1)}$$

(15)

Where $URSS$ stand for Unrestricted Residuals Sum of Squares due to equation (14) & (15) and $RRSS$ stand for Restricted Residuals Sum of Squares due to restriction on $\gamma_j = 0$. $T$ is the size of sample and $q$ is the lag length of $\sigma_{IV,t-1}$ and $p$ is the lag length of $\sigma_{RV,t-i}$ ($p$ & $q$ are the lag length). If $F\text{-}stat$ is greater than critical value then for both the Equation (14) & (15), then $\sigma_{IV,t-1} \Rightarrow \sigma_{RV,t} \Rightarrow \sigma_{IV,t-i}$ (i.e. $\sigma_{IV,t-i} \Leftrightarrow \sigma_{RV,t}$).

**Granger Causality Sims Method**

Sims model for causality is based on the past and future values of the regressor.

$$\sigma_{RV,t} = \alpha_3 + \sum_{i=0}^{m} \lambda_i \sigma_{IV,t-i} + \sum_{j=1}^{n} \delta_j \sigma_{IV,t+j} + u_t^r$$

$$\sigma_{IV,t} = \alpha_4 + \sum_{i=0}^{m} \lambda_i \sigma_{RV,t-i} + \sum_{j=1}^{n} \delta_j \sigma_{RV,t+j} + u_t^r$$

(17)(18)

According to Sims causality model only current and future values of regressor can cause the dependent variable. Here null $\delta_j = 0$ is tested using F-statistic. The past literatures on empirical study of Sims model suggest that residual in the model are highly autocorrelated. The Geweke et.al. model (1983) is one of the modifications of Sims model for the correction of autocorrelation by taking lagged value of dependent variable.

**Granger Causality Geweke et.al Method**

$$\sigma_{RV,t} = \alpha_5 + \sum_{i=1}^{n} \pi_i \sigma_{RV,t-i} + \sum_{j=1}^{n} \theta_j \sigma_{RV,t+j} + u_t^r$$

$$\sigma_{IV,t} = \alpha_6 + \sum_{i=1}^{n} \pi_i \sigma_{IV,t-i} + \sum_{j=1}^{n} \theta_j \sigma_{IV,t+j} + u_t^r$$

(19)(20)

The null is tested for $\theta_j = 0$ for $\sigma_{IV,t-i} \Leftrightarrow \sigma_{RV,t}$ against $\sigma_{IV,t} \Rightarrow \sigma_{RV,t}$ and vice versa. In Geweke model when lagged dependent variable included as regressor it leads to fall in degrees of freedom and possible misspecification.

Before testing for the causality optimal number of lags should be estimated. Here optimal number of lag suggested is one using AIC and SBIC criterion$^5$.

The empirical results on Granger causality are described in Table 4 and 5. An attempt is made to tests the causality relationship between implied and realized volatility. Time series variable under Causality analysis are call implied volatility,

$^5$ Due to space constraint results of Lag selection has been not reported here, results can be available on request.
put implied volatility, and average implied volatility (combined call and put implied volatility), realized volatility and historical volatility. The main reason behind doing Causality test is to analyze the direction of causality among the \textit{ex ante} and \textit{ex post} volatility.

For Causality test various models are specified (Equation 14-15, 17-18 and 19-20) and estimated using OLS regression. Estimated residuals are tested for autocorrelation, normality and heteroskedasticity. It is found that there are no significant problem of autocorrelation and heteroskedasticity. Therefore, the coefficient estimated for various models are consistent and efficient. However, in Sims model there is a problem of autocorrelation, therefore, Geweke model is adopted.

**Table 4 Ganger causality using Granger Model**

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>F-Statistic</th>
<th>Q-Stat</th>
<th>Diagnostic Test of Residual</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>LM-stat</td>
<td>JB-stat</td>
</tr>
<tr>
<td>CIV does not Granger Causes RV</td>
<td>4.66**</td>
<td>12.23</td>
<td>14.89</td>
<td>11.68</td>
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<td>[0.033]</td>
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<td>[0.247]</td>
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<td>46.31*</td>
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<td>8.27</td>
<td>259.00</td>
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<td>[0.764]</td>
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<tr>
<td>PIV does not Granger Causes RV</td>
<td>3.16***</td>
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<td>[0.078]</td>
<td>[0.577]</td>
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<tr>
<td>RV does not Granger Causes PIV</td>
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<td>17.56</td>
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<td>[0.066]</td>
<td>[0.129]</td>
<td>[0.343]</td>
</tr>
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<td>A VRIV does not Granger Causes RV</td>
<td>4.85**</td>
<td>11.76</td>
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<td>RV does not Granger Causes A VRIV</td>
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<td>[0.065]</td>
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<td>[0.985]</td>
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<tr>
<td>HV does not Granger Causes RV</td>
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<td>10.60</td>
<td>10.80</td>
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<td>[0.546]</td>
<td>[0.002]</td>
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<td>3443.17*</td>
<td>9.99</td>
<td>11.35</td>
<td>44.77</td>
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<td>[0.499]</td>
<td>[0.000]</td>
</tr>
<tr>
<td>PIV does not Granger Causes CIV</td>
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<td>12.94</td>
<td>149.12</td>
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<td>16.56</td>
<td>18.20</td>
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Null Hypothesis | F-Statistic | Q-Stat | Diagnostic Test of Residual | Inference |
<table>
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<th></th>
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<th></th>
<th></th>
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<td></td>
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<td>JB-stat</td>
</tr>
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<td>5.44</td>
<td>6.3</td>
<td>15.28</td>
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<td>[0.900]</td>
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<tr>
<td>CIV does not Granger Causes HV</td>
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<td>16.36</td>
<td>17.47</td>
<td>35.76</td>
</tr>
<tr>
<td>PIV does not Granger Causes HV</td>
<td>16.91*</td>
<td>9.38</td>
<td>9.02</td>
<td>34.15</td>
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<tr>
<td>PIV does not Granger Causes HV</td>
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<td>[0.701]</td>
<td>[0.000]</td>
</tr>
<tr>
<td>PIV does not Granger Causes HV</td>
<td>0.42</td>
<td>21.73</td>
<td>22.30</td>
<td>27.85</td>
</tr>
<tr>
<td>PIV does not Granger Causes HV</td>
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<td>[0.041]</td>
<td>[0.034]</td>
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</tr>
<tr>
<td>PIV does not Granger Causes HV</td>
<td>24.59*</td>
<td>8.81</td>
<td>8.03</td>
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<td>PIV does not Granger Causes HV</td>
<td>[0.000]</td>
<td>[0.719]</td>
<td>[0.782]</td>
<td>[0.000]</td>
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</tbody>
</table>

Table 4 reports results on Granger causality using Granger Model. F-stat Ho : “Does Not Granger Causes”, The Values in square bracket shows p-value Q-stat Ho: “Residuals are white Noise”, is obtained using Box-Pierces test statistics follows X2(12) distribution. LM-stat Ho: “No Serial Correlation” is obtained using Breusch-Godfrey Serial Correlation LM Test follows X2(12) distribution. JB-stat Ho: “Residuals are normally distributed” follows X2(2) distribution. White-stat Ho: “No Heteroskedasticity” using White test that also follows X2distribution. Implies unidirectional causality; Implies does not causes; Implies bi-directional causality. {*1%, **5%, ***10%, significant,}

Table 5 Ganger causality using Geweke Model (Correcting for the Autocorrelation)

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>F-Statistic</th>
<th>Q-Stat</th>
<th>Diagnostic Test of Residual</th>
<th>Inference</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>LM-stat</td>
<td>JB-stat</td>
</tr>
<tr>
<td>CIV does not Granger Causes RV</td>
<td>42.62*</td>
<td>6.29</td>
<td>7.05</td>
<td>6.30</td>
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<tr>
<td>RV does not Granger Causes CIV</td>
<td>0.33</td>
<td>9.08</td>
<td>10.33</td>
<td>280.07</td>
</tr>
<tr>
<td>RV does not Granger Causes CIV</td>
<td>[0.000]</td>
<td>[0.901]</td>
<td>[0.854]</td>
<td>[0.043]</td>
</tr>
<tr>
<td>RV does not Granger Causes CIV</td>
<td>[0.570]</td>
<td>[0.696]</td>
<td>[0.587]</td>
<td>[0.000]</td>
</tr>
<tr>
<td>PIV does not Granger Causes RV</td>
<td>75.52*</td>
<td>12.70</td>
<td>13.23</td>
<td>0.11</td>
</tr>
<tr>
<td>PIV does not Granger Causes RV</td>
<td>[0.000]</td>
<td>[0.391]</td>
<td>[0.353]</td>
<td>[0.947]</td>
</tr>
<tr>
<td>PIV does not Granger Causes RV</td>
<td>0.0009</td>
<td>19.26</td>
<td>14.68</td>
<td>15.80</td>
</tr>
<tr>
<td>PIV does not Granger Causes RV</td>
<td>[0.976]</td>
<td>[0.082]</td>
<td>[0.259]</td>
<td>[0.000]</td>
</tr>
<tr>
<td>AVRIV does not Granger Causes RV</td>
<td>82.24*</td>
<td>9.99</td>
<td>11.26</td>
<td>0.64</td>
</tr>
<tr>
<td>AVRIV does not Granger Causes RV</td>
<td>[0.000]</td>
<td>[0.617]</td>
<td>[0.506]</td>
<td>[0.727]</td>
</tr>
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<td>Null Hypothesis</td>
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<td>Q-Stat</td>
<td>Diagnostic Test of Residual</td>
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</tr>
<tr>
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<td>-------------</td>
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<td>----------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LM-stat</td>
<td>JB-stat</td>
</tr>
<tr>
<td>RV does not Granger Causes AVIV</td>
<td>0.08</td>
<td>24.12</td>
<td>25.66</td>
<td>9.64</td>
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<td>[0.774]</td>
<td>[0.020]</td>
<td>[0.012]</td>
<td>[0.008]</td>
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<tr>
<td>PIV does not Granger Causes CIV</td>
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<td>10.61</td>
<td>11.45</td>
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<td>[0.562]</td>
<td>[0.490]</td>
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<tr>
<td>CIV does not Granger Causes PIV</td>
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<td>15.00</td>
<td>18.59</td>
<td>4.43</td>
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<tr>
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<td>[0.062]</td>
<td>[0.242]</td>
<td>[0.099]</td>
<td>[0.109]</td>
</tr>
</tbody>
</table>

In Table 4 results on Granger causality are reported using Grange (1969) model. A variant of null hypotheses are tested for the possible rejection based F-statistic. The first line of the Table 4 F-stat signifies that both null are rejected. This implies that call implied volatility Granger Causes the realized volatility. Similarly, realized volatility also Granger Causes call implied volatility, this indicates the bi-directional Causality between call implied volatility and realized volatility. The same is true for put implied volatility shown in the second line of the Table 4. Sims and Geweke Model (see Table 5) clearly analyze that call/put implied volatility can cause the realized volatility and realized volatility cannot cause the implied volatility. It is also confirmed for the average implied volatility and, found that there is only unidirectional causality hold between implied and realized volatility. Based on this uncomplicated result it is concluded that Indian options market is an efficient market and incorporates all the recent information in the option prices. An ex-ante volatility obtained from options pricing model is the efficient forecast of the future realized return volatility. This result also confirms to the other options market of the globe like CBOE, NYSE, OEX, ASX, ADEX etc. The Causality result on the combined measures of implied volatility is reported in the third line of the respective Causality tables. The result shows that average implied volatility Granger Causes the realized volatility and the nature of causality is unidirectional.

In this study two different measures of ex-post realized return volatility are calculated. It is clearly seen from the Granger Table 4 the null “HV does not Granger Causes CIV” is accepted; the same is true for put implied volatility as well as combined implied volatility. Therefore, Granger Causality test suggest that
historical volatility cannot be the best estimate of the future realized return volatility. Call and put implied volatility are the measure of current market volatility and best subsumes the information about future volatility.

All Granger Causality result analyze that call and put implied volatility cannot cause to each other. It is because of the assumptions of constant volatility of the BSOPM. In option pricing model single annualized volatility is used to price both the call and put options. Therefore, volatility predicted from call and put price should be identical. Granger\textsuperscript{6} and Geweke et.al Causality model (see Table 5) supports the hypothesis “PIV does not Granger Causes CIV” and “CIV does not Granger Causes PIV”.

Conclusion

This study deals with the market efficiency of the OPTIDX CNX Nifty Index options. Implied volatilities are calculated for at-the-money non-overlapping monthly call and put options. The empirical results show that Indian options market is an efficient market that subsumes all the important information about the future volatility. This is a more comprehensive study in the Indian context based on causality analysis and employed three different approaches for non-overlapping at-the-money implied volatilities. It is concluded that call/put implied volatilities are the best estimate of future realized return volatility. It is also analyzed from the OLS estimation that historical volatility does not contain any significant information about the realized volatility what already contained in the options price. Granger Causality test concludes that there is only unidirectional causality prevails between implied volatility and realized volatility. Implied volatility can only causes the realized volatility; realized volatility cannot cause the implied volatility. One of the important result obtained from Granger test that historical volatility cannot cause the realized volatility. Finally, it is concluded that Indian options market is an efficient market and the volatility estimates based on option pricing model are the best forecast of the future volatility. This study can be useful for the volatility traders in the pricing of derivative instruments and portfolio risk management.

References


\textsuperscript{6} Granger causality using Sims Model not reported here, the result can be supplied on request.


Financial Development and Poverty
Short and Long Run Causality in Tunisia

Leila Chemli

Abstract The purpose of this paper is to examine the impact of financial development on poverty in Tunisia for the period 1970-2013. Our empirical analysis consists of three steps: the unit root test, the Johansen co-integration test, the Granger causality test in the context of an error correction model (ECM). The econometric results show that financial development is conducive to poverty reduction. It is the existence of a unidirectional causality relationship between financial development and poverty reduction.

Keywords Financial development - Poverty - Error-correction model
Granger causality

JEL Classification I32 - C32

1. Introduction

The poverty reduction represents a fundamental challenge that all developed and developing countries face. Indeed, our study focuses on the impact of financial development on poverty. This relationship can be composed by the link between financial development and economic growth. But also, a direct relationship is through access to financial services. Few studies have examined the link between financial development and poverty.

The purpose of this article is to focus on the relationship between financial development and poverty reduction in the case of Tunisia. To achieve this, we used an error correction model (ECM). In this respect, the paper is organized as follows: first, it was interested in presenting both theoretical and empirical work regarding

Leila Chemli
Faculty of Sciences Economic and Management, Sousse University, Tunisia

e-mail: chemli.leila@yahoo.fr
the relationship between financial development and poverty. Then we presented our econometric model and finally, the results summarized.

2. Review of the theoretical literature

Among the objectives of Millinénaire to development, is the eradication of poverty and hunger. The main idea is that the proportion of people whose income is less than $ 1.25 per day should be halved between 1990 and 2015. The relationship between financial development and poverty has not been widely explored. The economic literature shows that financial development affects poverty directly by improving the access of the poor to financial services and indirectly through its impact on economic growth. Hence, we have two channels: a direct and an indirect channel.

2.1. The Direct Channel

Several economists have emphasized that financial development can contribute directly to poverty reduction, through various ways, such as (Odhiambo, 2009; Pradhan, 2010; Akhter.S, Liu.Y and Daly.K, 2010) among others. Financial development can improve poor people’s access to formal finance, addressing the causes of failures of financial markets, such as asymmetric information and the high fixed cost of loans to small borrowers (Stiglitz, 1998; Jallilian and Kirkpatrick, 2001). Financial development also allows the poor to reduce the accumulated savings or borrowed money to start micro-enterprises, causing greater access to financial services, employment growth, higher incomes and therefore, poverty reduction (DFID,2004).

According to Kpodar¹ (2004), the provision of financial services is prominently to reduce poverty. These programs adopted by developing countries focus on micro-credit. Indeed, microfinance is recognized as a means that can lead to the reduction of poverty, in order to diversify their sources of income through self-employment. Financial development can contribute directly by improving facilities loans and deposits for the poor. Indeed, if the poor have access to financial services, they can increase their productive assets, improve their productivity and therefore their income. Kpodar (2004) distinguishes between two effects: the effect of capital conduit and the threshold effect².

The first effect means that “if the poor have access to the financial system as an investor, the theory of “the effect of capital conduit” developed by McKinnon (1973) could justify reducing effect of financial development on poverty »³. McKin-

1 Idée présenté par Kpodar (2004) dans le développement financier et la problématique de la pauvreté.
non’s hypothesis is that the mobilization of savings is a prerequisite for any investment. The lack of access to external finance places the poorest in a situation where capital accumulation is compromised. The effect of McKinnon stipulates that in the absence of a financial system, it is unable to finance the most efficient techniques of production, which means a sacrifice in terms of consumption. In developing countries, where the financial system is weak or nonexistent, and characterized by a small amount of external financing, investors are even saving time, while any significant expenditure planned accumulation requires an increase in real money necessary. Furthermore, McKinnon has argued that even if the financial instruments do not provide credit to the poor, they nevertheless provide profitable financial savings opportunities. When economic units are confined to the flow, so that there is no meaningful distinction between savers (households) and investors (firms), the indivisibility of the investment proves a considerable importance. Hence, there are complementarities between money and capital. However, an increase in real interest rate corresponds to a valuation of liquid short-term portfolio, and thus more opportunities for self-financing. And therefore, the establishment of adequate financial structures to facilitate the establishment of a financial savings would be pro-poor. The second effect is on the threshold effect. When the financial system grows, it may spread financial services to the poor. Indeed, we must reach a certain threshold, so that development can ensure the cost-effective financial services to the poor.

Moreover, according to Kpodar (2004), there are factors that limit the access of the poor to the formal credit market: the lack of sufficient or acceptable security that focuses on information asymmetry, the distance between housing and banking agencies, and the lack of formal financial institutions specializing in financial services to the poor. Akhter.S and Daly.K (2007) examine the transmission channels of financial intermediation through savings and investment. Indeed, Beck et al (2004, 2007) argue that financial development is not only pro-growth (increases economic growth), but also pro-poor (increases poverty reduction). This allows to identify a direct link between financial development and poverty reduction. These authors have shown that the overall credit considered as a measure of financial development has a direct impact on the poor, since the income of the poor is growing at a rapid rate above the average income growth in the economy.

Akhter.S, Liu.Y and Daly.K (2010) supported the existence of doubts about the direct role of financial development in reducing poverty and income inequality, as the two concepts are different, although they are closely related. The hypothesis of a direct link between finance and poverty seems to have found no support, since financial services are expensive and the poor cannot afford to pay. This argument seems true in developing countries, since financial services are proving to be expensive or non-existent for the poor. These are underserved, compared to the rich developed countries. Indeed, the development of financial intermediaries will have
a disproportionately beneficial impact on the poor. And this is due to the fact that the poor have little money to properly take advantage of sophisticated financial services. Where a financial system that works badly will produce a greater income inequality disproportionately. The development of the financial sector reduces information and transaction costs and, therefore, will allow the greatest entrepreneurs, especially those less fortunate to obtain external financing, improve the allocation of capital, and exerting a particularly significant impact on the poor.

In fact, these means are a direct channel. But besides, there is an indirect channel through economic growth. This shows how financial deepening has a positive effect on economic growth, and how the gains from growth are routed to the poor.

2.2. The Indirect Channel

Besides the direct channel between development and poverty, there is the indirect channel through economic growth. The relationship between financial development and economic growth has been the subject of many studies. According to the work of (Bagehot, 1873; Schumpeter, 1912) and Gurley and Shaw (1960) and until recently, financial intermediaries stimulate capital accumulation and productivity growth factors and consequently economic growth. Levine (1997) argues that in order to enhance economic efficiency and therefore economic growth, we must allocate capital to its best use. He also argues that financial systems can perform five functions to contribute to the long-term growth. These functions are: to facilitate the improvement of risk, the acquisition of information on investments and allocation of resources, monitoring managers and exert corporate control, mobilizing savings, and facilitating the exchange. These functions facilitate investment and therefore higher economic growth.

Indeed, economic growth can reduce poverty directly or indirectly (Arestis and Caner, 2004). Growth can have a direct impact on the poor through increased inputs and improved conditions in the areas and regions where they live. The indirect effect helps to redistribute the highest revenue growth and from an increase in government revenue that is used to transfer payments and improve resourcing the poor. Beck, Demirguc-Kunt and Levine (2007) study the effect of financial development on both inequality and poverty. They have determined two effects: the first related to credit constraints which may be binding on the poor, but the relaxation of these constraints will have a greater effect on the low-income population. Indeed, the poor can benefit from greater economic growth which could come from a more efficient allocation of capital. The second is related to the fact that financial development can benefit the rich. Indeed, the relationship between financial development and economic growth is positive in all stages of financial development, but has a positive impact on inequality in the early stages of development. At first, it is the rich who benefit in a greater proportion, but then more people have access to finan-
cial services including the poor. According to Beck, Demirguc-Kunt and Levine (2007), financial development promotes growth and reduces inequality. Imperfections in financial markets, such as information asymmetries, transaction costs can be especially hard on the poor because they do not have collateral. These credit constraints may affect the flow of capital to the poor (Galor and Zeira, 1993) which reduces the efficiency of capital allocation and increases income inequality.

3. Review of the Empirical Literature

On the empirical front, very few studies have examined the relationship of causality between financial development and poverty reduction. Among these studies, Beck et al, 2004; Odhiambo.N, 2009; Moreno.S, 2010; Akhter.S, Liu.Y and Daly.K, 2010; Uddin.GS, Kyophilavong.P and Sydee.N, 2012 and Ordóñez.P, 2012. Beck et al (2004) found that the income of the 20% poorest is growing faster than the average GDP per capita in countries where financial development is higher in a sample of 52 developed and developing countries, with data for the period from 1960 to 1990. Thus, they concluded that financial development is pro-poor, as it amplifies the income growth of the poor, at a faster rate than the rich. But opposite results have been presented by Guillaumont.J Kpodar.K (2005). Indeed, this opposition is due to the use of various econometric techniques.

While Odhiambo.N (2009) concluded that financial development and economic growth induce the reduction of poverty in South Africa, he recommends that policies geared towards economic growth should be intensified in South Africa to make more cash economy, and reduce the high level of poverty prevailing in the country. Through his study, Moreno.S (2010) used a panel of 35 developing countries including 14 countries in sub-Saharan Africa, 14 in Latin America and the Caribbean, 4 from South Asia, and 3 from East Asia and the Pacific. His analysis covers the years 1970, 1980, 1990 and 1998. It was used as a variable, the poverty rate of $ 1 per day (extreme poverty), and the poverty rate of $ 2 per day (moderate poverty), the M3 / GDP ratio, private sector credit to GDP. He concluded that if financial development is measured by private credit to GDP, then whatever the poverty line and the period studied, if we include the financial development, then there will be less good performance. Therefore he noted the absence of causality between financial development and poverty, when focused on access to the private financial intermediation and loans sector. However, the effects of financial development on poverty are sensitive indicators of financial development used. Indeed, they suggest that in developing countries, financial development can promote the population into a state of moderate poverty, the progress in financial intermediation offers real opportunity for their economies, which facilitates physical and human capital investment, in environments with high liquidity constraints. Akhter.S, Liu.Y and Daly.K (2010) used
a sample of 54 developing countries, with a study period extending from 1993 to 2004. They concluded that poverty decreases as the level of financial development increases. The impact of financial development on poverty reduction appears stronger when the level of financial development is measured by the ratio of credit to GDP. They showed a strong correlation between the level of financial development and financial instability, suggesting that financial development helps the poor more generally in countries with stable financial systems. They also concluded that more financial service induces improvement of economic activity, which means less poverty. They led to the idea that financial development is conducive to poverty reduction, and that instability is detrimental to the poor. They also noticed that corruption is an obstacle, and political stability is a catalyst in the fight against poverty through financial development. Indeed, incomplete regulation of financial institutions has also limited the confidence of the poor to financial services. Moreover, the lack of trust leads to a vast majority of the population being excluded from financial services, and therefore retards economic growth and increases poverty and inequality. Pradhan.R (2010) found a unidirectional causality from poverty reduction to economic growth, economic growth to financial development, economic growth to reduce poverty and financial development to reduce poverty. It is not either of causality between financial development and economic growth, and between poverty and financial development. Indeed, an improvement in economic growth due to the financial development and both has substantial reduction of poverty in economic contributions. The policy implication of this result is that economic growth is seen as the policy variable to accelerate financial development. Therefore, in order to maintain sustainable economic growth and to reduce poverty, the government should strengthen the financial sector and take essential measures to strengthen the long-run relationship between financial development and economic growth. Through their study Uddin.G.S, Kyophilavong. P Sydee. N (2012) concluded that there is of a long-term relationship between banking sector development and poverty reduction. They were surprised that poverty reduction appears to be a long-term variable leading to the explanation of financial development. They noted the existence of bidirectional causality between financial development and poverty reduction. They led to the idea that policymakers can influence poverty reduction by promoting financial development in the long term. And this by improving access to financial services and credit by the poorest people. According to Ordóñez.P (2012), there is a negative relationship between financial development and poverty. This inverse relationship between these two variables implies that any measure that promotes financial development will actually have a positive impact on reducing poverty. Expanding access to financial services, improving efficiency and avoiding the failures of financial markets will have a positive impact on the population as a whole, but especially on the poor. It is also clear
that the positive impact of financial development in reducing poverty goes beyond the positive effect it has on economic growth. Through their study, Uddin and Kyophilavong Sydee (2012) estimate the relationship between financial development and poverty in Bangladesh during the period from 1976 to 2010 through an approach of autoregressive distributed lag model (ARDL). They conclude that there is a long-term relationship between the development of the banking sector and poverty reduction. They also concluded that there is a bidirectional causality between banking sector development and poverty reduction. Therefore, this finding implies that policy makers can influence the reduction of poverty by encouraging financial development in the long term. Indeed, the development of the financial sector will enable the poor to better access institutional credit. But a retrieval system organized and efficient loan might encourage microcredit that the poor could use as a step out of poverty. On the other hand, measures of poverty reduction would put the economy on a higher growth trajectory, which will facilitate the continuation of reforms in the financial sector development. Uddin, Shahbaz, Arouri and Teulon (2014) use an approach of autoregressive distributed lag model (ARDL) to study the relationship between financial development, economic growth and poverty reduction in the case of Bangladesh for the period 1970-2011. They conclude that the political leaders of Bangladesh can influence the reduction of poverty through financial sector development by providing loans to SMEs that will be useful to reduce poverty by creating jobs in the country.

4. The Relation between Financial Development and Poverty: The Econometric Analysis

To investigate the relationship between financial development and poverty in Tunisia, we base our analysis on the different studies Odhiambo (2009), Moreno.S (2010), Pradhan.R (2010), through methodology for estimating time series. Our empirical strategy proceeds in three steps: first, the unit root test, then the test of Johansen co-integration. Finally, the estimation of the model error and the Granger causality test corrections.

Our analysis extends from 1970 to 2013. The data are from the World Bank’s World Development Indicators (2014). Table 1 of Appendix 1 provides descriptive statistics of the variables used in this study and their changes during the study period.

4.1. Test of Stationary

The traditional methodology of the analysis of stationary is to perform the test of unit root in the variables used. This test helps to identify the stationary or not a
chronic, by determining a deterministic or stochastic trend. In fact, you can use the following approaches: Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS). In our analysis we focus more precisely on the approach of Augmented Dickey-Fuller (ADF).

Indeed, the DFA test is applied and the results are shown in Table 2 in Appendix 2. The results indicate that the series in first difference D (LDCF), D (LC), D (LM3), D (LINF), D (LOUV) are stationary and integrated of order 1 (I(1)). Indeed, in terms of results in the first difference ADF statistic is below the critical value at the 1%, 5% and 10%.

4.2. Co-Integration Test
The co-integration test is used to establish the long-term equilibrium relationship between the variables. In our study, we will proceed to test Johansen (1988, 1991). This test provides a multivariate approach based on the method of maximum likelihood. This approach is used to check the co-integration different sets by rank test for co-integration. The results appear in Table 3 in Appendix 2.

According to our results, the null hypothesis for the trace test and the test for the maximum eigenvalue is rejected at 5%. This follows from the fact that the calculated values for the two statistics, namely 69.83 for trace statistical and 33.87 for maximum eigenvalue statistics is greater than the critical values at the 5% (respectively 69.81 and 24.51).

Indeed, these two tests conclude that there is one co-integrating relationship. We can conclude the existence of long run relationship between financial development and poverty, which is consistent with the results obtained by Uddin.GS, Kyophilavong. P Sydee.N(2012). Moreover, the justification for the co-integration relationship justifies the adoption of an error correction model.

Through their study, Uddin.G.S, Kyophilavong. P Sydee. N (2012) concluded that there is a long run relationship between banking sector development and poverty reduction. They were surprised that the poverty reduction appears to be a long-term variable leading to the explanation of financial development. They led to the idea that policymakers can influence poverty reduction by promoting financial development in the long run. And improve access to financial services and credit to the poorest people.

4.3. Error Correction Model
The error correction model allows to distinguish between long-term and short-term relationship. Alternatively, one can distinguish the vector of co-integration, that is to say the long-term relationship and coefficients of adjustment or short-term equations. Note that the dependent variable is LDCF. Each independent variable has three numbers: the first corresponds to the coefficient of the variable that is associ-
ated with the second parenthesis is presented Student’s t, and the last is the p-value. Indeed, non-stationary series, particularly that have a unit root, must be represented in the form of error correction model if they are co-integrated, that is to say if there is a stationary linear combination between them. The estimation of the vector error correction model requires the determination of the long-term relationship or the relationship of co integration by standardizing the variable LDCF:

\[ LDCF = 0.805 + 1.116 \text{LC} - 0.368 \text{LM3} + 0.078 \text{LINF} + 0.027 \text{LOUV} \]

According to this relationship, long run, LDCF, LC, LINF and LOUV go together since their coefficients are positive. An increase of 1% of LC, LINF and LOUV, LDCF leads to an increase of 1.116%, 0.078% and respectively LC, LINF and LOUV, while LM3 are a negative sign. A 1% decrease in LM3 resulted in a decreased of % LDCF.

The estimated error correction model is given in Table 4 in Appendix 2. We note that in the short term the DCF depends on its lagged one period to the 5% level, LC lagged one period to the 10% level, LM3 lagged one period to the 5% level, LINF lagged one period at the 5% and LOUV lagged one period to the 10% level. According to table 4, the setting of the error correction term is negative and significant, confirming the existence of long run relationship between LDCF, LC, LM3, LINF and LOUV. Indeed, in case of short run disequilibrium, the value of this parameter indicates that the LDCF seems slower to return to its equilibrium path. To deepen our analysis, the Wald test which has shown the existence of short run relationship between the variables is used.

The quality of the estimation of this model looks good in terms of the Fisher statistic and the coefficient of determination \(R^2 = 0.729\) and F-statistic = 4.61. According to the Breuschi-Godfrey test (Table 5, Appendix 2), we note that the likelihood Chi-square is equal to 0.1208 = 12.08% > 5%. In this case we reject \(H_0\) and conclude that the variables are not correlated. Heteroskedasticity test for the Breusch-Pagan-Godfrey (Table 6, Appendix 2), we note that the probability of Chi-square is equal to 0.2113 = 21.13% > 5%. In this case we reject \(H_0\), and we conclude that there is no heteroscedasticity. Finally, through the test of normality of residuals (Table 7, Appendix 2), we note that P-value of Jarque-Bera equal to 0.36 > 0.05. So we conclude that the residues of the error correction model are normally distributed. As these results, we can conclude that our model is a good model.

4.4. Granger causality test

The relationship between financial development and poverty is not analyzed in the different studies. However, the direction of causality remains a controversial topic. Indeed, the existence of co-integration relationship between the different variables
induces the existence of a causal relationship between these variables at least one direction. At this level, we will use the test causality Granger based on the vector error correction model. The results are presented in (Table 8, Appendix 2).

The Granger causality test reveals the existence of a unidirectional causality LM3 to LDCF; this result is consistent with the work of Pradhan.R (2010) and therefore supports the idea that financial development is pro-poor. We also found a causal LM3 to LC. However, we note that there is no causality between LDCF and indicators of financial development, which is also consistent with the work Pradhan.R (2010). There is also the existence of unidirectional causality LOUV to LC and LM3 to LOUV.

5. Conclusion

The purpose of this paper is to study the causal long and short term in Tunisia for the period 1970-2012. The estimation results show the existence of an error correction mechanism that allows catching up to equilibrium. Indeed, long run imbalances between different variables are compensated, so that the series have similar trends. This result is consistent with that of UddinG, Kyophilavong.P and Sydee.N (2012), which states the existence of a long-term relationship between financial development (presented in our model by the LM3 and LC indicators) and poverty (presented by LDCF). Note that financial development is conducive to poverty reduction. And there is a unidirectional causality relationship between financial development and poverty reduction thereby encouraging financial development through improved access to financial services and credit to the poor. In addition, the opening introduced variable in our model, can benefit from better access to goods and services to the poor. While inflation appears with a negative sign and deteriorate a situation of the poor.

References


Appendix 1

Table 1 Descriptive statistics

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LDCF</td>
<td>Household final consumption expenditure, etc. (% of GDP)</td>
<td>World Development Indicators (WDI)</td>
<td>4.17</td>
<td>4.22</td>
<td>4.12</td>
<td>0.03</td>
<td>4.05</td>
<td>4.22</td>
</tr>
<tr>
<td>LC</td>
<td>Domestic credit to private sector (% of GDP)</td>
<td></td>
<td>3.57</td>
<td>4.32</td>
<td>4.02</td>
<td>0.21</td>
<td>3.51</td>
<td>4.33</td>
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<tr>
<td>LM3</td>
<td>Liquid liabilities (M3) as % of GDP</td>
<td></td>
<td>3.53</td>
<td>4.23</td>
<td>3.92</td>
<td>0.17</td>
<td>3.53</td>
<td>4.25</td>
</tr>
<tr>
<td>LINF</td>
<td>Inflation, consumer prices (annual %)</td>
<td></td>
<td>2.18</td>
<td>1.80</td>
<td>1.72</td>
<td>0.46</td>
<td>0.68</td>
<td>2.18</td>
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<tr>
<td>LOUV</td>
<td>Trade (% of GDP)</td>
<td></td>
<td>3.84</td>
<td>4.63</td>
<td>4.39</td>
<td>0.21</td>
<td>3.84</td>
<td>4.74</td>
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Appendix 2

Table 2 Stationarity Test Summary for Tunisia

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<tr>
<th>Variables</th>
<th>Level (none)</th>
<th>First difference (none)</th>
<th>Order of integration</th>
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<tr>
<td></td>
<td>Test ADF 1% 5% 10%</td>
<td>Test ADF 1% 5% 10%</td>
<td></td>
</tr>
<tr>
<td>LDCF</td>
<td>0.889 -2.618 -1.948 -1.612</td>
<td>-2.619</td>
<td>-1.948</td>
</tr>
<tr>
<td>LC</td>
<td>1.336 -2.618 -1.948 -1.612</td>
<td>-2.619</td>
<td>-1.948</td>
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<tr>
<td>LM3</td>
<td>2.712 -2.618 -1.948 -1.612</td>
<td>-2.619</td>
<td>-1.948</td>
</tr>
<tr>
<td>LINF</td>
<td>-0.714 -2.618 -1.948 -1.612</td>
<td>-12.188</td>
<td>-2.619</td>
</tr>
<tr>
<td>LOUV</td>
<td>1.366 -2.618 -1.948 -1.612</td>
<td>-5.876</td>
<td>-2.619</td>
</tr>
</tbody>
</table>

Table 3 Johansen cointegration test

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Trace Statistic</th>
<th>0.05 Critical Value</th>
<th>Hypothesized No. of CE(s)</th>
<th>Max-Eigen Statistic</th>
<th>0.05 Critical Value</th>
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<tbody>
<tr>
<td>None *</td>
<td>69.83</td>
<td>69.81</td>
<td>None *</td>
<td>33.87</td>
<td>24.51</td>
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<tr>
<td>At most 1</td>
<td>45.32</td>
<td>47.85</td>
<td>At most 1</td>
<td>21.41</td>
<td>27.58</td>
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<tr>
<td>At most 2</td>
<td>23.90</td>
<td>29.79</td>
<td>At most 2</td>
<td>14.16</td>
<td>21.13</td>
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Table 4 Error Correction Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\Delta LDCF_{t-1}$</th>
<th>$\Delta LC_{t-1}$</th>
<th>$\Delta LM3_{t-1}$</th>
<th>$\Delta LINF_{t-1}$</th>
<th>$\Delta LOUV_{t-1}$</th>
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<td>$\epsilon_{t-1}$</td>
<td>-0.074***</td>
<td>0.171</td>
<td>0.064</td>
<td>0.083</td>
<td>0.260</td>
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<td></td>
<td>[-5.18]</td>
<td>[2.617]</td>
<td>[1.206]</td>
<td>[0.287]</td>
<td>[2.466]</td>
</tr>
<tr>
<td>$\Delta LDCF_{t-1}$</td>
<td>-0.247**</td>
<td>-0.929</td>
<td>-0.093</td>
<td>2.646</td>
<td>0.328</td>
</tr>
<tr>
<td></td>
<td>[-2.41]</td>
<td>[-1.989]</td>
<td>[-2.397]</td>
<td>[2.069]</td>
<td>[0.706]</td>
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<tr>
<td>$\Delta LC_{t-1}$</td>
<td>-0.033*</td>
<td>0.184</td>
<td>0.070</td>
<td>-0.676</td>
<td>-0.130</td>
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<td></td>
<td>[-2.009]</td>
<td>[1.064]</td>
<td>[0.806]</td>
<td>[-1.428]</td>
<td>[-0.756]</td>
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<tr>
<td>$\Delta LM3_{t-1}$</td>
<td>-0.094**</td>
<td>-0.299</td>
<td>-0.056</td>
<td>0.914</td>
<td>0.623</td>
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<td></td>
<td>[-2.662]</td>
<td>[-0.787]</td>
<td>[-0.295]</td>
<td>[0.878]</td>
<td>[1.645]</td>
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<tr>
<td>$\Delta LINF_{t-1}$</td>
<td>-0.025**</td>
<td>0.044</td>
<td>0.010</td>
<td>-0.663</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>[-2.795]</td>
<td>[0.720]</td>
<td>[0.345]</td>
<td>[-3.947]</td>
<td>[-0.043]</td>
</tr>
<tr>
<td>$\Delta LOUV_{t-1}$</td>
<td>0.043*</td>
<td>-0.114</td>
<td>0.117</td>
<td>0.325</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>[2.088]</td>
<td>[-0.670]</td>
<td>[1.365]</td>
<td>[0.699]</td>
<td>[-0.136]</td>
</tr>
<tr>
<td>Constante</td>
<td>-0.002***</td>
<td>0.025</td>
<td>0.013</td>
<td>-0.067</td>
<td>0.023</td>
</tr>
<tr>
<td></td>
<td>[-6.376]</td>
<td>[3.662]</td>
<td>[6.789]</td>
<td>[-1.615]</td>
<td>[1.549]</td>
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Table 5 Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>Prob. F(2,28)</th>
<th>Obs*R-squared</th>
<th>Prob. Chi-Square(2)</th>
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<tbody>
<tr>
<td>4.462.074</td>
<td>0.120</td>
<td>1.015.092</td>
<td>0.1162</td>
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Table 6 Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>Prob. F(15,26)</th>
<th>Obs*R-squared</th>
<th>Prob. Chi-Square(15)</th>
<th>Scaled explained SS</th>
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<tr>
<td>1.417.058</td>
<td>0.2113</td>
<td>1.889.176</td>
<td>0.2187</td>
<td>1.440.369</td>
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Table 7 Normality Test

![Normality Test Chart]

Table 8 Granger causality test

<table>
<thead>
<tr>
<th>Pairwise Granger Causality Tests</th>
<th>Date: 01/05/15  Time: 23:32</th>
<th>Sample: 1970 2014</th>
<th>Lags: 2</th>
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</thead>
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<tr>
<td><strong>Null Hypothesis:</strong></td>
<td><strong>Obs</strong></td>
<td><strong>F-Statistic</strong></td>
<td><strong>Prob.</strong></td>
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<tr>
<td>LC does not Granger Cause LDCF</td>
<td>43</td>
<td>2.89681</td>
<td>0.0675</td>
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<tr>
<td>LDCF does not Granger Cause LC</td>
<td>1.14512</td>
<td>0.3289</td>
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<tr>
<td>LM3 does not Granger Cause LDCF</td>
<td>43</td>
<td>7.48655</td>
<td>0.0018</td>
</tr>
<tr>
<td>LDCF does not Granger Cause LM3</td>
<td>1.27423</td>
<td>0.2913</td>
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<tr>
<td>LINF does not Granger Cause LDCF</td>
<td>43</td>
<td>0.80266</td>
<td>0.4556</td>
</tr>
<tr>
<td>LDCF does not Granger Cause LINF</td>
<td>1.41577</td>
<td>0.2553</td>
<td></td>
</tr>
<tr>
<td>LOUV does not Granger Cause LDCF</td>
<td>43</td>
<td>2.78641</td>
<td>0.0743</td>
</tr>
<tr>
<td>LDCF does not Granger Cause LOUV</td>
<td>0.87538</td>
<td>0.4249</td>
<td></td>
</tr>
<tr>
<td>LM3 does not Granger Cause LC</td>
<td>43</td>
<td>4.57974</td>
<td>0.0165</td>
</tr>
<tr>
<td>LC does not Granger Cause LM3</td>
<td>1.16590</td>
<td>0.3225</td>
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</tr>
<tr>
<td>LINF does not Granger Cause LC</td>
<td>43</td>
<td>0.18021</td>
<td>0.8358</td>
</tr>
<tr>
<td>LC does not Granger Cause LINF</td>
<td>0.35373</td>
<td>0.7044</td>
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</tr>
<tr>
<td>LOUV does not Granger Cause LC</td>
<td>43</td>
<td>6.77327</td>
<td>0.0030</td>
</tr>
<tr>
<td>LC does not Granger Cause LOUV</td>
<td>0.40049</td>
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<tr>
<td>LINF does not Granger Cause LM3</td>
<td>43</td>
<td>0.47216</td>
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<tr>
<td>LM3 does not Granger Cause LINF</td>
<td>1.99466</td>
<td>0.1501</td>
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</tr>
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<td>LOUV does not Granger Cause LM3</td>
<td>43</td>
<td>1.84813</td>
<td>0.1714</td>
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<tr>
<td>LM3 does not Granger Cause LOUV</td>
<td>4.65401</td>
<td>0.0156</td>
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</tr>
<tr>
<td>LOUV does not Granger Cause LINF</td>
<td>0.21303</td>
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<tr>
<td>LINF does not Granger Cause LOUV</td>
<td>0.75724</td>
<td>0.4759</td>
<td></td>
</tr>
</tbody>
</table>

**Series: Residuals**
**Sample: 1973 2014**
**Observations: 42**

- **Mean**: -9.08e-17
- **Median**: -0.001056
- **Maximum**: 0.058443
- **Minimum**: -0.071446
- **Std. Dev.**: 0.024701
- **Skewness**: -0.203073
- **Kurtosis**: 3.988735
- **Jarque-Bera**: 2.001175
- **Probability**: 0.387883
Testing for Unemployment Hysteresis in Selected Transition Economies

Qaiser Munir • Kok Sook Ching • Fumitaka Furuoka • Hanafiah Harvey

Abstract This study aims to examine the hysteresis hypothesis in unemployment using panel data of 11 Asian countries covering the period 1980-2012. We employ the second generation panel unit root tests recently advanced by Smith et al. (2004). These tests have an advantage as they are able to exploit the cross-section variations of the series. This study provides strong empirical evidence against the hysteresis hypothesis in unemployment for the Asian countries. Finding shows that the unemployment rates of these countries have a tendency for mean-reverting. As such, an increase in the unemployment rates is most likely only temporary. Hence, policy makers may not require short-run policies to curb the problem of rising unemployment. Instead, they may consider to pursue long-run strategies for strengthening the fundamental of the domestic labour markets. More importantly, the finding suggests that these countries will benefit from having a wider choice of fiscal and monetary policies as the polices may not result in the long-run negative impact on the unemployment rates.

Keywords Hysteresis - Unemployment rate - Panel stationarity tests Cross-sectional dependence

JEL Classification B23 - C12 - C2

Qaiser Munir (✉) • Kok Sook Ching • Fumitaka Furuoka • Hanafiah Harvey
Faculty of Business, Economics and Accountancy, Universiti Malaysia Sabah;
Faculty of Business, Economics and Accountancy, Universiti Malaysia Sabah
Asia-Europe Institute, University of Malaya, Kuala Lumpur
Pennsylvania State University, Mont Alto
e-mail: qaiser@ums.edu.my; emily@ums.edu.my; fumitaka@um.edu.my; hhh10@psu.edu
Introduction

The hysteresis hypothesis in unemployment is considerable important to policy makers and thus it has attracted much attention from researchers. Based on the theory, if unemployment is I(1) process, shock that affects a series will have a permanent effect. As such, it will shift the unemployment equilibrium from one level to another. Should this be the case, from the standpoint of policy makers, policy action is indeed necessary so as to return unemployment to its previous equilibrium level. On the other hand, if unemployment is I(0) process, the effect of shock is merely transitory. As a result, the need for policy action is less mandatory. This is because unemployment will eventually return to its previous equilibrium level. Literature refers the second case as the natural rate of unemployment hypothesis (NAIRU). In which, it characterizes unemployment dynamics as a mean reversion process.

In their early works, Phelps (1967) and Friedman (1968) claim that unemployment should converge to a natural rate in the long-run, often referred to as the natural rate hypothesis. If this hypothesis correctly describes the time series properties of unemployment rates, deviations from the natural rate are short-lived and will die out eventually. Blanchard and Summers (1987), however, argue that the movement of unemployment has a characteristic of hysteresis, implying that economic shocks will have a permanent effect on unemployment rates. These two competing hypotheses are empirically testable by employing conventional unit root tests on unemployment rates. The evidence of a unit root will be supportive for the hysteresis hypothesis. While rejecting a unit root serves as the evidence for the natural rate hypothesis. In the context of Asian countries, presently, there is no clear consensus on whether these countries’ unemployment rates are characterized by NAIRU or exhibiting hysteresis in unemployment. This is mainly due to only handful of past studies have focused on the Asian countries. As a comparison, the literature of the OECD countries is plentiful.

The objective of this study is to empirically investigate the nature of 11 selected Asian countries’ unemployment rates, by incorporating the most recent data and allowing for cross-section dependence among these Asian countries. The time span (1980-2012) is not so long that the univariate unit root tests might suffer from low power in this case. However, the panel unit root test used here may alleviate this shortcoming. Based on the cross sectional dependence (CD) test proposed by Pesaran (2007), we find strong evidence of cross-section dependence and motivation for the use of second generation panel unit root tests. Contrary to the many previous studies, we utilize the second generation panel unit root tests proposed by Smith et al. (2004). By using these panel unit root tests, we find strong support against the hysteresis hypothesis in unemployment for the selected Asian Countries.
The remainder of this paper is organized as follows. Next section is literature review. The third section is the discussion of econometric methodology and unit root tests applied. The data and empirical results are presented in the fourth section. Last section concludes.

**Literature Review**

As hysteresis is associated with nonstationary unemployment rates, unit root tests have been widely used in the literature to empirically investigate its validity (Blanchard and Summers 1986; Brunello 1990; Mitchell 1993; Arestis and Mariscal 2000; Roed 1996). Although these studies seem to support a unit root in unemployment rates and therefore hysteresis, critics of the hysteresis theory counterclaim that earlier empirical support may have been a result of the lower power of the conventional unit root tests employed. In line with this, recent studies have, in fact, find that conventional unit root tests not only have failed to consider information across regions, thereby leading to a loss in efficiency in the estimations, but also have low power against near unit root but stationary alternatives. These factors obviously cast considerable doubt on the many findings from earlier studies of a unit root in unemployment rates.

In recent years, a number of alternative procedures have been proposed to test for the presence of unit roots in panels that combine information from the time-series dimension with that from the cross-section dimension, such that fewer time observations are required for these tests to have power. The most commonly used unit root tests applied to panels include Maddala and Wu (MW) (1999) and Im, Pesaran and Shin (IPS, 2003). These tests are used for testing the joint null hypothesis of a unit root against the alternative of at least one stationary series, by using the augmented Dickey–Fuller (ADF) (1979) statistic across the cross-sectional units of the panel. Song and Wu (1997) use a panel unit test by Levin and Lin (1992) which the result rejects unit root of unemployment rates in 48 US states while fails to reject it for most of the individual states. Later on Song and Wu (1998) apply the Levin and Lin (1992) test to unemployment series of 11 EU countries and find no evidence of hysteresis. A recent study that employs panel data methods is León-Ledesma (2002). This study has confirmed hysteresis for 11 EU countries and the natural rate for 51 US states using the IPS test. It should, however, be noted that IPS (2003, p.73) warns that due to the heterogeneous nature of the alternative hypothesis in their test, one needs to be careful when interpreting the results, because the null hypothesis that there is a unit root in each cross section may be rejected when only a fraction of the series in the panel is stationary. A further issue of concern is that the presence of cross-sectional dependencies in the data generating process. Phillips and Sul (2003) point out that panel unit root tests
that do not allow for cross-section dependence are over-sized when the true data generating process contains substantial cross-section dependence. To some extent, these concerns are addressed by Camarero and Tamarit (2004) and Chang et al. (2005) who conduct ADF unit root tests within a seemingly unrelated regression framework. Camarero and Tamarit (2004) have rejected the hysteresis effects in 12 of 19 OECD countries, while Chang et al. (2005) have confirmed the hysteresis hypothesis for 8 of 12 European countries.

Another group of studies are based on panel unit root tests (with and without structural breaks), which try to exploit the cross-sectional variation of the series. The most commonly used panel unit root tests for the case of no breaks are the tests of Levin et al. (2002) and Im et al. (2003); and in the case of breaks the test of Im et al. (2005) that allows for up to two mean shifts. For instance, Song and Wu (1997, 1998) analyze 48 US states and 15 OECD countries, respectively. Both works find strong evidence against the hysteresis hypothesis. León-Ledesma (2002) has detected a higher degree of persistence in the EU than in the US. The author uses data up to 1999 and applies the Im et al. (2003) test. Camarero and Tamarit (2004) apply a panel SURADF unit root test to study 19 OECD countries and find evidence in favor of NAIRU hypothesis in most of these countries. On the other hand, Chang et al. (2005) apply the same test in 10 European countries and have confirmed the hysteresis hypothesis for 80% of the sample. In the case of breaks, Murray and Papell (2000) employ the test of Levin et al. (2002), which is extended to allow for a homogeneous break in the unemployment mean, to annual data of 17 OECD countries over the period 1955-1990; this test has strongly rejected the joint null hypothesis of hysteresis. Lee et al. (2001) use a panel LM unit root test with structural changes to analyze the unemployment in 17 OECD countries. They have strongly rejected the unemployment hysteresis hypothesis. Camarero et al. (2006) allow for a different number of endogenous break points in the unemployment series, as they examine the hysteresis hypothesis in unemployment rates by using panel data for 19 OECD countries covering the period 1956–2001. The finding gives support to the natural rate hypothesis of unemployment for majority of the countries analyzed. In the path, Camarero et al. (2008) offer similar detections for transition countries. Lee H-Y et al. (2009) apply the structural break panel unit root test of Im et al. (2005) to unemployment rates from nine Asian countries. The test allows for one or two endogenously determined structural break(s). Although the results are mixed, for the whole sample they have rejected the unit root hypothesis of unemployment rates, however, after excluding few stationary series from analysis they mostly could not reject the unit root hypothesis and hysteresis.

Recently, empirical studies have stressed on considering the possible cross-sectional dependence in the series. Lee (2010) applies the methodology of nonlinear panel unit root tests to test for the hysteresis of unemployment in 29 OECD countries,
and takes into account both nonlinearity and cross-sectional dependence. The data used are until 2008 and with different beginning dates due to the availability of data. A nonlinear panel unit root test developed by Ucar and Omay (2009) is employed for testing the hypotheses of nonlinearity and nonstationarity of the series. This study uses the bootstrap procedure proposed by Ucar and Omay (2009) to resolve the problem on the possible biased towards rejection of unit root null due to cross-sectional dependence. In addition, a sequential panel selection method suggested by Chortareas and Kapetanios (2009) is utilized to identify and separate the stationary series from the nonstationary series. The author points out that the major weakness of panel unit root tests is unit root is a joint hypothesis for all series in the panel. In which, the null hypothesis may be rejected even though only one series is stationary. The finding of this study is in favour of the natural rate of unemployment for 23 of 29 OECD countries. Evidence of hysteresis is found in Greece, Iceland, Ireland, Japan, Luxembourg, and Norway. This finding seems to be inconsistent with Chang (2002). The latter provides evidence of no hysteresis in 17 of 29 OECD. The countries associated with hysteresis are Australia, Czech Republic, France, Hungary, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Sweden, and the United Kingdom.

Ener and Arica (2011) examine the hysteresis hypothesis in 15 OECD countries over the period 1985-2004. They employ a panel unit root test that allows for cross-sectional dependency and a panel unit root test with structural breaks. The finding from the panel root test with cross-sectional dependency indicates that the unemployment rates in these OECD countries can be described as a non-stationary process. However, the finding from the test with structural break suggests that the unemployment time series can be seen as a stationary process.

Cuestas et al. (2011) examine mean reversion in the unemployment rates of European transition economies. A sophisticated econometric analysis carried out in the study has failed to reject the null hypothesis of a unit root. Ayala et al. (2012) use a unit root test with one structural break and a unit root test with two structural breaks to examine the unemployment hysteresis in 18 countries in Latin America for the period of 1980-2009. They point out that the unemployment rates in these countries can be described as stationary process when structural breaks are taken into account for analysis.

More recently, a few studies have demonstrated the usefulness of Fourier function to deal with the structural breaks in the series. Chang (2011) applies the stationary test with a Fourier function proposed by Becker et al. (2006) for testing the hysteresis hypothesis in 17 OECD countries. Data used are spanning from 1960 to 2009. This method is thought able to incorporate the structural breaks in the series while testing for the unit root null hypothesis. The results from traditional unit root tests, ADF, PP and KPSS do not reject the unit root process for these countries.
Distinctively, by using the method with Fourier function, the results reject the unit root process for six OECD countries including Australia, Canada, Finland, France, Sweden, and the United States.

Cheng et al. (2014) utilize a flexible Fourier unit root test proposed by Enders and Lee (2012) to examine the hysteresis hypothesis in unemployment for the PIIGS countries, namely Greece, Ireland, Italy, Portugal, and Spain over the period of 1960-2011. The Fourier unit root test is found to have greater power than the conventional unit root tests of ADF, PP and KPSS, when the series are stationary and nonlinear process with an unknown form of structural change. Results from ADF and PP do not reject the nonstationary null hypothesis for all these countries. By using KPSS, mixed results are produced. When a trend term is not used, the result does not reject the null of stationary for Ireland. When a trend term is used, the result does not reject stationary for Portugal. In sum, the traditional unit root tests find evidence of hysteresis for the PIIGS countries. Nevertheless, the method of Fourier unit root test confirms hysteresis only in Greece, Ireland, and Italy. This finding seems to be inconsistent with the belief that European countries tend to have a greater extent of unemployment hysteresis as a result of the role of specific market institution such as union.

Clearly, majority of the empirical inquiries focus on the developed countries in Western Europe and North America. Two notable exceptions are the studies by Lee et al. (2010) and Furuoka (2012) that examine the hysteresis in unemployment in the context of Asia-Pacific region. Lee et al. (2010) use the Lagrange Multiplier (LM) unit root test and the panel unit root test that takes account of structural breaks. The result fails to reject the null hypothesis of hysteresis even after incorporating the structural breaks in the series. Furthermore, Furuoka (2012) uses the MADF test and the SURADF test to analyze unemployment hysteresis in 12 Asia-Pacific countries. The empirical result confirms the presence of unemployment hysteresis, except for South Korea and New Zealand. The result of Furuoka’s study also indicates that equilibrium rate of unemployment in Asia-Pacific region tends to be path-dependent and the cyclical fluctuations in these economies could have a permanent effect on the level of unemployment.

Indeed, there is only handful of past studies which have focused on the Asian countries. This study is motivated to add to the literature with new empirical evidence on these countries. Thus, the contribution of this study is empirically investigating the nature of 11 selected Asian countries’ unemployment rates, by incorporating the most recent data and allowing for cross-section dependence among these countries.
Econometric Methodology

Panel Unit root tests with Cross-sectional dependence

Recently, Smith et al. (2004) have developed more powerful variants of some commonly used panel unit root tests, thereby allowing for general forms of cross-sectional dependence through bootstrap methods. The first two tests are the standard $t$-bar statistic ($\Psi_t$) and the Lagrange Multiplier (LM) panel statistic ($\Psi_{LM}$) of IPS. Smith et al. (2004) consider a panel specification of the form:

$$\Delta_{it} y_{it} = \mu_{it} + \phi_i \Delta_{it-1} y_{it-1} + \theta_i \Delta_{it-1} \Delta_{it-2} y_{it-2} + \kappa_i \Delta_{it-1} \Delta_{it-2} \Delta_{it-3} y_{it-3} + \epsilon_{it}$$

Where $p_i$ is the required degree of lag augmentation to make the residuals white noise, $\alpha_i$ represents the country-specific fixed effects, and $i = 1, \ldots, N$ and $t = 1, \ldots, T$ stand for the number of panel members and time periods, respectively. To achieve the most parsimonious model compatible with white noise residuals, $p_i$ is determined by the conventional step-down procedure.

The $t$-bar statistic is computed as an average of individual $t$-statistics from ADF specifications, i.e. $\tilde{t}_{NT} = N^{-1} \sum_{i=1}^{N} t_i$. The standardized statistics is given as following:

$$\Psi_t = \frac{\sqrt{N} (\tilde{t}_{NT} - E(t_i))}{\sqrt{\text{var}(t_i)}}$$

Where $E(t_i)$ and $\text{var}(t_i)$ are the expected value of the mean and variance, respectively. IPS also provided the Lagrange Multiplier (LM) test statistic, which after normalisation takes the following form:

$$\Psi_{LM} = \frac{\sqrt{N} (LM_{NT} - E(LM_i))}{\sqrt{\text{var}(LM_i)}}$$

Where $LM_i$ is the individual LM test and $LM_{NT} = N^{-1} \sum_{i=1}^{N} LM_i$. Smith et al. (2004) also develop panel versions of some powerful modifications of univariate ADF t-statistics such as the Max test (Maxi) of Leybourne (1995) and the weighted symmetric (WS) test of Pantula et al. (1994). Leybourne (1995) proposes to obtain the ADF t-statistic from original data ($DFf_i$), and from time-reversed data ($z_{iT} = y_i, T+1-t$) yielding $DFr_i$. The Max t-statistic for individual $i$ is obtained as $\text{Maxi} = \text{Max}(DFf_i, DFr_i)$. In a panel framework, the panel Max t-statistic takes the form:
\[ \psi_{\text{Max}} = \frac{\sqrt{N} (\text{Max}_{NT} - E(\text{Max}_i))}{\sqrt{\text{var}(\text{Max}_i)}} \]

Where \( \text{Max}_{NT} = N^{-1} \sum_{t=1}^{N} \text{Max}_i \). Likewise, individual WS tests are computed as in Pantula et al. (1994), and the panel counterpart is given by:

\[ \psi_{\text{WS}} = \frac{\sqrt{N} (\text{WS}_{NT} - E(\text{WS}_i))}{\sqrt{\text{var}(\text{WS}_i)}} \]

Where \( \text{WS}_{NT} = N^{-1} \sum_{t=1}^{N} \text{WS}_i \). Finally, Smith et al. (2004) present a more powerful variant of the Lagrange Multiplier (LM) statistic on the basis of forward and reverse ADF regressions which yield the univariate \( LM_{fi} \) and \( LM_{ri} \). Since both statistics take a positive value, the minimum LM statistic is computed as \( \text{Min} = \text{Min}(LM_{fi}, LM_{ri}) \). The panel version of the test is as follows:

\[ \psi_{\text{Min}} = \frac{\sqrt{N} (\text{Min}_{NT} - E(\text{Min}_i))}{\sqrt{\text{var}(\text{Min}_i)}} \]

Where \( \text{Min}_{NT} = N^{-1} \sum_{t=1}^{N} \text{Min}_i \). Given that these tests assume both cross-sectional independence and asymptotic normality, Smith et al. (2004) have developed a modified bootstrap procedure to compute \( p \)-values that are robust to small-sample bias and to general forms of cross-sectional dependencies across panel members\(^1\).

**Data and Empirical Results**

To perform our tests, we employ the annual data on unemployment rates from 11 Asian countries over the period 1980-2012. The countries are China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Pakistan, Philippines, Singapore, Taiwan and Thailand. The remaining Asian countries are excluded from our sample because there is not enough unemployment data. Our dataset comes mainly from International Labour Organization (ILO), World Development Indicators (WDI), and various government statistics publications. Figure 1 depicts the historical trend of the unemployment rate of the selected Asian countries.

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\(^1\) See Smith et al. (2004, pp. 165–166) for details on the bootstrap procedure that generates bootstrap innovations through resampling using a block size of 30 and 20,000 replications.


**Conventional Univariate Tests**

As a benchmark, we first apply several conventional unit root tests such as Dickey and Fuller (ADF, 1979), Phillips and Perron (PP, 1988) and Kwiatkowski et al. (KPSS, 1992) to examine the null hypothesis of a unit root in the unemployment rate of each country. Table 1 summarizes the results of hysteresis hypothesis testing based on conventional unit root tests. We include a time trend and intercept in the model and use the Schwartz Information Criterion to select the optimal lag length for ADF test. The bandwidth is selected automatically using the Newey and West (1994) method for PP and KPSS tests. Our main finding from ADF and PP (which tests the null hypothesis of non-stationarity) can be summarized as follows. We are able to reject the unit root null hypothesis only for China, South Korea and Thailand at the 5% or below level of significance. For the remaining countries in our sample, we are unable to reject the null hypothesis of unit root based on the ADF and PP tests. This implies that for 72% of the countries in our sample, the ADF and PP
tests suggest that unemployment series are non-stationary. Turning to the KPSS test, we are able to reject the null hypothesis of stationarity for China, Pakistan and Philippines at the 5% level of significance. However, for 8 countries, namely Hong Kong, Japan, South Korea, Malaysia, Pakistan, Singapore, Taiwan and Thailand we are unable to reject the null of stationarity.

Taken together, the results from the univariate unit root tests suggest that hysteresis in unemployment hypothesis is supported by 6 of 11 Asian countries under study. On the contrary, the hysteresis in unemployment hypothesis can be rejected for China, Korea, Pakistan, Philippines and Thailand. As rejection of the hypothesis implies evidence in favor of the natural rate hypothesis, this finding suggests that unemployment in these 5 Asian countries is flexible enough to easily revert to its long-run equilibrium determined by the domestic labour markets.

### Table 1 Unit root tests without a break

<table>
<thead>
<tr>
<th>Country</th>
<th>ADF t-stat</th>
<th>LL</th>
<th>PP t-stat</th>
<th>Band-width</th>
<th>KPSS t-stat</th>
<th>Band-width</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td><strong>-6.744</strong></td>
<td>1</td>
<td><strong>-6.071</strong></td>
<td>11</td>
<td><strong>0.147</strong></td>
<td>3</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>-2.219</td>
<td>3</td>
<td>-1.838</td>
<td>1</td>
<td>0.099</td>
<td>4</td>
</tr>
<tr>
<td>Indonesia</td>
<td>-1.218</td>
<td>0</td>
<td>-1.436</td>
<td>3</td>
<td>0.097</td>
<td>4</td>
</tr>
<tr>
<td>Japan</td>
<td>-2.265</td>
<td>1</td>
<td>-1.631</td>
<td>1</td>
<td>0.085</td>
<td>4</td>
</tr>
<tr>
<td>South Korea</td>
<td><strong>-3.591</strong></td>
<td>1</td>
<td>2.598</td>
<td>6</td>
<td>0.098</td>
<td>2</td>
</tr>
<tr>
<td>Malaysia</td>
<td>-2.222</td>
<td>4</td>
<td>-1.931</td>
<td>3</td>
<td>0.095</td>
<td>4</td>
</tr>
<tr>
<td>Pakistan</td>
<td>-1.549</td>
<td>0</td>
<td>-1.579</td>
<td>1</td>
<td><strong>0.147</strong></td>
<td>4</td>
</tr>
<tr>
<td>Philippines</td>
<td>-1.873</td>
<td>0</td>
<td>-1.761</td>
<td>2</td>
<td><strong>0.152</strong></td>
<td>3</td>
</tr>
<tr>
<td>Singapore</td>
<td>-2.231</td>
<td>0</td>
<td>-2.429</td>
<td>2</td>
<td>0.077</td>
<td>3</td>
</tr>
<tr>
<td>Taiwan</td>
<td>-2.536</td>
<td>1</td>
<td>-2.186</td>
<td>2</td>
<td>0.113</td>
<td>4</td>
</tr>
<tr>
<td>Thailand</td>
<td><strong>-3.587</strong></td>
<td>0</td>
<td><strong>-3.592</strong></td>
<td>2</td>
<td>0.058</td>
<td>3</td>
</tr>
</tbody>
</table>

Notes: LL denotes the lag length. The finite sample critical values for the ADF and PP test are −3.21, −3.581 and −4.273 at the 10%, 5% and 1% levels, respectively, and are extracted from MacKinnon (1996). The finite sample critical values for the KPSS test are 0.119, 0.146 and 0.216 at the 10%, 5% and 1% levels, respectively, and are extracted from Kwiatkowski et al (KPSS, 1992). * and ** denote statistical significance at the 1% and 5% levels, respectively.

**First Generation Panel Unit Root Tests**

It is well known that univariate unit root tests suffer from low power if the variable is a stationary but highly persistent time series. By contrast, panel unit root tests are aimed to increase power by exploiting cross-sectional information between units. Levin, Lin and Chu (LLC, 2002), Breitung (2002), Im, Pesaran and Shin (IPS, 2003), Maddala and Wu (1999) and Choi (2001), and Hadri (1999) have developed
Testing for Unemployment Hysteresis in Selected Transition Economies

The LLC (2002), Breitung (2000), IPS (2003), and Fisher-type (Maddala and Wu, 1999) and (Choi 2001) tests have the null hypothesis that all the panels contain a unit root. The Hadri (2000) test has the null hypothesis that all the panels are stationary. The authors have demonstrated that even relatively small panels offer large improvements with respect to power. Therefore, we proceed to test the hysteresis in unemployment rates by using the panel data tests.

It is observed from Table 2 that, after incorporating country-specific effects into account, the null hypothesis of unit root (implying existence of hysteresis in unemployment) can be rejected at the 10% significant level based on the LLC (2002), IPS (2003) and at the 5% level of significance based on the Breitung (2002) unit root test. It can be concluded, based on these three tests which by incorporating cross-country variations, the unemployment series of all the 11 Asian economics are stationary. In other words, the unemployment rates of these countries as a whole is mean-reverting in the long-run and therefore there is no evidence of hysteresis in unemployment in these countries. However, from Table 2, this finding is changed when we apply the nonparametric Fisher test of Madalla and Wu (1999) and Choi (2001), which shows the evidence for the hysteresis in unemployment rates of the selected Asian countries. The null hypothesis cannot be rejected based on Maddala and Wu (1999) and Choi (2001) tests, providing the strong support the hysteresis hypothesis. This finding is cross-validated by the Hadri (2000) test. The results indicate that the null hypothesis that all of series in the panel are stationary is clearly rejected (the test statistic is 2.964; p-value 0.001). These contradicting results from the first generation panel unit root tests are due to negligence of accounting for cross-sectional dependence.

**Table 2** The first generation panel unit root tests

<table>
<thead>
<tr>
<th>Test statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLC (2002)</td>
<td>-1.506</td>
</tr>
<tr>
<td>IPS (2003)</td>
<td>-1.599</td>
</tr>
<tr>
<td>Breitung (2002)</td>
<td>-2.246</td>
</tr>
<tr>
<td>Maddala and Wu (1999)</td>
<td>28.056</td>
</tr>
<tr>
<td>Choi (2001)</td>
<td>-0.798</td>
</tr>
<tr>
<td>Hadri Z-stat (2000)</td>
<td>2.964</td>
</tr>
</tbody>
</table>

Notes: *, **, *** denotes rejection of null at the 1, 5 and 10% level.

Testing for Cross-Section Independence

So far, the presentation of the panel statistics has assumed that individuals are cross-section independent. However, this assumption might be restrictive in practice since the analysis of macroeconomic time series for different countries are affected by similar major events that might introduce dependence among individuals in
the panel data set. A number of panel unit root tests allowing for cross section dependence have been proposed in the literature. In this paper, we account for cross-section dependence by using Moon and Perron (2004), chang (2002), (Choi, 2006), and Pesaran (2007) panel unit root tests. Since traditional panel unit root tests which are derived under the assumption of cross-sectional independence are well known to be subjected to large size distortions (O’Connell 1999; Maddala and Wu 1999), we need to test whether this assumption holds in practice. In order to test the cross-section dependence among the individuals, we use the CD statistic of Pesaran (2004).

Pesaran (2004) presents a test statistic based on the average of pair-wise Pearson’s correlation coefficients $\hat{p}_{ij}$, $j = 1, 2, ..., n$, $n = N (N - 1) / 2$, of the residuals obtained from ADF-type regression equations. The CD statistic in Pesaran (2004) is given by:

$$CD = \sqrt{\frac{2T}{N(N-1)} \left( \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{p}_{ij} \right)}$$

Pesaran’s CD statistic tests the null hypothesis of cross-section independence against the alternative of dependence.

For each country we compute the residuals from ADF regressions whose optimal lag-order is determined using the general-to-specific procedure suggested by Ng and Perron (1995) with a maximum lag order of eight. Since the CD statistic takes on a value of 10.5, we are able to strongly reject the null hypothesis that output innovations are cross-sectionally independent at the 1% level. This result is plausible and reflects the high degree of cross-sectional dependence induced by trade links, international capital movements and common shocks hitting the sample of Asian countries under scrutiny.

<table>
<thead>
<tr>
<th>Average (Pi, j)</th>
<th>CD Statistics</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.444</td>
<td>10.5</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Note: CD denotes Pesaran’s (2007) test statistic with the null hypothesis of cross-section independence

**Second Generation Panel Unit Root Tests**

We now proceed to report the results from the application of a battery of recently developed panel stationarity tests of Smith et al. (2004) which explicitly control for cross-sectional correlation. To account for cross-sectional dependence, we apply bootstrap methods to obtain the critical values of the panel statistics of Smith et
al. (2004). The first two tests are the standard $t$-bar statistic ($Ψ_t$) and the Lagrange Multiplier (LM) panel statistic ($Ψ_{LM}$) of IPS. They also develop panel versions of some powerful modifications of univariate ADF $t$-statistics such as the Max $t$-statistic and the Min LM-statistic, which are both based on forward and reverse ADF regressions, as well as the weighted symmetric (WS) test. These panel statistics are denoted by $Ψ_{Max}$, $Ψ_{Min}$ and $Ψ_{WS}$. All the five tests take as null a unit root in all individuals versus the alternative of stationarity for at least one individual panel member. The $p$-values of the five tests are computed employing 20,000 bootstrap replications in order to control for general forms of cross-sectional dependence as well as for finite-sample bias. We define a block size equal to 30 and a maximum lag-order for whitening the residuals equal to eight.\textsuperscript{2}

The results from the computation of these more powerful panel unit root tests are reported in Table 4 below. The evidence provided by the bootstrap version of the five panel unit root $t$-statistics do not support the presence of a unit root in unemployment rates of the selected Asian countries as they all reject the null of nonstationarity at the 10% or below significance level. This finding provides the evidence against the hysteresis hypothesis.

Taken together, contradicting to conventional panel unit root test, the results from second generation panel unit root tests suggest that the unemployment rates of these economies are stationary. This leads to the conclusion that the unemployment rates as a whole is mean-reverting in the long-run and therefore there is no evidence of hysteresis in unemployment for these countries.

<table>
<thead>
<tr>
<th>Test</th>
<th>statistics</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Ψ$</td>
<td>-1.932</td>
<td>0.081</td>
</tr>
<tr>
<td>$Ψ_{Max}$</td>
<td>-1.514</td>
<td>0.036</td>
</tr>
<tr>
<td>$Ψ_{LM}$</td>
<td>7.444</td>
<td>0.015</td>
</tr>
<tr>
<td>$Ψ_{Min}$</td>
<td>3.133</td>
<td>0.054</td>
</tr>
<tr>
<td>$Ψ_{WS}$</td>
<td>-1.832</td>
<td>0.018</td>
</tr>
</tbody>
</table>

Notes: $p$-values for all panel unit root tests are computed employing 20000 bootstrap replications and defining a block size equal to 30. The maximum lag order is set at eight. A general-to-specific procedure has been used to select the optimal lag-length.

Overall, our empirical results provide significant support for unemployment rate stationarity among 11 Asian countries. The finding is in sharp contrast with those reported previously based on univariate and traditional panel unit root tests where the null is not rejected in all cases. The latter is such as Lee et al. (2010) in the

\textsuperscript{2} The results remain unchanged for a block size equal to 100 and other maximum lag-orders different from eight.
context of Asia-Pacific region. Further, this highlights the importance of allowing for contemporaneous correlation in the panel setting demonstrating the gain in power after controlling for cross sectional dependence. By comparing our finding with those reported by other researchers for the Asian countries (i.e. Lee et al., 2010; Furuoka, 2012) we see that all these studies have led support to the contention that the unemployment hysteresis hypothesis is accepted which is in contrast with what the present study claims.

This study adds new evidence to the existing literature of the natural rate of unemployment which has been postulated by Song and Wu (1997) for 48 US states, Song and Wu (1998) for 11 EU countries, Song and Wu (1998) for 15 OECD countries, Lee et al. (2001) and Murray and Papell (2002) which both give strong evidences on 17 OECD countries under their studies, Chang (2002) for majority of 29 OECD countries, Camarero and Tamarit (2004) for majority of 19 OECD countries, Camarero et al. (2006) for majority of 19 OECD countries, Camarero et al. (2008) for selected transition economies, Lee (2010) for majority of 29 OECD countries, and Ayala et al. (2012) for 18 Latin America countries. In a contrast, this study’s finding which is against the hysteresis hypothesis in unemployment is inconsistent with Chang et al. (2000) for majority of 10 European countries, León-Ledesma (2002) for 11 EU countries and 51 US states, Cuestas et al. (2011) for selected European transition economies, and Chang (2011) for majority of 17 OECD countries.

Conclusion

This paper analyses the empirical validity of the hysteresis hypothesis in unemployment rates for 11 Asian countries over the period 1980-2012. To this end, we have first applied univariate unit root test namely ADF, PP, and KPSS. The fact that conventional unit root tests normally lack power has led to the development of panel unit root tests which are more powerful than their univariate counterparts. However, More recently, it has also become well known the fact that panel tests that fail to allow for cross-sectional correlation are subject to severe size distortions. In order to test the cross-sectional dependence in the data, we have applied the CD statistic of Pesaran (2004) to unemployment innovations, rendering strong evidence of cross-sectional dependence in the error structure of our panel of countries. Lastly, we have accounted for this fact by employing a battery of panel unit root tests of Smith et al. (2004) that explicitly allow for cross-sectional dependence across countries. In contrast to the existing literature for Asian countries, we find support for the view that unemployment rates appear stationary in the long run after allowing for cross sectional dependencies. An implication of this finding is that it
provides support to the view that the unemployment rates exhibit mean reversion, and therefore appear consistent with the natural rate hypothesis.

Unemployment is a major source of concern among policymakers and society as a whole. Some important policy implications can be drawn from the findings of the present study. First of all, the empirical results suggest that higher-than-normal unemployment rates in Asian countries will automatically revert to a sustainable level. This indicates that policy makers in Asian countries need not to hammer out some special short-run policies to deal with the problem of high unemployment. Instead, as the findings suggest, the policy makers in Asian countries may focus on the long-run strategies that would aim at strengthening the fundamental of domestic labour markets. Among such strategies could be creating favorable conditions for and promoting Research and Development (R&D) activities by the multinational corporations (MNCs) in Asian countries.

Secondly, contractionary fiscal policies in Asian countries that would aim at achieving a low level of the budgetary deficit would not have produced a negative long-run impact on their unemployment rates due to its mean-reversion tendency. In other words, the policy makers of Asian countries for fiscal policy would have a wider choice of policy options to fulfill their policy targets.

Finally, restrictive monetary policies in Asian countries that would aim at controlling the inflation rate in order to achieve their target inflation rate also would not have a prolong negative effect on the unemployment rates because of unemployment rates’ mean-reversion tendency. In this sense, the monetary authorities in Asian countries could have a wider range of options to regulate money supply in order to achieve the target inflation rate.

The present study examines the behavior of the unemployment rates in Asian countries using second generation panel unit root tests. Future studies may use longer periods of the time series data to examine the hysteresis in the region. More importantly, researchers may consider using the latest available statistical methods, such as nonlinear unit root test or fractional integration analysis, when examining the stationary process of the unemployment series data in the region. The findings of such studies would give much needed insights on the mean reversion in the unemployment in Asia.

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Implementation of Electronic Democracy in Ukraine

Iryna Harechko

Abstract: This study aims to determine the level of e-democracy’s development in Ukraine. In spite of difficult social and political situation and staying in war, information and communication technologies play a significant role in society and promote democratic governance. We have found that there are a few political mechanisms of citizens’ participation in the conditions of e-democracy, which are regulated by Ukrainian legislation, such as electronic rulemaking, e-discussion, e-appeal, and online authority’s session. These tools of e-cooperation between government and citizens provide access to constantly updated information on the activities and policy proposals of the authorities, opportunity to comment on the activity of government institutions, to assess it and to submit suggestions for improving the effectiveness of political management. However, the practice proves that the existing mechanisms of Ukrainian citizens’ e-participation do not ensure a stable and strong influence on the political process and political institutions of the country. With the beginning of Euromaidan revolution in late 2013 and till now the surge of citizens’ interest to online mechanisms of political participation and control over the authority is noted. Internet and social media have become key tools of crowdsourcing, raising funds for the army, helping the wounded and refugees from the conflict zone. They are also actively used for discussions on urgent social problems and to impact on the governmental activities.

Keywords Ukraine - Electronic democracy - Euromaidan revolution - Social networks - Volunteer platform

JEL Classification Z18 – Public Policy

Iryna Harechko (✉)
Assistant at Lviv Polytechnic National University and Ivan Franko National University of Lviv, Ukraine
e-mail: iryna_harechko@ukr.net
Information and communication technologies offer new opportunities not only for modernization, optimization and greater accountability of government, they also contribute to the democratic participation of citizens in political life. Increasingly, governments commit themselves to developing mechanisms of e-democracy, which Hagen (1996) has defined as a democratic political system, where ICT are used to perform the essential functions of the democratic process – informing, communication, articulation and aggregation of citizens’ interests, decision-making (discussion and voting for a political decision). Implementation of electronic instruments of citizens’ democratic participation is aimed at increasing the capacity of citizens, businesses and other organizations to take an active position in society through the use of new technologies and tools. An important advantage of electronic forms of participation in the development, implementation and evaluation of public policy is cheaper democratic procedures. This includes not only financial costs, but also time-consuming.

Today, Ukraine is at a critical stage of its social and political development. External threats to national sovereignty and territorial integrity to some extent pushed into the background issues and problems of internal political life, but recent events of late 2013 indicate a desire to rid Ukraine of embryonic effects of authoritarianism and take the path of democratic development. Moreover, the fact that a key role in the revolutionary social and political events have played citizens of Ukraine, proving their maturity and willingness to be engaged and actively participate in political decision-making. Beyond this, it is needed to take into account the global trends of informatization and computerization of all sectors of society, including public administration, as ICTs provide simplification and optimization of citizens’ participation in political decision-making. This also caused timeliness and relevance of the research.

For the number of Internet users Ukraine is ranked 9th in Europe. Internet audience is 18.5 million of 44.3 million total populations (Internet World Stats, 2014). With the growth of the World Wide Web users’ number in Ukrainian society there has been appeared the need for mechanisms of electronic participation. According to a survey conducted by the Razumkov Centre in September 2014, 24% of respondents said that they would like to be able to influence through online petitions on consideration of an issue by the authorities and to make proposals for governmental decisions’ projects. Another 19% expressed their interest in participating in consultations on local regional and state policy organized by the authorities on their official web pages; and 11% are willing to devote to this a few hours monthly. Approximately 3% of Internet users in Ukraine express their interest in the discussion of a projects / reports on the implementation of state and local budgets, projects / reports on the implementation of national and regional target programs, forecasting / regulatory impact analysis, draft legal acts.
Introduction in society the idea of e-democracy primarily requires adherence to the principles of democratic governance and democratic practice. Electronic democracy should carry clear benefits for democracy and society in general and in particular for citizens (Recommendation, 2009). The introduction and implementation of e-democracy’s concept starts with amending the legislation, adopting strategic documents on e-democracy and current legal acts. Ukraine’s legislation to some extent regulates the interaction between government and society with the use of ICT. However, it is declarative rather than functional because there is a lack of rigid binding mechanisms and procedures of providing the citizens with opportunities for e-participation. So, there are a few political mechanisms of citizens’ participation in the conditions of e-democracy, which are regulated by Ukrainian legislation.

**Electronic rulemaking.** Public discussion of the draft normative acts is a mandatory step in the legislative process in the system of government that ensures the participation of citizens in the process of preparing and making decisions on important issues of public and social life [2]. It ensures a transparent rulemaking of authority. Ukrainian legislation prescribed such a procedure for electronic rulemaking as follows: 1) to take account of public opinion the authorities publish on their websites draft legislation; 2) for a specified period, citizens send their proposals (comments) to the specified e-mail address; 3) after discussing authority analyzes these questions and remarks and takes them into account during the finalization of such acts; 4) authority publishes the comments and suggestions received from the public, and the discussion on its official website. However, in the documents regulating public participation in the drafting of legislation there is no preferred use of the Internet, namely - the official authority’s website as prescribed rule-making tool. The preference is given to print media.

Website «Civil Society and Government» (http://civic.kmu.gov.ua) can be seen as a platform of e-rulemaking of Ukrainian citizens. Its main advantage is that it contains the draft legal acts submitted for discussion by the central executive power. There is opportunity to give suggestions and comments to each project, see the different points of view on them, learn about projects, and also to see past discussions. The site has a mechanism for easy public access to the discussions held by the executive, namely - service «Public discussion of draft legal acts». In addition, citizens who are the experts on relevant issues can create their own accounts, organize themselves into groups, share experiences and more. This approach promotes expert community’s structuring in Ukraine and expert professionalism of the public sector’s representatives [1, p. 23]. Referring to the statistics, during the last quarter of 2014 central and local authorities held 1274 public consultations. 1335 issues of public importance, including 405 draft legal acts were proposed for discussion.

Another example is the portal «e-Ukraine» (www.e-ua.org/), which was founded on the initiative of the NGO «Bukovyna Center for Economic Research and
Policy». It contains a section «Write the law together» and provides an additional opportunity for e-rulemaking. Through «e-Ukraine» citizens have the opportunity to: 1) create a draft legislative act; 2) make suggestions to the draft legislation acts which are proposed by other visitors or are prepared by the deputies of Ukraine and registered by the Verkhovna Rada of Ukraine; 3) propose amendments to existing legislation; 4) vote on draft legislation being developed. The citizens’ legislative proposals will be submitted to the Verkhovna Rada of Ukraine or other public authorities which are competent to these projects. Citizens can also participate in rule-making through the websites of central government bodies and the official websites of the local and regional authorities.

The portal «We have been developing eGovernment» http://egov.inf.ua/ may become the solution of the problem of a single e-rulemaking website. This portal is a unique platform for storage, preservation, and dissemination of information, knowledge, best practices; it is a mechanism for policy formulation, monitoring and assessing the quality of implementing e-government. The portal also offers options for interactive work as follows: 1) groupware system - an opportunity for citizens to discuss regulations and legislative initiatives in virtual mode, to form their own community pages; 2) expert club - tools for experts’ work; 3) exchange of projects - a marketing platform for new projects and ideas of developers and analysts to solve technological, software and hardware problems; 4) «electronic city office» - there has already been e-city office of Lviv, Kalush and Novograd Volynskyy. The mechanism of e-rulemaking should be a key area of involvement of citizens in public policy, as it gives citizens the opportunity not only to solve current problems and issues, but also to shape the future course of state development.

Electronic discussion. Ukrainian legislation provides various forms of public discussion, but with the use of ICT - only Internet-conference and e-consultation. There is no obligation on authorities to provide preference to electronic forms of discussion. Instead it is fixed the self-determination of its shape, based on the need to involve as many interested participants and own organizational capacity. If the public debate is planned to conduct in the form of e-consultation, then it uses the official website of the authority, where there are information on the topic of discussion, the necessary materials, timing, and contacts [6].

During the electronic discussions participants send comments by email, noting their name and address. After that the person receives a confirmation mail [5]. All comments and suggestions received during the prescribed period shall be subject to an authority. As a result of this review, the authority in whole or in part takes into account the comments/suggestions or rejects them motivated [4]. Information about the decision is placed on the official website of the organizer of public debate [5]. In Ukraine, the tools of public e-discussion are the government website «Civil society and power» (http://civic.kmu.gov.ua/) and a single web portal of executive
power www.kmu.gov.ua, which is the central part of electronic information system «Electronic Government». Another example of efforts to embody the concept of e-democracy is a practice in the Dnipropetrovsk region, where citizens have the opportunity to shape the priorities of regional policy by means of interactive feedback system (www.consult.dp.gov.ua). Citizens act as experts on determining the relevance of certain problems of their city or region and evaluating the effectiveness of local authorities on their solution. After successful registration you can take part in public discussion. For registering it is needed to indicate age, sex, region and area of activity. Evaluation occurs as follows: first citizen chooses the problems of the city (district) from a list, which, in his opinion, are the most urgent, then using the 5-point scale evaluates each chosen problem; the larger is the score, the more urgent is the specific problem. There is also an opportunity to express clarification, comments, suggestions or facts concerning any of the problems.

*Electronic appeal.* In 2012 there was created a single website of citizens’ appeals to government agencies and local governments (http://z.gov.ua). It was created for fast processing of requests and responding electronically, providing operational control of the citizens for the consideration of complaints, maintaining statistical accounting of appeals by authorities and controlling the solution of issues raised in appeals. Today, however, this portal is still running in pilot operation mode. Effective exploiting of this mechanism is complicated by the fact that sending e-appeal citizen must use the electronic signature. In Ukraine, only several hundred thousand people have digital signature.

*Online authority’s session.* This mechanism provides an opportunity to submit questions, respond to polls and access background information and in a few days access to digital copies of press releases and speeches in real time. In Ukraine, this mechanism of electronic participation is partly available on some governmental websites. For example, on the website of the Lviv City Council there is possibility to view the live broadcast of the plenary session (http://city-adm.lviv.ua/realaudio.php), but there are no specifications for public participation and no video archive. Barriers to the effective functioning of this mechanism are the next: the absence of a legally enforceable obligation to broadcast regular session on the official website of the authority; poor technical level of authorities’ websites which does not allow feedback from the public. According to the program of informatization of legislative process, during 2013-2015 years the Verkhovna Rada of Ukraine is planning to create a parliamentary web portal «Internet Broadcasting» for transmission parliamentary activities on the Internet [7].

Available tools of e-cooperation between government and citizens provide access to constantly updated information on the activities and policy proposals of the authorities, opportunity to comment on the activity of government institutions, to assess it and to submit suggestions for improving the effectiveness of political man-
agement. However, the existing mechanisms of Ukrainian citizens’ e-participation do not ensure a stable and strong influence on the political process and political institutions of the country. General lower level of efficacy of existing instruments of public participation in the formulation and implementation of public policy is explained by underlying problems of governance, mediocre competence of civil servants, their underdeveloped political consciousness. However, the situation was changed. During and after the events of late 2013 - early 2014 in Ukraine there was a surge of public participation and was created a demand for new mechanisms and forms of democratic control over the activities of government and innovative tools of influence on them.

During the events of Euromaidan revolution and till now in conditions of Russia’s war against Ukraine, Internet technologies and social media in particular have a great influence on the political system of Ukraine, on the interaction between the authorities and Ukrainian citizens.

For the first time the word «Euromaidan» appeared November 21, 2013 in the social network when the government of Azarov-Yanukovych had suspended the preparation of the Association Agreement between Ukraine and the EU. In social networks there began spreading appeals to people to protest. Spark that started the protests was largely post of known journalist on Facebook. The official EuroMaidan Facebook page served a dual purpose: to provide information about the ongoing protests to individuals who were not participating, and to coordinate protestors. The most popular Facebook posts on this page provided news updates that generated intense discussions, but also it was used to provide important logistical information for protestors. There were, for example, posts with maps of places to get free tea and access to warm spaces, advice on how to avoid being provoked by government agents, flyers to print and distribute around the city, as well as information on where protesters will be gathering (Barberá and Metzger, 2013). By continuing to exist as a mass movement, Euromaidan has a powerful on-line measurement, where activists share information, discuss reform and continue to organize themselves to influence the new government of Ukraine.

In the early stages Euromaidan-protesters used Facebook for organizing and communicating with each other, while Twitter was a tool to convey information about the protest to the rest of the world and to draw the attention of the international community. Barberá and Metzger (2013) observed a reciprocal relationship between social media and protest in Ukraine, where social media could serve as an important strategic tool for protest, and at the same time attract new users to online communication platforms. With the help of social networking Ukrainians had repeatedly drawn the world’s attention to the revolution in Ukraine. Flashmobs #digitalmaidan, #NATOforUkraine, «for the resignation of President Yanukovych» and many others took the first place in the micro-blogging network and collected
hundreds of thousands repost worldwide (Ворона, 2015). Live Internet broadcast of the «Hromadske TV» («Public Television») has become a key tool for observing Euromaidan protests remotely, and after the overthrow of Yanukovych’s regime in late February 2014 it has been on-line platform for public debate about the future of Ukraine.

After Euromaidan Facebook has become one of the key online platforms to discuss current political events in Ukraine. Many officials have begun to lead an active political life in social networks, working more promptly than press service of their department. Often here they write about their intentions and draft decisions, gaining thousands of likes and hundreds of comments. It is the crucial events of late 2013 -2014 years that have provoked the growth of e-participation of Ukrainian citizens, because till this time the use of social networks by officials were the exception of the rule and it looked quite formal (Червоненко, 2015). Minister of Internal Affairs A. Avakov is famous for regular reports about his activities in the social network Facebook. His posts are ahead of Ministry’s press releases, are fiercely debated with involving the minister himself. A. Avakov’s post on January 12, 2015 was the primary source of information about the announcement of former President V. Yanukovych and Prime Minister M. Azarov wanted by Interpol. Many members of parliament and leaders of Deputy Factions almost straight through Twitter and Facebook broadcast the events where journalists do not have access to. It was during the coordination of the coalition agreement, when every decision or conflict appeared online almost immediately. President of Ukraine P. Poroshenko also actively uses Twitter and Facebook. In addition to the posts about international meetings and conferences, on his pages there are also announced of decisions that have not yet adopted. For example, it was the announcement of the signing of the law on lustration, and the provision of Ukrainian nationality to prospective government ministers. Foreign Minister P. Klimkin on Twitter tries to write informally and joking. His posts are much more anticipatory than the official comments of the Ministry, and the majority of meetings and visits are initially announced through social networks.

Security Service of Ukraine has got official pages on social networks Facebook (https://www.facebook.com/SecurSerUkraine) and Twitter (https://twitter.com/ServiceSsu). It is assumed that these pages will become not only a source of timely information on Service’s work but a platform for professional discussion on security issues that are particularly relevant at the present time for Ukraine. In addition, the SSU puts videos on Youtube - mostly video reports on the its activities and operative videos from areas in eastern Ukraine, where there is fighting.

In Lviv, all the rulers of district police departments have been registered in the social network Facebook. Link to the profiles of policemen in the social network can be found at the Lviv police department. Thus, citizens can now send their com-
plaints directly to the Chief of any police station.

At the beginning of Russia’s military operations against Ukraine Internet and social networks were practically the only available channels for Ukrainians to get «hot» news and objective information. Under these circumstances there had been posed a threat to the Ukrainian information space in connection with the Russian Internet campaign to discredit the actual data and spread misinformation to justify Russia’s actions in eastern Ukraine. In response, Ukrainian volunteers have created the projects (www.stopfake.org/, http://fakecontrol.org), which are designed to verify the facts and expose the lies and fight against Russian propaganda in traditional media and social networks.

Another example is the project «Stop terror» (https://stopterror.in.ua/) which was launched in June 2014 for searching, collecting and processing information coming from patriotic citizens for more efficient operation of military units. Basically, it is designed to: 1) monitor and analyze information, aimed at discrediting the Ukrainian military and senior management of the state; 2) detect the information that are intentionally distorted or falsified for manipulation of citizens’ consciousness; 3) track such information or overt misinformation to establish the source; 4) make actions for preventing of its expansion or publicate the reliable material to prevent manipulation and provocation in the Ukrainian information space. «Stop terror» is used for assisting the military forces to determine the terrorists’ place of deployment, their firing positions, fortifications, presence and amount of equipment and manpower of terrorist groups. This project is also intended to ensure communication and coordination between Ukrainian military units, as well as between civilians and government officials to carry out operations to combat illegal terrorists’ activities in the Donetsk and Lugansk regions.

Data from social networks, including photos and videos, which fixed the movement and basing of Russian military equipment have allowed activists to create an interactive map (http://mediarnbo.org/). It makes possible to track the movement of Russian military equipment in Russia and on the Ukrainian territory, controlled by terrorists. The map is constantly updating based on proven materials.

The war of Russia against Ukraine has made soberly evaluate the conditions of Ukrainian Armed Forces and find significant problems caused by underfunding. Realizing the seriousness of the situation, the needs of the military and the need to modernize the army, the citizens of Ukraine have begun an active campaign to raise funds, food, and clothing. Most of the donations come from organized groups of civilians in Facebook, the online private initiatives and individual volunteers whose posts on social networks persuade users to donate on the army funding. Today, the founders of these organizations and key volunteers have become counselors of Ukrainian President P. Poroshenko. They also work at the Ministry of Defence where are involved in reforming this structure. Volunteers actively share impres-
sions, opinions and reports on their activities in the social network Facebook. There have been also created numerous charitable volunteer platforms – «People’s Project» (http://www.peoplesproject.com/), «Wings of Phoenix» (http://wings-phoenix.org.ua/en), «Army SOS» (http://armysos.com.ua/). These initiatives are intended to raise funds through the Internet and provide the army with everything needed, e.g. military equipment, means of individual protection (body armor, helmets), repairing buildings of military units, individual first aid kits.

At the end of 2014, volunteers have created an interesting project - trading platform «Ants» (http://murahy.com/). Here you can buy and sell secondhand things, and all profits from the transaction will be transferred to aid the army, the wounded and refugees from the area of anti-terrorism operations. Currently, the site is operating in the mode of filling goods catalog. Activists also create numerous sites aimed to raise funds for treatment and rehabilitation of wounded soldiers and suffered citizens. For example, volunteers’ web site «Heroes ATO» http://atoheroes.org/ offer information about the wounded soldiers who need help. The Internet resources http://vostok-sos.org/, http://www.helpua.center/ provide refugees from ATO area assistance in finding housing and employment.

In early February 2015 there has been created the web site http://ato.com.ua/, which is dedicated to the discussion of the antiterrorist operation in Ukraine. Everyone can freely express his/her views on the situation that has arisen in the country. The forum is accessible not only in Ukrainian, but also Russian and English. There is also access to Twitter through hashtag #NATO.

There has appeared a large number of online projects aimed at promoting self-associates, joint efforts on solving not only military but urgent problems of modern Ukrainian society, initiation of issues for consideration, preparation and discussion, giving proposals for the content of the govermental decisions. Representatives of civil society actively make use of not only their own resources, but also the social networks Facebook, Twitter, and others. In Ukraine, examples of active use of online methods in social work are such independent initiative:

• civic campaign «New Citizen» (http://newcitizen.org.ua/). It is succesfull politically unbiased public initiative, which is aimed to influence on social and political processes in Ukraine to a greater extent, to search new mechanisms of control and pressure on the authorities. Participants protect human rights, the freedom of speech. They are involved in monitoring, exploring current issues of public policy, solving problems of local government, caring for environment and health, helping youth etc.

• «Map of action» (http://newcitizen.org.ua/map) is an interactive map of the events and projects organized within the campaign «New Citizen». Anyone can join the meeting in their city or initiate a meeting, set the venue on the map and hold
it in real life. At the meetings, participants speak on the theme and look for ways of solving actual problems.

- **civil movement «Fair»** (http://www.chesno.org/) is an initiative of civil society to monitor the transparency, accountability and accessibility of every Member of Parliament.

- **«Vladometr»** (http://vladometr.org/) is draft public monitoring of political promises. This is a new Ukrainian Web 2.0 tool of public control of the authorities content of which is generated not only by editorship, but also by the users. Its goal is to make Ukrainian politics more transparent and less populist.

- **http://costua.com/** is online service that shows how the government spends taxes. This website enables for everyone to thoroughly understand the mechanism of tax sharing and equips people with arguments and knowledge to fight against embezzlers and corrupt officials.

Ukraine also has some examples of effective crowdsourcing media projects. **«Kantselyarska sotnya»** («Office Hundred») is volunteer project that emerged during the events on the Maidan in winter 2014, after the escape of former Ukrainian President V. Yanukovych. He tried to conceal a large amount of documentation that could confirm his involvement in many crimes and fraud. This «Hundred» is engaged in the restoration of many documents which people of Yanukovych hastily tried to destroy. With the support of many Ukrainian journalists there was created website http://yanukovichleaks.org/, which has issued all recovered documents. This form of online activism is based on free participation of many people. Participants of the project «Kantselyarska sotnya» have also created a Web resource **«Garna hata»** («Good house») (http://garnahata.in.ua/), where everyone has access to the database of the most expensive real estate’s owners in Ukraine. Engaging in such on-line initiative, anyone can find out not only about luxury properties, owned by Ukrainian officials and relatives of politicians and businessmen, but also can complement the database by his/her own information. This project is an online mechanism for improving transparency, accountability and openness of Ukrainian politics.

These examples show that such initiatives arising from the need to implement the tasks that traditional public and media structures can not solve. The demand for this in a significant part of society points out an attempt to find alternatives in solving social problems. This method of creating compensatory mechanisms indicates that modern society creates new orders for themselves. The Internet and new technologies have made it possible to implement new solutions in a fast, affordable and cheap way. Taking into consideration that all these projects are relatively simple and affordable, everyone without being an expert in a particular field gets an opportunity to take part in solving a specific problem. That’s why decision-making is
more effective with attraction of crowdsourcing.

For developing e-democracy and e-participation of Ukrainian citizens in governance it is needed to solve a number of problems, namely the identification of citizens, security and protection of personal data, the digital divide, the legal status of e-participation mechanisms and results received on their basis (surveys, discussion, voting, etc.). Also at this stage there is necessity to inspect thoroughly numerous initiatives in the field of e-democracy in order to identify the most successful and critically important for their maintaining, developing and providing the appropriate legal framework.

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Natural Resources: Could Ever Be a Blessing?
The Russian Case

Giovanni Covi

Abstract  The debate on the best way to achieve economic development for a country rich of natural resources has been a matter of discussion and disagreements. In this paper a possible solution has been provided. Through a case study an in-depth analysis on the Russian economy will prove that a unique reliance on a single sector - energy sector - is a twofold mistake. The Dutch Disease model developed by Corden and Neary as well as the Gabaix’s theory of Granular Origins of Aggregate Fluctuations will dig into the Russian economic structure in order to develop a complete and a complementary perspective. The main results of the paper state that the long-term consequences of this strategy outweigh the initial achieved economic improvements. The natural resource curse is a real economic problem and it is only a matter of time before the concealed symptoms display and spread throughout the whole industrial organization of the country damaging inexorably the manufacturing sector - the real source for a stable and sustainable economic development.

Keywords  Economic Development - Natural Resource Curse - Dutch Disease Oil - Industrial Policy - Russian Economy - Dualistic Development

JEL Classification  E52 – P28 – O11 – Q32 – Q33 – Q43

Russia provides a dramatic case in which the government has received but a pittance for the country’s most important asset - its inheritance of natural resources.

Joseph E. Stiglitz (2007: p. 37)

Giovanni Covi
Department of Economics and Finance, University of Verona, Italy
Market Operations Analysis, European Central Bank, Frankfurt Am Main
e-mail: giovanni.covi@univr.it; giovanni.covi@ecb.europa.eu
1. Introduction

Economists have identified a rather strange phenomenon called resource curse, term coined by Richard Auty\(^1\): natural resource-rich countries often make worse in the field of economic development than resource-poor countries. There is something counterintuitive in the fact that rich endowments of oil or other mineral can be a bridle rather than a spur to rapid economic growth. The case of the four Asian Tigers (Hong-Kong, Singapore, Taiwan, Korea) are the best proof that rapid economic growth and a competitive manufacturing export sector can be built by countries lacking at all of natural resources. On the other hand, it has been proved (Sachs and Warner, 1995) that many natural resources-rich countries fail to reach a take-off into a sustainable development if not lose out true growth collapses\(^2\).

**Figure 1** Median GDP per capita growth (constant 1995 US $)

![Graph showing median GDP per capita growth](image)

Source: World Bank, 1999

A broad framework of explanations can be applied to solve the paradox. The first could be the classical Hirschman’s concept of enclave production (1958): a type of production that does not need to have any kind of linkage - forward or backward - with other sectors of the economy and with complex strategies of development. The second relevant aspect is that the large difference between the costs of extraction of non-renewable resources and their market value is usually very large, giving strong incentive to rent-seeking behaviors by politicians and private corporations. This aspect often spins out of economic sector the negative effects of the resource curse:

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2 The research, based on 97 developing countries heavily reliant on natural resources exports, discovered that real GDP growth per capita for these economies was negatively correlated to the ratio of resource exports on GDP during 1970-1989.
into the domain of corruption, authoritarian regimes and civil war (Sala-i-Martin and Subramanian 2003, Ross 2001). The third explanation is the Dutch disease\textsuperscript{3}, so called because the discovery of the natural gas in the North Sea, in the 1970s, brought negative effects on the Netherlands’ manufacturing sector through an appreciation of the real exchange rate. Often these three aspects are interconnected neatly, and escalate up to a point of no-return where long-term consequences outweigh initial economic improvements.

Since then, a growing literature has sought to uncover new evidence to solve the paradox. But these studies have had so far controversial results. The disagreement ranges over a number of issues starting from the conceptually correct measure of resource abundance: natural resource exports as a share of GDP (Sachs and Warner 1995, 1997a, 1997b, 1999, 2001) or natural resource exports as a share of total exports (Sachs and Vial 2001, Lederman and Maloney 2007) or net exports of resources per worker (Leamer 1984). And once identified the dimensions of the resource abundance, the channels the impact spreads in the economy may vary widely with the measures of policy eventually implemented.

As a result of these complications, some econometric research states a positive impact of natural resources abundance on the welfare of a nation (Graham 1995, Stijins 2005) leading Lederman and Malony to affirm that at the very least we should abandon the stylized fact that natural resource abundance is somehow bad for growth (2007: p.32). Similar conclusions reach Brunnschweiler and Bulte (2007). In their empirical study analyzing almost 80 countries between 1970 and 2000, they found that: a) resource abundance, constitutions, and institutions determine resource dependence b) resource dependence does not affect growth c) resource abundance positively affects growth and institutional quality.

In light of these objections, this paper tries to re-examine the Dutch disease model - its etiology, its symptoms and course - from the perspective of a case study of a very resource-rich country like the Russian Federation and the policy measures adopted since Putin came to power in August 1999.

From 2000 Putin started a campaign of re-nationalization with whichever means were in his power, often not following - let’s say - a civilized way. The Ministry of Natural Gas acquired 51% of Gazprom shares, so that it passed in 2005 under a total state-control. Therefore Gazprom (renamed Gazpromneft) started to control a big part of the oil production, in addition to the gas monopoly. Putin did not limit his purchases to the oil and gas sector, taking control over industries such as aircraft, aviation, heavy machinery, telecommunication, electricity, diamonds and exports, obviously acquiring the majority stake according to the capitalist system,

\textsuperscript{3} The Economist, The Dutch Disease, November 26th 1977. Ellman (1981) found that the real problem in that case for Netherland was not the real appreciation of the exchange rate, but the rising government’s expenditures on public services which were not sustainable.
giving birth to the so-called state capitalism.

It is reasonable to think that the case of the Russian economy fits with the explanations suggested above by Brunnschweiler and Bulte. Indeed, Russia has started to recover from recession and the default of August 1998 thanks to the recovery of oil production and to the oil-price increase in the 2000s. Moreover, when Putin came to power, his policy determined the country’s dependence on natural resources, as well as the energy industry reunification under the state’s control to boost the economic growth. Given this, we could say that in this specific case, the institutions determined the dependence from natural resources.

This is a crucial point because, according to the empirical study of Mehlum, K. Moene, R. Torvik (2006), if a country owns bad institutions, on one hand, these can transform the natural resource abundance in a curse for the country’s economic growth; on the other hand, depending on the revenues derived from exporting natural resources may also worsen the quality of these institutions, thereby leading to a vicious circle or a doom-loop⁴.

On what has been said so far, natural resources seem to represent more of a blessing than a curse. However, certain phenomena such as the increasing oil-export’s dependence, the rising rents’ revenues and widening inequalities shed light on the potentially negative path that Russia is pursuing.

In accordance with this introduction, the rest of the paper reviews the Russian economy on the basis of data analysis and at the light of the Dutch disease model. Next section 2 will focus on the Dutch disease classic model of Corden and Neary (1982) and Corden (1984). Section 3 deals with statistical evidence of the dimensions of the Russian dependence on natural resources. Following the sequencing of the model, section 4 deals with the effects on the ruble and on its real exchange rate with the U.S. dollar. Section 5 tries to assess if there has been an impact, and its eventual dimension, on the others sectors (services and manufacturing) of the economy as well as on the deepening of inequalities among wages and incomes. Section 6 deals with the microfoundations of the macrodevelopments investigated in the previous sections, i.e., the linkages between the concentration of output growth at firm level and GDP fluctuations. Ultimately the last section is dedicated to an overview of the current and future possible scenarios Russia has been facing.

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⁴ This last effect is caused directly by a fight to control the resource rents, and indirectly by removing incentives to reform, improve infrastructure, or even establish a well-functioning tax bureaucracy. (T. Harford, M. Klein, Aid and the Resource Curse, The World Bank Group, Private Sector Development Vice Presidency, Note #291, Washington, DC, 2005)
2. The Dutch Disease Model: Symptoms, Causes and Effects

For the purposes of the present analysis, and to have a guide for choose the most significant economic data for Russian economy, I have adopt the core model of Corden and Neary (1982) that closely limit the larger framework of the resource curse telling to the interplay of the economic phenomena acting in a dynamics of causes and effects. The model divides the economy in three main sectors: the energy sector (the booming sector B), the manufacturing (or lagging sector M), and the service sector (or the non-tradable sector S).

According to Corden and Neary (1982) the main analysis concerns an extractive sector, a natural resource, even if it could be applicable to any other sector that shows a boom caused by technological improvements. The core model is the basic model on which many other more specific models can be built, and it will be used to understand how the effect of an energy boom affects the other two sectors of the economy, the manufacturing and services.

The boom in the extractive sector can be caused by three main factors, which lead to similar but not identical effects. The first is an exogenous technical improvement, which leads to a shift in the production function, and will therefore be used as the main tool to analyze the core model. The second one is a discovery of a new supply of natural resources (as in Russia, the rich Siberian oil fields), and the last, but not least, is an exogenous rise in the price of the energy sector in the world market (the well-known oil-shocks, for example).

According to these assumptions, the model works as follows. Thanks to one of the reasons above explained, the energy sector (booming-B) undergoes a boom of output, which in turn lead to an increase of the aggregate incomes of the employees in that sector. This can lead to two types of effect:

The **Resource Movement Effect**: due to the rise in the marginal product in the Booming sector, the demand for labor in B rises, thereby drowning out labor force from the manufacturing sector and from the service sector into the Booming one.

The **Spending Effect**: this effect can be direct or indirect, that is, caused either by the employees and the owners of the Booming sector, or by the government through tax revenues which increase the public spending on services. Given a positive income elasticity for the service sector, the prices of the services related to the tradable sectors rise, bringing a real appreciation of the currency. Therefore, this

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5 This indirect effect is very important for the reallocation of the resources inside the economy. It is crucial to analyze on which commodities the tax’s revenues is spent, because it can worsen the effects of the Dutch Disease. According to Oomes and Kalcheva, an increase about 1% of the Russian government’s consumption leads to an approximate 1,5 % real appreciation of the Ruble. (IMF Working Paper, April 2007, p.13)

6 This is one of the most important consequences for the analysis. It is due to the fact that the prices of the tradable sector, energy and manufacturing, are exogenous, so an increase of the price in the
ratio can be considered as an approximation of the real exchange rate, so that it is possible to forecast a real appreciation of the domestic currency and a corresponding shift of the labor force into the non-tradable sector from the tradable one.

These two effects combined together lead to an important consequence following two different paths.

The first is a direct de-industrialization and implies a movement of the labor force from the lagging sector into the booming sector so as to reduce the output in the former. This effect does not involve the service sector and it does not require an appreciation of the real exchange rate. We will assume that this process is not relevant for the case of Russia because the energy sector employs a very small part of the population (only about 1 million people).

The second one is an indirect de-industrialization. It is due to the fact that there is an excess of demand for the service output created by the spending effect thereby improving the real appreciation. This draws the labor force from the lagging sector to the service one, thereby leading to the so-called indirect de-industrialization effect.

As a conclusion, the main consequence of an increase of the extractive-oil sector output is a decline of the tradable sector’s output. This is caused by the change in the income distribution, that is, the decrease of the real rent of the specific factor-capital in the lagging sector. This is the essence of the so-called Dutch Disease.

So we assume that in Russia only the Spending effect acts on this mechanism, leading to a real appreciation of the exchange rate, so that de-industrialization occurs in an indirect way. Thus, eventually, the output of the manufacturing sector declines while it increases in the service sector.

In the specific case, it is therefore possible to conclude that the Russian economy could fit - if proved by data - the theoretic scenario involving the Dutch Disease explained by the enclave model.

Finally, it was also pointed out that the result of this process is a positive growth of the booming sector and a possible increase of output of the service sector, against only one loss: the slow-down of the manufacturing sector. Given these considerations, one might wonder why the Dutch disease, despite bringing to a huge windfall of revenues, continues to be considered such a negative phenomenon.

The relevant reasons for which this economic disease continues to be dreaded are:

1. Macroeconomic Instability. For a country that is so reliant on the exports of natural resources with volatile prices, this consequence is caused by the effect that these revenues have on the exchange rate, trade balance and public debt.

service sector lead to an increase in the ratio: \( \frac{P_{\text{non-tradeable}}}{P_{\text{tradeable}}} \), so as creating a real appreciation of the currency.
For example an exogenous fall in the price of crude oil may lead to a strong depreciation of the Ruble, a huge deficit of the current account as well as of the public finances. Vice versa, an exogenous increase in the oil price may lead to a real appreciation of the currency thereby exacerbating the Dutch disease (van Wijnbergen, 1984).

2. A higher level of social and regional inequalities (Fetisov, 2007: p.54). This symptom is due to the problem of a sharp rise in incomes of a small part of the population, the owners of natural resources (and the workers in the sector), as compared to the majority of the population which conversely is subject to a lower income growth, if not to an income stagnation process.

3. The trend is not reversible. The irreversibility of the trend is the most important consequence in terms of growth sustainability. According to the Dutch disease model, an energy boom draws resources from the manufacturing and service sectors into the energy sector, and from the manufacturing into the service one. However, in addition to this, two variables prove to be crucial to understand the real impact of the disease on the economy - the size and the duration of the transfer. According to Krugman, a key factor is the role of the learning curves, that is, the existence of economies of scale in which cumulative past output determines current productivity In this model the comparative advantage is created by the dynamics of learning rather than from national characteristics(1987: p.47). As a dramatic consequence, even when the external shock ends, not only the manufacturing industries do not come back, but most importantly the economy will face a permanent reduction of its home country’s market share and of its relative wages. As Krugman writes (1987: p.41) like a river which digs its own bed deeper, a pattern of specialization, once established, will induce relative productivity changes which strengthen the forces preserving that pattern.

In the next sections we will investigate whether the model here examined fits the Russian case, that is, if in the Russian economy there is any evidence of the structural changes mentioned so far. For the purpose of a better control of the good match between theory and data, our analysis has to satisfy the model’s conditions specified in the following questions.

3. Is Russia Dependent on Natural Resources?

Russia is one of the biggest main historical crude oil producers, and it has been always reliant on natural resources for its economic development. The Russian oil story started in 1860. And in 1901 for the first time, and not the last, became the first world’s producer with nearly 12.000 million metric tons a year, almost 2 million
higher than United States. But the Russian technique was old and very inefficient (they used wooden tools and not metal): so they couldn’t drill deeper than 300 feet why the American companies were able to extract oil at more than 1800 feet deeper (Goldman, 2008: p.22). This led in few years Russia to lose its primacy and the Bolshevik Revolution of 1917 did the rest.

Figure 2 Main historical crude oil producers

![Graph showing historical crude oil producers](Image)

Source: British Petroleum, Statistical Review of World Energy 2014

Then, it regains the primacy among the top world producers at the mid-70s, after the first oil shock, and it kept up to the USSR’s collapse in 1991, when the oil output shrank by a 30% from its peak of 12.601 bbl/day in 1987, and then attained its all time negative record of almost -50% in 1996. The impact of this productive collapse - and of the Soviet Union’s disintegration - on the Gross Domestic Product was dreadful. As reported by Goldman (2008: p.56) on CIA data, while in the 80s the Soviet Union’s GDP was nearly half of the United States, by 1992 the Russian GDP had fallen hardly to about 10% of the U.S. GDP.

Said this, to give a first rule of thumb to measure, at a glance, the impact of a raw material on the revenue of a country, the main economic indicators of the dependence of Russian economy from oil are reported in Fig.3.

The Russian GDP growth, or decrease, is highly correlated to the oil production growth, or decrease. In the first year after the collapse, in 1992 when the oil production touched its lowest record of -15.7%, the GDP shrank by nearly the same amount. In the following three year, 1992 -1994 oil production fell to the lowest record of -36% followed by a GDP’s drop of -35%. And when from 1999 to 2008 the economy began to grow at 7% rate, it was fuelled by world oil rising price. The average increase of crude oil price between 2003 and 2008 was 26% every year and in the same period Russia had the best performance of the previous 20 years.
The correlation holds as well in the downturn: when in the world crisis of 2008-2009 the crude oil price collapsed, it provoked in Russia much bigger recession (-7.8%) than in the average of developed economies (-3.4%) and also the average of emerging economies (+2 %) that escaped recession.

Generally, Spilimbergo (2005) calculate that government budget’s revenue increases by 0.40% of GDP for every 1 $ of price increase of an Ural barrel (over an average price of 24 $/bbl). And Gurvits (2006) calculate that under the current Russian tax system, the fluctuations in the government’s revenues related to the oil-exports swing between –4 % and +9 % of the GDP increasing the risk of sudden slow down or even worst recessions. The analysis of this development pattern prove clearly how the Russian GDP is strongly dependent on its oil production and in turn reliant on its price, which is exogenous and quite often volatile.
To sum up the argument we can just look to the basic indicators of dependence: fuel exports as a share of GDP and fuel exports as a share of total merchandise exports. The weight of fuel exports on GDP passed from 9.6% in 1996 to almost 20% in 2013. And the fuel exports passed from accounting almost 43% on total merchandise exports in 1996 to almost 70% in 2013, an increase of 27% of its weight. To better appreciate these data is sufficient to look at the weight of manufactures exports on GDP: from 6% in 1996 to 4.8% in 2010, reaching the bottom in 2008 with a weight of 3.1%. The presence of a single and very visible export concentration is confirmed. The answer to the question raised in this section - on Russian dependence - can only be positive.

4. Is Ruble a Commodity Currency?

A country that relies on export of only one commodity, as Russia does, is highly prone to external shocks and to their dangerous effects. As we know from the model presented in section 2, the first vehicle with which an exogenous stimulus spreads into the wider economy is through the movements of the currency’s exchange. And this happens because the currency fluctuations affect, with different intensity, a broad spectrum of prices, from the terms of trade to the prices of all the commodities and wages.

Let’s start the analysis from January 1999 when the Ruble had been heavily depreciated, almost by half in real terms due to unilateral suspension of payments, which determined the Russian default. Afterwards, the recovery of oil output and its rising prices both led to an enhancement of the economic activity, thereby effacing recession. Once the recession was over, between 2002 and 2008, there was an appreciation of the Ruble against the Dollar in real terms, from 32 Rubles for 1 Dollar to 25 i.e. about 22%, while the real effective exchange rate increased even stronger.

This trend was due to the increase in oil prices which led to a constant appreciation in nominal terms - thanks also to an accommodative stance of the Bank of Russia - till when the price of crude collapsed, reaching the value of almost 60 $/bbl in 2009. Between 2008 and 2009 the collapse of the oil price led to a collapse of the exchange rate in nominal terms. But there is here an asymmetry: a negative shock is always heavier than a positive one in the Russian economy. The contraction of the oil price between 2008 and 2009 was almost of 36.5 %, and the collapse of the nominal exchange rate was about 27.7 %; while between 2007 and 2008 respectively the increase of the price was 40 % and the increase of the nominal exchange rate was less than 3 %.

8 World Bank database. To calculate the real exchange rate, I base my calculation on the consumer price index where 2005 = 100
To sum up what has been said so far, a positive/negative shock on the oil price of almost the same percentage has a totally different impact on the nominal exchange rate: if it is positive, the appreciation is very small, but if it is negative the depreciation is huge. A plausible explanation is given by the monetary policy used by the Central Bank of Russia on occasion of a positive price shock. Indeed, it tries to offset the possible negative impact of a strong appreciation on the manufacturing and exporting industries by increasing reserves of foreign currency. A monetary policy known as the sterilization process.

This real appreciation of the Ruble is a crucial element as it squeezes profits and employment in manufacturing while the energy sector keeps on rising, benefiting from this currency appreciation. An excessive and long lasting appreciation would permanently reduce the competitiveness of the domestic industries, providing evidence of the existence of the Dutch Disease. According to the data, therefore, the scenario that Russia is facing, is precisely an increase of the relative prices of the domestic products\(^9\).

We can safely conclude that the real exchange rate is heavily correlated to the oil price, and this is due to the big weight that oil exports’ revenues have on the Russian current account and gross domestic product. This leads to the conclusion that oil price and output are key variables in determining the fluctuations of the Russian real exchange rate, thereby we can answer positively to the initial question, and we can affirm that the Ruble can be considered as a *commodity currency*.

\(^9\) The appreciation of the Ruble could also, in theory, be a consequence of the Balassa-Samuelson effect, that is, the effect produced by the increase of labor productivity in the energy sector on the wages in all the economy. However, in the case of Russia, according to Egert (2007, 2013), there is evidence that the Balassa-Samuelson effect played a limited role in the case of Russian economy.
5. The Impact on the Russian Macroeconomic Structure

As consequence of the dynamics described so far, the model presented in section 2 predicts that the Russian economy should have undergo a process whereby manufacturing became the lagging sector. So the aim now is to check if this really took place: if there has been a relative reduction of the output in the manufacturing sector, in absolute or relative terms, compared with the energy and the service sectors. Accordingly, also the trend of employment and wages among sectors will be analysed.

After the Ruble’s devaluation in 1999, the output started to recover, especially the energy and the manufacturing sector, while the service sector enjoyed the growth of the other sectors in the following years. On average, between 2000 and 2012, the mining sector grew yearly at 2.5% points higher than the manufacturing sector. Nevertheless the big winner, in this long period, was the service sector which outperformed, on average yearly, all the others: the mining by 1.4%, the manufacturing by 3.8% and agriculture by 7.3%. The analysis is summarized by Tab. 1 which shows the share of each sector on the Russian’s gross value added.

Table 1 Share of Gross Value Added by Sector

<table>
<thead>
<tr>
<th></th>
<th>Service</th>
<th>Mining</th>
<th>Manufacturing</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>49%</td>
<td>27%</td>
<td>18%</td>
<td>6%</td>
</tr>
<tr>
<td>2012</td>
<td>58%</td>
<td>26%</td>
<td>13%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: United Nation, 2014

Between 2000 and 2012 the service sector increased its share of 9 percentage points passing from 49% to 58%. Manufacturing is the main looser (-5%) passing from 18% to 13%, while agriculture and mining decreased their shares respectively by 3% and 1%.

This exploit of the service sector, although coherent with our Dutch disease model, in that case of Russia has a second special explanation. That is during the Soviet era the development strategy was focused on the heavy industry and the services sector was totally disregarded. It began to expand only at the end of the 1990s. In fact, services were not even accounted for in the annual statistics on what in Soviet Union was called Net Material Product (NMP)\textsuperscript{10}.

\textsuperscript{10} Differently from the notion of Gross Domestic Product (GDP) the value added of trade, banking, transportation, telecommunication, education, public administration etc. were designated as unproductive activities - following the definition first of Adam Smith and than of Marx. At the end of 1980s, before the collapse of the USSR, the service sector employed around 7% of the work force, that is less than half of the comparable sectors in the main market economies. Distribution received in USSR usually not more than 3% of total investments (compared to 4-9% in the countries of G-7) (IMF et alii,1990: p.38).
These growth rate differentials among sectors can be explained as follows: a boom in the oil sector in 2003-2004, thanks to the sky rocketing trend of the oil price, and the fast pace of the manufacturing sector thanks to Ruble’s devaluation in 1999, led to a rising consumption for services thereby boosting its output. More precisely, accordingly to the Dutch disease model, an increase in the oil price and therefore of the productivity of the energy sector and its relative wages compared with the other sectors, induced the government and the renters of the booming sectors to increase the consumption on services. The rise in demand for services increased employment in the sector, which, although with a small lag, adjusted its output as well.

5.1 The distribution of the employment by sectors

The de-industrialization process predicted by the model can be tested also following the movement of the labour force. According to Tab.2, the service sector owns the biggest share of employment, with 43.3 millions of employees, almost 60% of the total. The energy, mining and quarrying sectors, conversely employed a very small part of the labour force, less than 1 million, almost 1.5%. This, as previously mentioned, leads to the conclusion that the direct de-industrialization effect, that is, the shift of the labour force from the manufacturing sector to the energy sector, can be neglected in the Russian case. The percentage change in labour in the energy sector decreased from 1.6% in 2005 to 1.5% in 2010, in absolute terms, around fifty thousand people.

**Table 2 Employment by sectors**

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>1,05</td>
<td>1,00</td>
<td>0,99</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>11,5</td>
<td>10,38</td>
<td>10,4</td>
</tr>
<tr>
<td>Agriculture</td>
<td>7,38</td>
<td>6,58</td>
<td>6,5</td>
</tr>
<tr>
<td>Services</td>
<td>40,8</td>
<td>42,95</td>
<td>43,27</td>
</tr>
</tbody>
</table>

Source: Federal State Statistics

We have now to focus our attention on the other three sectors, agriculture, hunting & forestry (AHF), manufacturing and services. The AHF sector shows a decrease of its employment between 2005 and 2010, almost 1.5%, shifting from 11,1% to 9,6% - around 1 million employees in absolute terms. Of utmost importance for our analysis is the decrease in the labor force in the manufacturing sector, almost 1.8%, decreasing from 17,2% to 15,4% between 2005 and 2010, more than 1 million people. Taken together, the three sectors, energy (with a smallest change, only 0,1%), manufacturing (with the biggest change) and AHF, showed a total decrease of labor force of about 3.4%. This, in turn, increased labour force in the service sector, the winner, which passed from 59,6% in 2005 to 62,7% in 2010, an increase of almost 2,5 million of people. Indeed, the service sector was the only one where
employment was able to increase so as to confirm the de-industrialization process under way in the Russian economy.

5.2 The growing wages’ differential

An unequal growth of wages is another important symptom in the framework of this analysis. The energy sector, compared to the other sectors, enjoyed a wage premium already in the ‘90s: its average wage was 2,3 time higher than the manufacturing sector (1.070 Rubles against 466) and 2,1 times higher than the service sector (1.070 Rubles against 505).

Figure 6 Average monthly nominal wages by sector 1995-2010

With these strong wages differentials it was likely to expect an aggressive catching up by the manufacturing and service sectors in the 2000s. Nevertheless it didn’t take place at all for the manufacturing sector, while for the service sector this slightly happened. In 2010 the nominal wage of the mining sector was still 2,1 times higher than the manufacturing and even more, if we look strictly only to the energy sector11. The energy sector wages only slightly lost ground against the service sector, the one that most enjoyed the last decade of soaring oil prices and the shift from a communist to a capitalist market system. The lacking wage incentives brought the system to greater inequalities both among sector and employees, thus exacerbating the effects of the Dutch disease. An high energy price is a crucial determinant for a Consumer Price Index as well for the Russian citizens. Therefore, a fast growth of the energy sector, which, as we have seen, accounts for more than 20 % of the Russian GDP, could lead to an overheating of the economy against a big share of the population, whose wages are lower than the economy average especially for those sectors such as agriculture and the manufacturing sector. This can be called a fake

11 While the mining and quarrying sector represents a gross indicator, the energy sector takes into account only energy related activities plus the coke and refining petroleum industry.
Natural Resources: Could Ever Be a Blessing? The Russian Case

growth because, as we have analysed in the previous paragraph, although the GDP grows, it does only for specific sectors of the economy - energy and services - as well as for specific categories of workers.

5.3 The lack of financial resources

Empirical researches (Fasano 2000, Davis et al. 2003) support the evidence that economic logic is rarely followed in resource-rich countries because the policy makers have strong political incentives not to discipline the public overspending, not to collect but to use up windfall revenues (Humphreys and and Sandbu 2007: p.213). The Russian case confirms these findings. Two points can be enlightened.

The first point is that Russian monetary policy has always tried to achieve multiple targets, trying to control the exchange rate and at the same time inflation. But, as the economy is highly prone to external shocks (the oil-price), this goal has been much more difficult to pursue than in other countries. The basic problem is that an increase of the interest rates to reduce the money supply curbs the inflation\textsuperscript{12}, producing a nominal appreciation of the exchange rate thanks to the channel of free capital mobility. Furthermore, this increment of the interest rates in turn leads to an overheating of the interest rate on loans to private citizens and firms, thus contracting the access to credit. Ultimately, this contraction of credit, combined with a low saving rate, brings the economy to grow at much slower rate than it could. If we look at the Russian lending interest rate, it has been around 12\% in the last ten years, with a peak in 2009 (15,3\%). Obviously this is a big disincentive to invest, and only the sector with the highest productivity, the petroleum one, succeeds in securing a loan. To stress the point let make a comparison with China, which in the last ten years has pursued an average lending interest rate around 5,8\%, less than half of the Russian one, to boost its growth and investments.

The second point concerns the tool to get access to financial resources through the foreign direct investment channel (FDI). The cumulative inflows of Foreign Direct Investments in Russia grew from $ 3,5 billion in 2002 to $ 278 billion in 2010 (WB Database, 2012). This obviously has contributed to boost the real appreciation of the Ruble, thereby exacerbating the effects of the Dutch Disease.

Fig.7 is very telling: when the price of crude goes up, the inflows’ of FDI in percentage of GDP increases as a consequence. When in 2002 the oil price was, on average, about 24 $/bbl, the ratio of FDI on GDP was almost 1\%. Conversely In 2010, when the crude average price reached 78 $/bbl, the ratio of FDI on GDP jumped to 3,3\%, with the record in 2008 of 4,5\%, when the oil price reached on average the level of 96 $/bbl. The main collector of foreign investments is the service

\textsuperscript{12} Only in 2010 the Russian inflation was around 5\%, but in the years before it has always been around 7-8\%. A real appreciation of the Ruble happens only if the increase in the nominal exchange rate is higher than the decrease of inflation rate.
sector with almost 60% of the total between 2003 and 2010. The main performer categories are wholesale and commission trade, real estate, renting and business activities and financial activity, the latter alone accounting for almost 33% of the total in 2010.

**Figure 7** FDI net inflows as GDP % and Oil Price

![Graph showing FDI net inflows as GDP % and Oil Price](image)

Source: World Bank

The energy industry (mining plus petroleum processing) accounts for more than 20% of the total. While this number does not seem relevant, its economic significance overturns if we look at the employment weight of the sectors. As we know from section 5.1, if we compare the energy sector in terms relative to labour force employed of the other sectors, the ratio between foreign investments and people employed is totally in favour of the energy industry. Indeed, in 2010 this ratio for the mining sector was 8 compared with 1.9 for the manufacturing sector and 1 for the service sector.

The problem concerning the lack of financial resources is crucial for the growth of those sectors that do not attract foreign investors as much as the petroleum industry does. While for the manufacturing and mining and quarrying sector the common problem which restricts the increase in production is the lack of financial resources, for the service sector which is less capital intensive than the other two, the main issues are competitive imports and economic uncertainty. In the specific case of the manufacturing sector it must be highlighted that in addition to the lack of financial resources the main factor restricting the increase in production is the insufficient demand for production in the domestic market. This further emphasizes the effects of the Dutch disease which, apart from reducing the competitiveness of the manufacturing sector for the reasons previously explained, exacerbates the conflict between the local manufacturing sector and foreign competitors.

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13 Author’s calculations on Federal State Statistics Service database.
6. Microfoundations of Macro Developments

In this chapter the attention will be set upon the microstructure of the Russian economy, i.e. the impact the industrial organization of Russia may have on its growth trajectory. The analysis will be based on the theory of ‘Granular Origins of Aggregate Fluctuations’ developed by Gabaix. The theory demonstrate that idiosyncratic shocks do not die out in the aggregate if firm size distribution follows a Power Law - fat tailed distribution (Gabaix, 2011, p. 735). More precisely he shows that idiosyncratic shocks to the top 100 firms in the United States can explain one-third of the fluctuations of GDP (Ivi., p. 736). Contrary, if an economy is composed by small-firms, the central limit theorem applies leading idiosyncratic shocks to cancel out in the aggregate.

This theory provides microfoundation for aggregate shocks - those up to here presented - thereby it completes the investigation made in the previous sections neatly.

Data are collected from Bloomberg for Russian firms with revenues larger than $50 millions for the period ranging from 2005-2014. Table 3 underlines the principal statistics concerning the share of GDP for top firms in the economy. Firms with aggregate revenues higher than $50 millions passed from accounting 42% of GDP in 2005 to almost 59% in 2014. Moreover firms concerning natural resources in the top 30 accounted for 26,3% in 2014, while the top 3 bucket represented by Gazprom, Rosnef and Luckoil - exclusively energy firms - accounted for 21% of GDP alone.

**Table 3** Firms’ Revenues as Share of GDP and Distribution of Firms

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>GDP growth</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant 2005</td>
<td>0,6%</td>
<td>1,3%</td>
<td>3,4%</td>
<td>4,3%</td>
<td>4,5%</td>
<td>-7,8%</td>
<td>5,2%</td>
<td>8,5%</td>
<td>8,2%</td>
<td></td>
</tr>
<tr>
<td>Full sample GDP share</td>
<td>58,8%</td>
<td>57,8%</td>
<td>55,6%</td>
<td>56,8%</td>
<td>55,4%</td>
<td>53,1%</td>
<td>50,6%</td>
<td>47,5%</td>
<td>46,5%</td>
<td>41,8%</td>
</tr>
<tr>
<td>Top 50 GDP Share</td>
<td>47,6%</td>
<td>46,9%</td>
<td>44,4%</td>
<td>45,9%</td>
<td>44,2%</td>
<td>41,8%</td>
<td>40,1%</td>
<td>37,9%</td>
<td>37,5%</td>
<td>33,9%</td>
</tr>
<tr>
<td>Top 30 GDP Share</td>
<td>43,2%</td>
<td>42,5%</td>
<td>40,1%</td>
<td>41,5%</td>
<td>40,2%</td>
<td>38,3%</td>
<td>36,1%</td>
<td>34,5%</td>
<td>34,0%</td>
<td>30,6%</td>
</tr>
</tbody>
</table>
The first step of the analysis to apply Gabaix’s theory consists in verifying if the distribution of firm size in the Russian economy follows a Power Law distribution. As we can see by figure 7 and by the statistics here presented there is a strong concentration of GDP creation in the top 30 firms for the full period considered, thereby letting us presume a distribution with fat tails.

*Figure 8* Firms’ Concentration: 2014

By dividing the data sample in buckets of magnitude of $100 millions, I obtain 1650 buckets for the year 2014, ranging from $50 millions up to $165 bn of revenues for Gazprom, the highest contributor. Then by equalizing the number of firms (Y) to the revenues segmented in buckets (X) equation (1) and by applying logarithmic

---

14 The same methodology is applied to the periods up to 2006. A fewer number of buckets are present in the previous years since the highest contributor experienced lower revenues.
properties to equation (2) I can now obtain by regressing the value of buckets on
the number of firms specific to each bucket, the alpha coefficient - the exponent of
the distribution (3)\(^\text{15}\).

1. \(Y = X^a\)
2. \(\ln(Y) = \ln(X^a)\)
   
   By applying logarithmic properties it follows:

3. \(\ln(Y) = -a \ln(X)\)

If the alpha coefficient lies within the interval \(1 < a < 2\) the distribution is Power Law
- fat tailed (Gabaix, 2011, p. 740).

**Figure 9** Power Law Distribution of Firm Size: 2014

![Power Law Distribution of Firm Size: 2014](image)

Source: Bloomberg, Own Computation
Note: The power law distribution is computed for the threshold of firm revenues < $2.5 bn.

By computing the exponent for the time ranges 2014-2006, as shown in figure 9,
the alpha coefficient for each year lies within this interval, stating that the firm size
distribution for the Russian economy is a Power Law.

Given this result we can now move on to compute the Granular Residuals for
the natural resource firms among the top 30 firms so as to appraise the impact of
idiosyncratic shocks on GDP fluctuations. The methodology here applied replicates
likewise the one of Gabaix. First of all we compute the revenue growth rate for the
13 energy firms in the top 30 for each year \((K=13)\). Then we subtract to each firm’s
revenue growth rate the GDP growth rate of the same year \((g_{it, t} - \bar{g}_t)\).

---

15 The regression is not applied to the full sample, but takes into consideration all the firms with
revenues higher than $50 millions and lower than $2.5 bn. By looking at table 3, last row, we can
appreciate the number of firms lying within this interval for each year. The interval has been selected
in order to have only few data points with empty buckets.
This can be interpreted as the differential growth speed between a firm and the economy average\(^{16}\). Then we multiply this value by the weight on the GDP of the firm’s revenue \(S_{(t-1)}/Y_{(t-1)}\) so as to obtain the granular residual of each firm for each year (Gabaix, 2011, p. 750).

\[
\Gamma_t = \sum_{i=1}^K S_{i,t-1}/Y_{t-1} (g_{i,t} - \bar{g}_t)
\]

\[
\bar{g}_t = \beta \Gamma_t + \alpha
\]

By summing up the granular residuals of all the 13 energy firms - equation 4 - we get the time series of the energy sector’s granular residuals for the time period 2014-2006. At this point by regressing the granular residuals on the GDP growth rate - equation 5 - we obtain that the energy sector’s idiosyncratic shocks explain almost 65% of variations in output growth as clearly depicted in figure 10\(^{17}\). Although the existing shortcomings concerning the length of the time series may rise some doubts on the precise impact of the energy sector’s idiosyncratic shocks on GDP fluctuations, the Russian industrial structure is fat tailed distributed, therefore they matter.

This result can be better understood if we think an idiosyncratic shock as a shock to the output volume or to the output price. A manufacturing/service firm may have a bad year because the demand for the product it produces drastically diminishes for whatever reason or because a cheaper version has been started to sell in the market. Therefore its revenues experience a downfall. However not all the firms belonging to the same sector will experience the same bad luck, others may gain market shares and increase output price. However in a sector like the energy sector where the price of output - natural resources - as well as its volumes are exogenous and highly correlated to the global demand, a positive/negative shock is likely to take place for the whole sector simultaneously. Therefore given the extraordinary contribution of the energy sector to the Russian GDP, it is reasonable that idiosyncratic shocks to the energy sector explain almost 65% of the GDP fluctuations. This further investigation stresses an additional weakness of the Russian growth model, i.e., the highly fat-tailed industrial structure amplifies instead of softening the negative effects of external shocks both at firm level and sector level. Idiosyncratic shocks it has been demonstrated do not cancel out in the aggregate thereby contributing to amplify the amplitude of business cycle’s swings.

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\(^{16}\) In Gabaix’s analysis \(Q\) is the average revenue growth rate of top 100 firms, but for my purpose I extend \(Q\) to all firms in the economy, therefore \(Q\) is the GDP growth rate as it follows from the following equation: .

\(^{17}\) The beta coefficient is statistically significant at 1%, since the associated p-value is equal to 0.0053.
Figure 10 Power Law Distribution of Firm Size: 2013-2006

Figure 11 Energy Sector’s Granular Residuals and GDP Fluctuations

Source: Bloomberg, Own Calculations
Note: The energy sector is composed of all natural resource firms in the Top 30.
This implies ultimately that the Russian economy may be able to experience only interchanging periods of shortage and bonanza as respectively took place in 1991-1998, 1999-2008, and 2009-2015.

This last period will be investigated in the next conclusive chapter so as to depict which trajectories might be still pursued by the Russian government.

7. The Curse Once Again

As emphasizes in the previous chapters the major weakness of the Russian model is the extreme vulnerability to external shocks. The first symptom was already clear by the economic crash Russia experienced during the Financial Crisis of 2009 when GDP growth shrank by 13 percentage points from +5.2 to -7.8. A deadly combination of weak global demand, low energy prices and an almost absent manufacturing sector let the economy to freely fall likewise the years following the collapse of the Soviet Union. Since 2008 Russia is almost stagnant and the invasion of Crimea only contributed to exacerbate an already compromised economic recovery. GDP growth decreased further. In 2014 the economy grew only at 0.4% and the forecast for 2015 has been revising constantly downward. The IMF’s last estimates give it close to -4% although oil prices recently stabilizes around $60 per barrel and the Ruble stops depreciating around 50 Ruble per $ from the peak reached in February of almost 70 Roubles per $. The State Capitalism’s main achievement, i.e., the reunification of its energy superpowers through state owned enterprises, whose virtues were exalted during the Russian renaissance of 1999-2008, is showing its deepest and sickly rifts once again. The analysis here developed sheds light on Putin’s double bet: concentration of GDP creation from a single source - energy exports - and from a restricted group of corporations - Gazprom, Rosnef and Luckoil. This creates the most classical doom-loop. A shock to the former immediately propagates to the latter and vice versa, without any chance of breaking the self-reinforcing process through the tools of government intervention - fiscal and monetary policy - since government finances highly depends on both. Moreover pinning high hopes on a fading manufacturing sector is clearly a utopia as we have seen in section 5. If the lack of financial resources was the major problem affecting the sector productivity, now that interest rates spiked up to 17% to curb inflation and the Ruble depreciation, the huge domestic capital flights, the negative FDI flows, and the resetting of domestic savings, the situation looks more a nightmare than a spring-blooming. The same prospects hold for the service sector which is completely reliant on the energy sector’s consumption expenditures and on foreign investments to boost growth. Ultimately the energy sector is far from making a miracle. Opec is persisting with its strategy of high crude oil production to force high-cost producers out of the market.
and thereby increasing market share. The collateral effect is that prices will remain low for the whole 2015 and probably 2016. Moreover the European sanctions against Russia mainly target the Russian energy giants avoiding any possible loan to these companies as well as any type of export of energy related equipment and technology necessary to further boost production. In this hopeless scenario a step off of the Russian government is only a chimera. Putin’s defence spending almost doubled since 2010, up to almost 15% of GDP within 2015, over a third of the federal budget.

The gloomy perspectives here presented are the natural consequence of a short-sighted economic strategy of a man that put his glory in front of the well-being of his state and his people - the crucial point rised by Mehlum, K. Moene, R. Torvik (2006) concerning the crucial role of bad institutions. This once again has proved the curse of natural resources to be painfully true and relentless.

Neglecting the manufacturing sector was a fatal error, unfortunately the point of no-return has already been overtaken.

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Inter-firm Trust and Access to Financing

Elvin Afandi • Majid Kermani

Abstract All cross-transactions among firms require an element of trust, meaning that in areas where a mutual trust is high, moral hazard problems associated with contract enforcement would be relatively low. This is true even in circumstances where third party enforcement is well institutionalized and market-supporting institutions are more advanced. Although it has rarely been studied empirically, the role of trust on financial development is recognized as one of the important mechanisms through which social capital fosters economic development. In our study, we investigate the association between inter-firm trust and access to bank financing for 11,500 firms across developing and transitional countries. Our empirical analyses suggest that enterprises in countries with high levels of inter-firm trust are more likely to obtain bank loans and less likely to report access to financing as a major obstacle to their business growth. This result remains robust with the inclusion of many controls and various specification checks as well as econometric adjustments for the potential endogeneity of trust and access to financing.

Keywords Access to financing - Social capital - Inter-firm trust Prepayment - Developing and transitional countries

JEL Classification G21- P20- D22

1. Introduction Lack of access to financial services among entrepreneurs is a serious problem in developing and transitional countries. Current development theories see the inclusive financial system as a critical factor for generating higher growth, lower poverty and narrower income inequality. In theory, there are a wide range of ways and means that help overcoming access barriers and supporting broader financial

Elvin Afandi (✉) • Majid Kermani
Islamic Corporation for the Development of the Private Sector (ICD),Jeddah, Saudi Arabia
Islamic Development Bank (IDB) Group, Jeddah, Saudi Arabia
e-mail: e.afandi@yahoo.com
Although it has rarely been verified in the empirical literature, the role of trust on financial development is recognized as one of the important mechanisms through which access to financial services can be boosted. The concept of social capital in general, and trust in particular has crucial implications for advancing our understanding of how entrepreneurs’ access to financial services can be improved. Unlike very few studies that investigate trust and financial access in the context of developed countries, our study attempts to analyze the relationship between these two concepts in the context of developing and transitional countries. In general, our paper makes several compelling contributions to address the following gaps in literature on trust and access to finance.

First, and perhaps most importantly, this is the first study which specifically focuses on the relationship between trust and financial access among firms in developing and transitional countries. Following the trust measure suggested by Raiser et al. (2008), we are the first to empirically test the association between inter-firm trust and two different measures of financial access of which one is absolute, and the other is perceptional. Second, the dataset utilized in our study is more comprehensive than the datasets used in the previous studies. Unlike previous works that derived trust and financial access measures from aggregated and household-level sources, we construct both indicators directly from nationally representative firm-level datasets from 30 developing and transitional countries. Furthermore, we combined the micro-data with a diverse set of aggregated macroeconomic indicators in order to reflect the general level of economic, financial and institutional development in the countries. Third, we employ two simultaneous equation specifications with instrumental variables to isolate reverse causality between trust and financial development. In this way, we tried to establish and quantify causal effect of trust on the financial access of firms.

Our results suggest that trust among businesses is strongly associated with the financial outreach of firms. The higher the inter-firm trust in a country, the higher a firm’s probability of obtaining credit and less complaining about financing as a major or severe obstacle to their growth. The results remain the same even after controlling for a wide range of covariates as well as geographic groupings. Using instrumental variable techniques to deal with the potential endogeneity of trust also leaves the results unchanged. In line with the results of earlier studies, we also find that size, obtaining international certificates, capacity utilization and the sectoral origin of firms are significantly related to their financial outreach. In addition to the firm-level characteristics, macroeconomic variables such as GDP per capita, inflation and Rule of Law also explain access to finance.

The rest of the paper proceeds as follows: the next section briefly reviews the underlying literature in the field. Section 3 discusses the notion of trust and financial access, and explains the conceptual framework of the association between trust and
access to finance; Section 4 describes the data and empirical methodology; Section 5 presents the empirical results of the relationship between trust and financial access; and finally Section 6 concludes.

2. Literature Review

Research regarding the potential link between institutions and economic performance has become widespread since the publication of Acemoglu et al.’s (2001) seminal paper. Consequently, in recent years, theme related to the developmental impact of social capital, the natural or informal complement of institutions, has also become increasingly popular in the economic literature. This popularity has further been promoted by influential papers written by Putnam (1993) and Fukuyama (1995). Putnam (1993), for example, documented a strong positive relationship between the degree of individuals’ free association with one another and economic performance in Italy. Fukuyama (1995) also showed the strong effect of social capital on economic development, and since then a large body of empirical literature has emerged to verify the benefits that social capital has on economic outcomes (Helliwell and Putnam 1995, Knack and Keefer 1997, Knack and Zack 2001). Helliwell and Putnam (1995) noted that, when holding income constant, regions of Italy with high levels of social capital grew faster than did regions without high levels of social capital. Knack and Keefer (1997) showed that higher levels of trust were more conducive to growth in a sample of 29 market economies, while Knack and Zack (2001) found this relationship to be persistent even after controlling for the quality of law enforcement.

Social capital is generally defined as the degree of trust, co-operative norms and networks and associations within a society and therefore, trust and social capital are usually used interchangeably in the literature (Putnam et al. 1993, Knack and Keefer 1997, La Porta et al. 1997, Knack and Zak 2001, Bowles and Gints 2002). In addition to its direct effect on economic performance, various arguments have been put forward regarding the ways in which trust can be associated with economic phenomena through indirect mechanisms (Knack 2002, Durlauf and Fafchamps 2004). For example, La Porta et al. (1997) found trust to be correlated with measures of education and health, while Bjornskov (2012) showed that trust affects both schooling and rule of law. Positive associations between trust and international trade have been investigated by Butter and Mosch (2003), while Ackerman (2001) and Ahlerup et al. (2009) documented some interchangeability between social capital and formal institutions.

Despite the theoretically straightforward association between financial development and trust, there are only two fundamental studies that have investigated this link empirically. First, in a cross-country analysis, Calderon et al. (2002) have
empirically tested the relationship between trust and different variables of financial development. Their study concludes that social trust is strongly associated with financial development and efficiency indicators. A second study has been conducted by Guiso et al. (2004) where they empirically tested the relationship between social capital and different measures of financial development in Italy. The authors suggest that households are more likely to use checks, invest in stocks, have access to credit lines and use less informal credit in the areas of Italy where social capital is high. To our knowledge, these are the only two papers that have empirically analyzed the role of social trust in financial development.

3. Conceptual and Methodological Framework

A. Concept of Trust

Theory and empirical evidence point to the important role that trust has in increasing the number of mutually beneficial business transactions. As argued by Arrow (1972), virtually all inter-firm transactions require an element of trust, meaning that an absence of trust reduces the number of mutually beneficial trades that can take place. With this primary argument in mind, in our paper we suggest the level of prepayment demanded by firms from their customers as a measure of (dis)trust. This measure is based on the study by Raiser et al. (2008), where the authors interpreted prepayment as a measure of (dis)trust. In order to construct our trust variable we used the answer to one of the questions raised in the Business Environment and Enterprise Performance Survey (BEEPS): “What percentage of total annual sales were paid for before the delivery in last fiscal year?”.

Prepayment as an indicator of trust is a somewhat generalized measure of trust and reflects the confidence levels towards every type of private enterprise (e.g. foreign, domestic, small, medium and large companies etc.). However, it is narrower than a typical generalized trust metric of the World Values Surveys (WVS), which may not provide a good representation of the existing moral resources in the business sectors of developing and transitional countries (Raiser et al. 2008). Therefore, our measure of trust can also be considered to be a localized indicator, since more a generalized trust variable must also capture the level of trust towards individuals, government institutions, foreigners etc., which we do not capture in our trust measure.

In general, we assume that an enterprise will forgo prepayment if it has enough trust in its customer, either through repeated experience in trading with that customer, or through a recommendation from a third party. Our main assumption is that an enterprise will only attempt to acquire prepayment if it doubts that its money will be paid fully and/or on time. That is, the higher (lower) the prepayment, the lower (higher) the trust in customers.

As a driving force of inter-firm trust, one should not avoid the significance of
enforcing legal contracts in any country. As an example, a supplier may decide to ask for a higher level of prepayment in case of falling into the circumstance that third party enforcement would be insufficient. Nevertheless, prepayment as a measure of trust can also be problematic. The main difficulty with our measure of trust is that it may reflect credit market imperfection, which is common in transitional countries (Bonin et al. 2005). When suppliers lack working capital, they may ask for prepayments to supply their cash requirement. A second problem may arise due to the type of goods being sold, where demand for prepayments may be more prevalent in some sectors than in others (Raiser et al. 2008). A third problem concerns the issue of using trade credits as an alternative measure of trust, which can also be complex and problematic. Given that a detailed discussion of that advantages and disadvantages of our trust measure is provided by Raiser et al. (2008), we confine ourselves to only a brief discussion of the topic, and conclude that prepayment is a powerful proxy for trust.

B. Concept of Access to Finance

The concept of access to finance has become a popular topic in the recent literature. Claessens (2006) defines access to finance as the availability of a supply of financial services at reasonable quality and cost. The terms financial access and financial usage have been proposed to be synonymous by Demirguc et al. (2008). Furthermore, Beck and Demirguc (2008) suggest that the firm-level metrics of financial outreach provide a more precise way to measure access to finance.

In our study, we use two measures as proxies for access to finance by firms. The first measure, Having a Credit, is a supply-side proxy that shows whether a firm has a loan or line of credit. The following question from the BEEPS survey was used to construct the first measure, “At this time, does this establishment have a line of credit or a loan from a financial institution?”. The main strength of this measure is that it reflects actual access to credits, the main element of financial services that are needed, and there is no leeway for firms to provide a wrong or incomplete answer. However, the main problem with this measure is that it does not reflect the extent of access to finance, since it only allows us to know whether a firm uses a loan or not. As suggested by Beck and Demirguc (2008), measures of financial outreach can be either voluntary or non-voluntary. According to the Having a Credit metric, firms that have access but choose not to use services (voluntary absence of finance) are treated in the same way as are those who have no access to finance. This leads to a partially biased estimate in terms of the general access to finance, and therefore an alternative measure of access to finance is proposed in this study.

The second measure, Financing Obstacle, is a demand-side proxy and reflects a firm’s perceptions regarding the degree of difficulty of accessing external
finance. To construct our second measure of financial access, we use the following question from the BEEPS survey: “How problematic is financing for the operation and growth of your business?” Despite its broader definition when compared to the Having a Credit question, using perception-based measures can be also problematic. Since our measure comprises of unaudited self-reporting of financing obstacle, it is possible that while firms report financing obstacles, they are actually not constrained by them. Moreover, this measure does not capture the supply side of the market that is financial institutions’ willingness to supply financial services. However, there is empirical evidence showing that among few, firms’ perception on financing obstacles is strongly associated with their growth rates (Beck et al. 2005).

C. How Does Trust Affect Access to Finance?

Using the inter-firm trust indicator, we assume that in countries where trust is generally high, the supply of financial services would be enhanced. Conversely, in areas where trust is very low, moral hazard problems associated with financing may be increased for lending to businesses. Below, we will elaborate on the ways in which high levels of trust in business transactions may improve firms’ access to financial services.

As discussed by Guiso et al. (2004), a financial contract is ultimately a trust-intensive contract. In addition to the legal enforceability of contracts, the extent to which the lender trusts the borrower can also affect the use and availability of financial services. If, for example, creditors doubt that borrowers will be willing or able to repay their debts, fewer financial institutions will be willing to extend them credits. This is true even in circumstances where third party enforcement is strong, market-supporting institutions are more advanced, and where the opportunistic behavior of borrowers can be avoided by additional clauses such as collateral requirements or by courts.

Financial institutions may also consider firms that exhibit high levels of trust in their partners and have wide networks to be more successful and trustworthy. As argued by Barr (1998), entrepreneurs with larger and more diverse set of networks might have more productive enterprises, resulting in the achievement of better credit ratings. The level of trustworthiness can be viewed as even greater if a firm’s trusted companies overlap with the financial institution’s existing clientele. In this case, the role of an existing member of a financial institution can be twofold. First, it can act as a screening device for loans (Varian 1990, and Ghatak 1999). This is simply because financial institutions are more likely to rely on relationships with well-known business partners than on more formal mechanisms to make decisions and resolve disputes. Second, peer’s pressure or advice are also essential elements of high levels of trust between a financial institution and a new customer since an
existing customer would wish to preserve its corporate reputation and trustworthiness in front of a financial institution.

In light of the above-mentioned arguments, we expect that in our study, the trust-intensive nature of financial contracts will be even more prevalent because of the developing and transitional country context of the study. The following three reasons may support this idea.

First, because of weak formal contract enforcement mechanisms, a financial institution would be more likely to rely on trust indicators in developing and transitional countries. In such countries, banking practices suffer from a number of problems such as asymmetric information, insufficient physical collateral, low legal enforcement and ineffective court systems. Empirical evidence suggests that in high-income countries, enforcement of contract matters most for financial development, while in developing countries information infrastructure is more critical (Djankov et al. 2007). Hence, we can assume that trust would strongly and positively associate with access to financial services in our set of countries.

Second, in general, developing and transitional countries experience lower levels of generalized trust which allows them to benefit from localized trust in their formal financial sector development. Low levels of trust toward others are generally associated with high levels of trust within subgroups such as family, friends and coworkers (Fukuyama 1995). For this reason, we would expect that the likelihood of better access to external finance will be larger in the countries with high levels of inter-firm trust.

Third, the extent to which a financial contract requires trust should also depend on the level and quality of human capital in the developing countries, where the environment is plagued by relatively weak human capital. Low levels of education impede the degree of sophistication of investors, which in turn will require greater levels of trust to make the same investment (Guiso et al. 2004). Hence, we expect financial institutions in developing and transitional countries to rely more on trust as a substitute for their relatively weak level of competency and experience.

4. **Reverse Causality: Does Financial Outreach Influence Trust?**

It is worth noting that simultaneity may be a potential problem in our study as it is possible that firms can afford to be more trusting in countries where access to finance is growing. A more developed financial system may improve the trust of firms which may be encouraged to intermediate or function financially. Furthermore, better access to financial services may encourage firms to expand their business and hereafter, develop higher trust towards clients in order to keep their business growing. Financial deepening can increase incentives for firms to incorporate (Demirguc et al. 2006). All these arguments might suggest that our trust measure
might be an endogenous variable, which would render rather biased estimates. For controlling such simultaneity bias, we use instrumental variables (IV) procedure which requires finding instruments that are both correlated with trust (good instruments), but which have no independent correlation with the dependent variable (valid instruments). To find the best instruments for trust, we follow both Alesina and Ferrare (2000) and Calderon et al. (2002), and use cultural diversity and crime variables that associate with inter-firm trust, but may not have a direct effect on access to finance. The Soviet dummy as a proxy for cultural diversity is justified by the notion that transitional countries that used to be part of the Post-Soviet Union might share cultural traits and a historical heritage that would have an effect on the level of trust in those countries, and which may be different from other transitional economies. The Crime variable is proposed to capture the level of insecurity of business in terms of crime, theft and disorder, with the assumption that enterprises that face more criminal activity and theft may begin from a baseline of a lower level of trust in others.

4. Data and Empirical Specification

A. Data

In our paper we utilize the dataset of the Business Environment and Enterprise Survey (BEEPS) IV, which is a joint initiative of the European Bank for Reconstruction and Development (EBRD) and the World Bank Group (the World Bank). The survey was conducted in 2009 and collects data from 11,500 enterprises operating in the manufacturing and service sectors in 29 transitional countries from Eastern Europe and the Commonwealth of Independent States (including Mongolia) \(^1\). Turkey was also included in the survey for comparison purposes. Table A.1 in the appendix reports the number of firms surveyed from each country.

The Survey uses standardized instruments and a uniform sampling methodology with the following objectives:

(a) To provide statistically significant business environment indicators that are comparable across all of the world’s economies;
(b) To assess the constraints to private sector growth and enterprise performance;
(c) To build a panel of firm-level data that will make it possible to track changes in the business environment over time, and
(d) To stimulate policy dialogue on the business environment and to help shape the agenda for reform.

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\(^1\) Albania, Armenia, Azerbaijan, Belarus, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Macedonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Poland, Romania, Russia, Serbia & Montenegro, Slovak Republic, Slovenia, Tajikistan, Turkey, Ukraine, and Uzbekistan
There are three levels of stratification: industry, size and region. The survey universe was defined as ‘private business establishments with at least five full-time employees’. Government departments including military, police, education, health and similar activities were excluded. The structure of the BEEPS IV questionnaire consists of three modules. First, the basic questionnaire, the Core Module, includes all common questions asked to all establishments from all sectors (manufacturing, services and IT). The second expanded variation, the Manufacturing Questionnaire, is built upon the Core Module and adds some specific questions relevant to the sector. The third expanded variation, the Services Module, is also built upon the Core Module and adds to the core specific questions relevant to either retail or Information Technology (IT). The BEEPS IV covers topics such as firm characteristics (i.e. firm’s age, size, owner, legal status), access to infrastructure (i.e. electricity, transportation, water), government relations (i.e. regulations, tax administration, corruption, construction permits), labor (i.e. number of temporary employees, permanent jobs), firm performance (i.e. capacity utilization, sales, export), access to finance (i.e. saving accounts, sources of investment financing), and business obstacles (i.e. ranking the 15 most important obstacles to business).

In general, several academic papers and policy documents have been produced using the BEEPS data base as a good source for across-country and across-time analysis. A detailed list of papers that has used the BEEPS IV database can be obtained from the World Bank’s enterprise surveys web site at www.enterprisesurveys.org. In addition to the BEEPS IV micro data, we also include country-level information on the macro and institutional variables that might affect the degree of access to finance by firms.

**B. Empirical Specification**

The main objective of our study is to evaluate how inter-firm trust affects access to finance among firms in developing and transitional countries. To do this, we model the financial outreach of firm. We use two proxies that have been employed as outcome variables measuring access to finance. Both of them are dummy variables reflecting actual, as well perceptional, aspects of access to finance. The first dependent variable, *Having a Credit*, indicates whether a firm has a credit or line of finance in the fiscal year surveyed. The following question on the BEEPS IV dataset was used to construct this dependent variable, “At this time, does this establishment have a line of credit or a loan from a financial institution.” The variable is a dummy variable and answers consist of either 0 (no) or 1 (yes).
The second variable, \textit{Financing Obstacle}, is a subjective variable and reflects a firm’s perceptions regarding the degree of difficulty of having an access to external finance. In order to construct our dummy variable for financing obstacles, we use the following question from the survey: “How problematic is financing for the operation and growth of your business?”. Answers vary between 0 (no obstacle), 1 (minor obstacle), 2 (moderate obstacle), 3 (major obstacle), and 4 (very severe obstacle). Based on these answers, we construct our dependent variable which is a new binary variable getting 1 if a firm considers financing as either a major or very severe obstacle (answers 3 or 4 to the question), 0 if otherwise (answers 0, 1 or 2 to the question). Given that both our outcome variables are binary, we perform our estimation in three steps. In the first step, we use the binominal probit regression model. Here, we include firm-level variables first, as not to overload the specification, and then we add country fixed effects as well as country-specific covariates. We run these models for whole sample, containing 30 developing and transitional countries.

Second, we run the pooled regression with all firm-level and country-specific covariates for European and Asian countries separately. This allows us to check the robustness of our coefficients and to see whether the results are geographically bound or not.

Third, we address the possible existence of reverse causality between trust and financial access using the instrumental variables method, namely bivariate probit model. In general, we assume that a firm’s underlying response can be described by the following equation:

$$Y_{ik} = \alpha + F(X'\beta) + C(Z'\gamma) + T'\delta + u$$

where

- $Y_{i}$ - underlying probability that firm $i$ in country $k$, has access to financing.
- $F(X'\beta)$ - is the vector of firm-level independent variables.
- $C(Z'\gamma)$ - is the vector of country-specific explanatory variables.
- $T'\delta$ - is the measure of inter-firm trust.
- $u$ - is a disturbance parameter, and it is assumed that the parameter has normal distribution.

As a main independent variable, we construct our trust variable, \textit{Average Trust}, using the answers to the BEEPS IV question on “What percentage of total annual sales were paid for before the delivery in the last fiscal year?”. We calculate the average opposite value of this statement for each country. As such, our country-level trust scores indicate the percentage of firms, on average, that trust in their
Inter-firm Trust and Access to Financing

To study the determinants of a firm’s access to finance, we proceed in three steps. First, as has been done in previous studies, we use a wide set of firm-level controls (Beck et al. 2005). We expect a firm’s access to finance to be related to its size, age, export status, sectoral origin, capacity utilization, ownership status and external auditing experience. Second, controlling for country fixed effects is also important because certain countries may be more prone to reporting better access to finance. Therefore, we do not want to bias our results if our regressors systematically co-varies with this episode of more intensive reporting of financial development, and therefore prefer to include country dummies. Third, we also include several country-level variables in our analysis. We use GDP per capita, inflation and Rule of Law to measure overall economic development, financial perfection and legal system efficiency, respectively. Table A.2 in the appendix reports the sources and definitions of the country-level dataset, along with the actual interview questions.

Finally, as explained above, we use equation (1) as the baseline to address the possible existence of reverse causality between trust and financial access. In this regard, we employ two additional indicators to instrument our trust variable. The first is Soviet, a dummy which gets 1 if a transitional country was a member of Post-Soviet Union, and otherwise it gets 0. The second is the Crime variable which we construct from the answers to the following question of BEEPS IV: “How much of an obstacle are crime, theft and disorder to this establishment?”. Answers vary between 0 (no obstacle), 1 (minor obstacle), 2 (moderate obstacle), 3 (major obstacle), and 4 (very severe obstacle). As instrumental variable methods, we employ two different models: (i) standard simultaneous equations (2SLS) to perform standard IV tests and (ii) the bivariate probit model which explicitly takes into account the binominal nature of the outcome variable (Sajaia 2006).

5. Empirical Results and Discussions

A. Descriptive Analysis
In Table 1, we report summary statistics of access to finance indicators for each country, where we see a large variation in access to finance across countries, ranging from Uzbekistan (16.4) to the Slovenia (77.5) for the measure of Having a Credit and from Russia (40.2) to the Estonia (6.3) for the measure of Financing Obstacles.

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2 In unreported regressions we also analyzed a firm-level trust variable instead of a country average measure. While the results were unchanged in a majority of the specifications, in a very few cases we found the variable statistically insignificant. Since Raiser et al. (2008) also found country-level trust to be a more robust metric, we stick to it and report only the results of the aggregated measure.
<table>
<thead>
<tr>
<th>Country</th>
<th>Having Credit</th>
<th>Financing Obstacle</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>Albania</td>
<td>89</td>
<td>51</td>
<td>86</td>
</tr>
<tr>
<td>Belarus</td>
<td>116</td>
<td>46</td>
<td>138</td>
</tr>
<tr>
<td>Georgia</td>
<td>216</td>
<td>59</td>
<td>152</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>246</td>
<td>69</td>
<td>109</td>
</tr>
<tr>
<td>Turkey</td>
<td>441</td>
<td>39</td>
<td>693</td>
</tr>
<tr>
<td>Ukraine</td>
<td>554</td>
<td>67</td>
<td>277</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>306</td>
<td>84</td>
<td>60</td>
</tr>
<tr>
<td>Russia</td>
<td>556</td>
<td>56</td>
<td>439</td>
</tr>
<tr>
<td>Poland</td>
<td>219</td>
<td>50</td>
<td>215</td>
</tr>
<tr>
<td>Romania</td>
<td>236</td>
<td>47</td>
<td>270</td>
</tr>
<tr>
<td>Serbia</td>
<td>122</td>
<td>31</td>
<td>266</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>322</td>
<td>59</td>
<td>221</td>
</tr>
<tr>
<td>Moldova</td>
<td>193</td>
<td>53</td>
<td>170</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>113</td>
<td>31</td>
<td>246</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>308</td>
<td>81</td>
<td>72</td>
</tr>
<tr>
<td>Macedonia</td>
<td>148</td>
<td>41</td>
<td>217</td>
</tr>
<tr>
<td>Armenia</td>
<td>203</td>
<td>55</td>
<td>166</td>
</tr>
<tr>
<td>Kyrgyz Republic</td>
<td>180</td>
<td>77</td>
<td>54</td>
</tr>
<tr>
<td>Mongolia</td>
<td>157</td>
<td>43</td>
<td>205</td>
</tr>
<tr>
<td>Estonia</td>
<td>117</td>
<td>43</td>
<td>153</td>
</tr>
<tr>
<td>Kosovo</td>
<td>206</td>
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<td>63</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>121</td>
<td>51</td>
<td>117</td>
</tr>
<tr>
<td>Hungary</td>
<td>159</td>
<td>55</td>
<td>131</td>
</tr>
<tr>
<td>Latvia</td>
<td>108</td>
<td>40</td>
<td>163</td>
</tr>
<tr>
<td>Lithuania</td>
<td>110</td>
<td>40</td>
<td>164</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>139</td>
<td>52</td>
<td>129</td>
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<td>Slovenia</td>
<td>62</td>
<td>22</td>
<td>214</td>
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<tr>
<td>Bulgaria</td>
<td>159</td>
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<td>Croatia</td>
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<td>30</td>
<td>112</td>
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<tr>
<td>Montenegro</td>
<td>48</td>
<td>41</td>
<td>68</td>
</tr>
<tr>
<td>Total</td>
<td>6,001</td>
<td>52</td>
<td>5,499</td>
</tr>
</tbody>
</table>
In the following two charts, we aim to depict the association between financial access and the average trust level in each country. Chart 1 shows that there is substantial variation with regard to having a loan among transitional countries, with banked private firms being less common in economies with lower inter-firm trust, such as most of the countries in the Commonwealth of Independent States (CIS). Furthermore, having a loan or obtaining a line of credit tends to be higher in countries where inter-firm trust is also high. For example, access to credit is apparently better in Slovenia, Croatia, Serbia and Turkey where inter-firm trust is also prevalent, while CIS countries such as Uzbekistan, Azerbaijan, Tajikistan and Kyrgyz Republic are found to experience lower access to credit and lower inter-organizational trust.

**Figure 1** Having a credit vs. inter-firm trust in transitional countries

Chart 2 shows the association between inter-firm trust and self-reported financing obstacle. A cursory examination of the chart shows that self-reported financing obstacle is lower in countries where generalized inter-firm trust is high. Despite some minor differences, the results of Chart 2 mirror the outcomes of Chart 1. For example, the majority of CIS countries which were found to have both low levels of inter-firm trust and low access to lines of credit (e.g. Russia, Ukraine, Azerbaijan) seem to also exercise high levels of self-reported financing obstacles. Conversely, fewer firms in the relatively advanced European countries (e.g. Estonia, Hungary, Turkey) report that financing is a major or severe obstacle to their growth, with apparently higher inter-firm trust.
Figure 2 Financing obstacle vs. inter-firm trust in transitional countries

The cross-correlation between our financial access indicators and trust, as well as a broad array of firm-level and country-specific indicators is shown in Table 2. Both Having a Credit and Financial Obstacle are correlated with the trust variable. Although this correlation is not that high in absolute terms, it appears to be both statistically and economically significant. A firm operating in a country with a high level of trust tends to have better access to credit and usually do not report access to finance an obstacle to its growth.

When examining the correlation between access to finance indicators and different control variables, we can identify some other interesting findings from Table 2. First, all control variables (except foreign ownership) seem to statistically correlate with the Having a Credit measure, while some correlations such as size, auditing status and capacity utilization were found not to be statistically significant with regard to the measure of Financing Obstacle. In terms of Having Credit, some control variables are more strongly correlated with the dependent variable than are others. For example, being large, audited and having any international certificate are all positively and strongly correlated with Having a Credit. As far as the Financing Obstacle is concerned, having a quality certificate and being owned by foreigners are negatively correlated with self-reported financing obstacle, while being older and belonging to the manufacturing sector seems to positively correlate with reporting poor access to finance. Finally, according to Table 2 results, we also note that all country-specific variables are significantly (statistically and economically) correlated with both proxies of financial access.

Table 2 also shows that many of the control variables are correlated with each other. For example, externally audited as well as export oriented firms tend to be older, larger, and foreign-owned, while older firms tend to be larger and involved
### Table 2 Cross-correlation

<table>
<thead>
<tr>
<th></th>
<th>Having Credit</th>
<th>Financing Obstacle</th>
<th>Trust</th>
<th>Age</th>
<th>Small</th>
<th>Medium</th>
<th>Manufacturing</th>
<th>Trade</th>
<th>External Audit</th>
<th>Certificate</th>
<th>Foreign Owner</th>
<th>Capacity Utilization</th>
<th>Export Status</th>
<th>GDP p.c.</th>
<th>Inflation</th>
<th>Rule of Law</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having Credit</td>
<td></td>
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<tr>
<td>Financing Obstacle</td>
<td>0.052***</td>
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</tr>
<tr>
<td>Trust</td>
<td>0.196***</td>
<td>-0.12***</td>
<td></td>
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</tr>
<tr>
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<td>0.148***</td>
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<td>GDP p.c.</td>
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<td>0.053***</td>
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<td>Inflation</td>
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<td>-0.01</td>
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<td>-0.02***</td>
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<td>-0.07***</td>
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<td>Rule of Law</td>
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<td>-0.03***</td>
<td>-0.004</td>
<td>-0.06***</td>
<td>0.031***</td>
<td>0.125***</td>
<td>0.169***</td>
<td>0.074***</td>
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<td>0.138***</td>
<td>0.578***</td>
<td>-0.65***</td>
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</table>
in manufacturing rather than trade and other services. Furthermore, the country-level trust variable is also correlated with other aggregate variables, showing that economies with higher levels of inter-firm trust tend to have larger GDP per capita, lower inflation and better Rule of Law.

B. Econometric Results

1. Having a Credit

In order to investigate the true effect of inter-firm trust on financial access, together with all firm characteristics and country-specific controls that explain our dependent variable, we conduct a multivariate analysis. Columns (1), (2) and (3) of Table 3 report marginal effects of binominal probit estimates for Having a Credit using the whole sample of 30 countries. The reported estimates in Column (1), which display marginal effects of firms-level variables on the Having Credits, show that access to credit is positively associated with level of trust. After controlling for firm-specific variables, a 1 unit increase in country-level trust is associated with a 0.7 percentage point higher probability that the firm has a credit from a financial institution. This effect is statistically significant at the 1-percent level.

Most control variables coefficients in Column (1) are statistically significant and have the expected signs. For example, large size, external auditing status, having international certification, being export oriented and higher capacity utilization are all positively associated with access to credit, and all these controls have statistically significant coefficients. However, age and sectoral origin of firm appear to be statistically non-significant. Finally, being owned largely by foreign individuals or companies is negatively associated with the probability of having a credit. This however, may be partially due to foreign-owned enterprises having less necessity for borrowing money since they may have more access to internal capital resources than do firms that are domestically owned.

Table 3 Effect of trust on having a credit. (The symbols ***, **, * mean that the coefficient is statistically different from zero, respectively, at the 1-, 5-, and 10- percent levels.)

<table>
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<tr>
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<td>0.0151***</td>
<td>0.0070***</td>
<td>0.0067***</td>
<td>0.0096***</td>
<td>0.0039***</td>
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<td>(0.0004)</td>
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<td>(0.0007)</td>
<td>(0.0014)</td>
<td>(0.0010)</td>
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<td>-0.0001</td>
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<td>(0.0004)</td>
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<td>(0.0008)</td>
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<tr>
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<td>-0.2460***</td>
<td>-0.1800***</td>
<td>-0.2055***</td>
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<td>(0.0132)</td>
<td>(0.0135)</td>
<td>(0.0137)</td>
<td>(0.0177)</td>
<td>(0.0219)</td>
<td>(0.0367)</td>
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<td>Medium</td>
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<td>-0.1134***</td>
<td>-0.1087***</td>
<td>-0.1193***</td>
<td>-0.1068***</td>
<td>-0.1048***</td>
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<td>(0.0130)</td>
<td>(0.0132)</td>
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<td>(0.0175)</td>
<td>(0.0211)</td>
<td>(0.0346)</td>
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</table>
Column (2) of Table 3 displays the marginal effects of the probit model with country fixed effects. Here, we include country dummies in the core regression, as specified in Column (1). The results show that the positive and significant relationship between inter-firm trust and access to banking services is highly robust. However,
The economic magnitude of this effect is relatively small, suggesting that a 1 percent increase in aggregate trust level is associated with a 0.15 percentage point greater likelihood of a firm having credit. Other covariates remain statistically as well economically significant.

In Column (3) of Table 3, we also control for some country-specific variables in order to isolate the impact of trust from other aggregate indicators. The magnitude and significance of the effect of trust remains the same as in Column (1), suggesting that the probability of having credit increases by 0.7 percentage points when country level inter-firm trust increases by 1 percent. Moreover, in countries where GDP per capita and Rule of Law are high, firms are more likely to obtain credit. Finally, firms operating in countries with high inflation, appear to have lower access to credit.

In Column (4) and (5), the same model of Column (3) is being used with splitting the sample into Europe and Asia respectively. In brief, neither economic nor statistical significance of the effect of inter-firm trust on having credit has changed. Other results are also largely the same as in Column (3), meaning that none of the marginal effects of covariates changed the sign, while very few changed in terms of significance level.

As mentioned, the results of binominal probit estimates of the relationship between aggregate trust and access to finance must be interpreted cautiously because of the potential reverse causality between these two variables. Column (6) of Table 3 displays the results of the main regression equation of the bivariate probit model. We find that trust is strongly related to financial access, and the model passes all statistical tests for instrumental variable procedures (Sargan’s test for overidentification, the Anderson canonical correlation test for joint significance and the Wu-Hausman test for endogeneity), meaning that estimating the bivariate probit instead of the single equation probit appears to be more appropriate.

In Column (6) the results of the simultaneous equations bivariate probit regression are reported in marginal effects. These results suggest that a 1 unit increase in country-level trust among businesses increases the probability of having credit by 0.4 percentage points. Between firm-level and country-specific variables, the same controls remained statistically as well as economically significant, and their magnitudes are very similar to the ones obtained in Column (3). The degree of legal enforcement is also positively related to financial access, and this association is statistically insignificant.

2. Financing Obstacle

Thus far, we have restricted our econometric analysis to the association between

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3 In addition to the bivariate probit model, we have also run the same bivariate probit model with 2SLS in order to perform the standard tests of the IV estimates (the results of the 2SLS model can be provided upon the request).
aggregate trust and *Having Credit*. However, we know that having credit can only partially reflect the true picture regarding firms’ access to finance. As discussed earlier, when a firm has access to (denial of) a loan or line of credit from a financial institution it does not necessarily mean that it has better (worse) access to finance when compared to a firm with zero (more) borrowing. In this regard, we use our second measure of access to finance namely *Financing Obstacle*, and employ the same model specifications used above to estimate the effect of trust on financial outreach. As was elaborated above, we expect access to finance to be a less severe obstacle for firms operating in countries with higher levels of inter-firm trust.

In Table 4, we use the four model specifications that we employed in Table 3 and find a striking confirmation of our expectations. Column (1) of Table 4 reports the marginal effect of aggregated inter-firm trust on the self-reporting of financing obstacle. Trust has a negative and statistically significant impact on the degree of financing obstacle. A one unit increase in inter-firm trust in a country reduces the probability of a firm’s financing access to be a major or severe obstacle by 0.35 percentage points. Among firm-level covariates, age, size, sectoral origin, ownership structure and international certification appear to be statistically significant in terms of explaining a firm’s reporting on financing obstacles. However, external auditing status, capacity utilization and the export orientation of firms are found not to be statistically significant in explaining subjective financing obstacles. Among statistically significant covariates, for example, older enterprises and firms within manufacturing were more likely to have reported access to finance as a severe obstacle than were younger firms and companies operating in other sectors. Interestingly, foreign-owned firms seem to report less financing obstacles, which confirms the result we obtained for *Having a Credit*. This can help justify our argument that firms owned by foreigners do not obtain credit as frequently as do domestic firms, largely because the former have enough internal investment resources available to them not to need to apply for credit.

<table>
<thead>
<tr>
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<td>0.0006**</td>
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<td>0.0000</td>
<td>0.0006**</td>
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<td>(0.0003)</td>
<td>(0.0003)</td>
<td>(0.0005)</td>
<td>(0.0009)</td>
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<td>(0.0119)</td>
<td>(0.0154)</td>
<td>(0.0186)</td>
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</table>
Column (2) of Table 4 reports the estimates of the same binomial probit model with country fixed effects. We find that our variable of trust is significantly associated with financing obstacle, suggesting that a 1 percent increase in aggregate trust leads to a 0.55 percentage point reduction in the probability of a firm self-reporting as financially constrained. The patterns and magnitudes of other estimates remained very similar to those obtained in Column (1).

In Column (3) we add the country-level variables and re-run the model. We confirm the finding that firms in countries with higher trust levels face lower
financing obstacles. The results also indicate that firms in countries with higher levels of GDP per capita and Rule of Law report lower financing obstacles, although the estimates appear statistically insignificant. However, the inflation level was found to be positive and significant at the 1 percent level, suggesting that enterprises in countries with higher inflation levels are more likely to face higher financing obstacles. When we include country-specific variables, the firm-level covariates found to be significant in predicting firms’ financing obstacles continue to be significant with one additional variable, namely capacity utilization, becoming significant as well.

In Column (4) and (5), we again split the whole sample into European and Asian countries and rerun the model specified in Column (3) respectively. In general, the results of Column (4) and (5) show that our findings are not geographically bound for financing obstacle either, and the conclusions above hold true irrespective of the country context.

Finally, in Column (6) we provide the marginal effects of the simultaneous equations bivariate probit regression for the independent variable Financing Obstacle. As was expected, trust was found to be statistically as well as economically significant, even when we instrument our basic measure of trust with Soviet and Crime dummies. A one unit increase in aggregated inter-firm trust reduces the probability of financing obstacles for firms by 0.3 percentage points. All other control variables have the expected sign and most of them are statistically significant.

6. Conclusion

As suggested by Beck and Demirguc (2008), the agenda on access to finance is still unfinished and there is more research needed to identify critical barriers preventing firms from financial outreach and inclusion. While supply-side barriers were found to be important in excluding some fraction of businesses in transitional countries, cultural impediments such as inter-firm trust appear also to be critical in obtaining formal financial services. Provided that formal institutions are commodities which are in relatively short supply in developing and transitional economies, our results suggest that developing trust among businesses is likely to prove to be a powerful tool for expanding access to finance.

Third party enforcement through mutual trust and networks may be a useful complement to enforcement through formal institutions such as courts. The efforts aimed at building trust among businesses can prove to be even more important to success in transitional countries where legal enforcement is often inadequate. With this conclusion in mind, the question regarding how to eradicate the ultimate causes of distrust among businesses in transitional countries becomes one of the key components of reforms towards enhancing financial inclusion.
Our results are also a fruitful avenue for further research on the importance of inter-firm trust on economic outcomes. For example, some of the numerous possible topics for future research that have been identified include the link between inter-firm trust and a wide range of firm-level performance metrics including the growth, innovation, profitability etc.

References
Arrow KJ (1972) Gifts and Exchanges, Philosophy and Public Affairs 1: 343-362
Appendix

Table A.1. Country samples

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<td>6 Bulgaria</td>
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<td>7 Croatia</td>
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<td>15 Kyrgyz Republic</td>
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<td>17 Lithuania</td>
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<td>Uzbekistan</td>
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<td>Total</td>
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**Table A.2. Variable description and data sources**

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<th>Variable</th>
<th>Description</th>
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<td>Firm-level variables</td>
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<td>Having Credit</td>
<td>Dummy variable is equal to 1 if firm has a loan or line of credit, otherwise 0</td>
<td>BEEPS</td>
<td>2009</td>
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<tr>
<td>Financing Obstacle</td>
<td>Dummy is equal to 1 if financing constraint is cited as “moderate” or “major obstacle”, otherwise 0.</td>
<td>BEEPS</td>
<td>2009</td>
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<td>Trust</td>
<td>Percentage of total sales for which firms are not paid in advance of delivery (country average)</td>
<td>BEEPS</td>
<td>2009</td>
</tr>
<tr>
<td>Age</td>
<td>Number of years since establishment began operations</td>
<td>BEEPS</td>
<td>2009</td>
</tr>
<tr>
<td>Small</td>
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<td>2009</td>
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<tr>
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<td>BEEPS</td>
<td>2009</td>
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<tr>
<td>Variable</td>
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<td>Source</td>
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</tr>
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<td>External audit</td>
<td>Dummy variable is equal to 1 if financial statements of firm checked &amp; certified by external auditor in last fiscal year, otherwise 0.</td>
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<td>2009</td>
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<td>Dummy variable is equal to 1 if firm has internationally recognized quality certification, otherwise 0.</td>
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<td>2009</td>
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<td>Foreign Ownership</td>
<td>Percentage of firm owned by private foreign individual, companies or organizations.</td>
<td>BEEPS</td>
<td>2009</td>
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<tr>
<td>Capacity Utilization</td>
<td>Percentage of capacity utilization of establishment in the last year.</td>
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</tr>
<tr>
<td>Export status</td>
<td>Dummy is equal to 1 if over 50 percent of firm’s products &amp; services were export sales, otherwise 0.</td>
<td>BEEPS</td>
<td>2009</td>
</tr>
<tr>
<td>Country-level variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP per capita (Log)</td>
<td>GDP per capita in USD per year</td>
<td>EBRD</td>
<td>2008</td>
</tr>
<tr>
<td>Inflation</td>
<td>Increase of consumer prices (annual average)</td>
<td>EBRD</td>
<td>2006-08</td>
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<td>Rule of Law</td>
<td>Rule of Law Index</td>
<td>WGI</td>
<td>2006-08</td>
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Journal Transition Studies Review
Aims and scope

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 reunifica-
tion 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.

Transatlantic and Asia-Pacific relations, security and international order represent, together with applied regional studies, another cornerstone of the Network’s activity and of Transition Studies Review’s contents as well as of three other Journals covering specific aspects and regions: the Journal of Global Policy and Governance; the Journal of East Asia in World Affairs, in cooperation with Asian universities and the Journal of Welfare Policy and Management at Udine University. The Network is deeply committed to a wide range of transition issues related to quantitative modeling and tools to analyzing and researching economic, financial, strategic studies, social, cultural, environmental, juridical main issues.
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JMNE - Journal Mittelforum and Next Europe
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JEAWA - Journal East Asia in World Affairs
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Are Transition Economy Labor Markets Less Efficient at Matching Workers to Appropriate Jobs?
Vera A. Adamschik, Josef C. Brada, Arthur E. King

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Patrizia Stacchi

R&D Spillovers and Total Factor Productivity in South Korea with ARDL Approach
Safuzzaman Ibrahim, Hazirah Mohd Sidik, W. N. W. Azman-Sani, Mazlina Abdul Rahman

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

Comparing the EU and China Wind Energy Policies
Ho-Ching Lee, Pei-Fei Chang

Trading Effect in Emerging Stock Markets Risks-Return Volatility Dynamics and Enterprises Economic Exposure
Faisal Khan, Melati Ahmad Amaar, Lim Guan Choo, Mohammad Tahir

“Theory of Communicating Vessels”. The Problem of Currency Regulation
Sandoyan E.M., Voskanyan M.H., Barseghyan M., Mnatsakanyan L.A.

Determinants of the Demand for Life Insurance. Evidence from Jordan
Demeh Darsalah

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Ehsan Rajabi, Junainy Mohammad

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Rabab Chibet

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May 2015
Volume 22 - Number 1 June 2015

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