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Chee-Heong Quah\*

ECONOMIC FEASIBILITY OF A BRICS MONETARY UNION

**Abstract**

This paper attempts to assess the feasibility of monetary integration between the world's fastest growing economies today, namely China, Russia, Brazil, India, and South Africa (BRICS) by reviewing variables according to the classical optimum currency areas (OCA) framework and recent considerations. The proposition is that, with greater trade and financial cooperation between the BRICS through the Contingent Reserve Arrangement (CRA), New Development Bank (NDB), and Asian Infrastructure Investment Bank (AIIB), there should be greater multilateral economic and monetary interconnectedness in the long run. In addition, tighter monetary integration between the BRICS can be a potential strategic reaction to the financial instabilities originated in the financial centers of the West. Since China is the largest economy, it is designated as the monetary anchor country in the exercise. The examined period spans from 2000 to 2013, including the periods before and after the peak of the 2008-09 global financial crisis. While the findings are mixed, results suggest Brazil as the most feasible candidate to unify monetarily with China.

**JEL CLASSIFICATION:** E62, F31, F32, F41, F42, O53.

**KEYWORDS:** CURRENCY, MONETARY UNION, BRICS, RENMINBI, YUAN.

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## **1. Introduction**

The strength of the dollar is grounded on its status of international reserve currency. In the absence of this privilege, foreigners' willingness to purchase the American government liabilities will diminish sharply (Stokes 2014). Confidence in the health of the US economy and the dollar can plunge because of continued large and rising current account deficits, unfunded liabilities of the federal government, expansionary monetary policy, and unreliable financial regulation system.

Against this gargantuan stock of foreign debt, there is little doubt that the US federal authorities will choose to inflate prices and depreciate the value of the dollar to diminish the real value of the amount owed rather than to default outright (Ryan 2011). As a reaction to this, the Chinese government has begun to diversify and minimize devaluation risk by purchasing other assets such as gold and eurozone bonds.

At the same time, with the rise of China, India, Brazil and other emerging economies, today the US no longer towers over the global economy and hence the dollar will not be as dominant as that after the Second World War (Eichengreen 2010). As a matter of fact, the emerging Brazil, Russia, India, China, and South Africa (BRICS) are home to more than 40 percent of the world's population and account for 55 percent of global economic growth between 2000-08 (Carmody 2013). The BRICS's common agendum of pushing international economic governance away from neoliberalism and western dominance was manifest when they denounced that austerity in the West was holding back world growth and that their central banks' unconventional monetary policy encouraged speculation worldwide instead of real growth (Desai 2013).

Led by China, the emerging economies have organized alternative sources of credit flows in the attempt to circumvent the conditionality of the IMF loans and to counter the hegemony of the US (Sen 2015). This is not surprising because, as of 2014, The BRICS possessed just 11% of the votes in the IMF, despite accounting for more than 20% of global economic activity (Eichengreen 2014).

To reduce their dependence on the dollar, in 2015 the BRICS established the Contingent Reserve Arrangement (CRA) to provide liquidity and precautionary instruments against actual or potential short-term balance-of-payment pressures. The launch of these financial institutions by the BRICS,

when combined with the proposed intra-BRICS clearing arrangement in local currencies, shall help to mitigate shocks brought about by the American economy.

Another institution is the New Development Bank (NDB) created by BRICS in July, 2014 which serves the mandate of investing in infrastructure and renewable energy projects. The first set of loans at 811 million dollars was approved in May 2016. At the same time, China also led the formation of the Asian Infrastructure Investment Bank (AIIB) that began operation in 2015, aimed at financing infrastructure development in the Asia Pacific region.

Just as the US used its control over the IMF to exert pressures on debtor nations, a successful BRICS bank and AIIB can, by offering loans to governments, be used in the similar way in other situations (McMaken 2015). By making loans in currencies other than the dollar, they can loosen the dollar's clutch on the default reserve status. Once these alternative institutions diminish the value of holding dollar assets, foreign holders can aggressively dump dollars just like the way the Americans dumped the pound-sterling bonds in 1956.

Despite the above potentials, there are several flaws in the present BRICS agreement. Firstly, balance of payments constraints for BRICS members will not be relieved as the present arrangement requires an IMF intervention after just 30 percent of the quota is borrowed. Secondly, NDB appears close to the Bretton Woods model, promoting frenetic extractivist calculations based on US dollar financing (Bond 2016). On top of that, further progress depends upon BRICS capability to overcome structural obstacles under which huge growth discrepancies and heterogeneous domestic priorities are the most prominent ones (Liu 2016).

Nevertheless, in the light of the declining dollar and the emergence of BRICS, this paper assesses the feasibility of a form of monetary integration between the BRICS countries. The analytical tool deployed is the criteria of real convergence stemming from the optimal currency area (OCA) theory and recent developments in the literature. The method used is straightforward and does not conceal actual characteristics of data through aggregation which may be present in econometric analysis.

Since today China is the most promising contender to the US in the economic and monetary arenas, China is designated as the monetary anchor country in the present analysis. A total of nine dimensions are explored of which most of the items are measured with respect to China whilst the other

facets are measured in absolute terms. Whilst findings are mixed, Brazil stands out as a potential candidate to integrate monetarily with China.

The remainder of this paper consists of two sections. The second section introduces the OCA-related variables and simultaneously evaluates these criteria in relation to the BRICS countries. The third section discusses the key findings and concludes.

## **2. Criteria and evaluation**

The foundations of the OCA theory are laid out by Mundell (1961), McKinnon (1963), and Kenen (1969). In essence, the OCA theory outlines the criteria under which an economic zone can reap the benefits and reduce the costs of joining a currency area. Following Quah (2017, 2016b, 2015, 2014b, 2014a, 2013b, 2013a, 2012a, 2012b), Quah and Crowley (2010, 2012a, 2012b), the OCA criteria investigated here are trade openness, business cycle synchronization, exchange rate variability, inflation convergence, and real interest rate symmetry. The efficacy of the criteria was confirmed when Artis and Zhang (2001, 2002) accurately singled out Portugal, Italy, Greece, and Spain as the euro states with the least conforming OCA features against Germany.

To assess the appropriateness of monetary integration between the BRICS countries and constrained by data availability, the characteristics of these economies are examined from 2000 to 2013, a period that includes the 2008-09 global financial crisis episode. Observations are made to check for significant changes after this crisis period. If a BRICS country comparatively conforms to the criteria and/or vis-à-vis the others, it indicates greater readiness for exchange rate fixation with China. Data sampled for each variable are constrained by availability for the period concerned.

### *2.1 Business Cycle Symmetry with China*

When business cycles of two currency areas are highly synchronous, the role of exchange rate flexibility as a temporal external shock absorber becomes less important. For present purpose, the greater the degree of symmetry in business cycle with China, the smaller will be the costs from renouncing independent monetary policy for a peripheral country. In other words, the stronger is the case for a monetary unification with China.

In terms of measurement, this criterion is measured using synchronicity of business cycles through evaluation of cyclical component of output (see Gerlach 1988; Baxter and Stockman 1989). Over here, the cyclical component is extracted by detrending annual real GDP<sup>1</sup> series using Hodrick-Prescott filter (see Quah 2015; Artis and Zhang 2001, 2002).

Figure 1 compares each of the business cycles of Brazil, Russia, India, and South Africa with that of China for 2000-2013. Correlation coefficients of the cycles by periods of 2000-08, 2009-13, and 2000-13 are provided in the accompanying Table 1. Since China plays the anchor country in this exercise, the business cycle of each of the other countries is correlated with that of China. As an indication of relative variation in national output, standard deviations<sup>2</sup> (SD) of the cycles are also furnished in the table.

As reflected by the charts, in the pre-crisis period of 2000-08, it is apparent that each output cycle of the other countries does move substantively in tandem with China. The visibly synchronous trajectories are corroborated by the corresponding correlation coefficients. For this pre-crisis period, China experiences huge swing in production and the country most convergent with China during this time is South Africa.

As for the post-crisis period of 2009-13, extent of symmetry with China has increased for all. Indeed, Brazil and India have been most synchronous with China with most parallel paths and statistically high correlation coefficients. While increased synchronicity might be largely due to the global crisis shocks, this observation should not be a hindrance to present analysis. Not all countries are equally affected by the crisis.

As can be seen here, Russia and South Africa have not increased much their symmetry with China in the post-crisis period. Hence, one cannot easily claim that greater business cycle symmetry with China is due to the global crisis per se. Unquestionably, fundamental factors may play a role in bringing about the increased symmetry with China for Brazil and India.

When the whole period of 2000-13 is observed, synchronicities with China are moderated but are still significant as shown by the still substantial correlations. Amongst all, Russia is the least parallel with China.

In respect of variation in real production, variability of China has remarkably reduced as shown by milder oscillation and smaller standard

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<sup>1</sup> Real GDP at annual frequency is used for consistency across all countries.

<sup>2</sup> Standard deviation for each case equals to unity for the whole period because standardized detrended values are used for consistency and comparability.

deviation in the post-crisis period. A similar pattern is also seen for South Africa. On the contrary, Brazil's output variation has somewhat risen after the global crisis. Also interesting is the relatively stable China during the crisis period of 2008-09, as shown by its moderate swing. This moderation could be a result of its massive fiscal stimulus in infrastructure and energy and increased growth in domestic demand (see Nolan 2015).

In a nutshell, despite the greater output gyration in Brazil, the business cycles of Brazil, Russia, India, and South Africa have somewhat increased their convergence with that of China. If one were to rank business cycle convergence with China as indicated by correlation of the post-crisis period, the first place will be taken by Brazil, the second place by India, the third place by South Africa, and the last place by Russia.

## *2.2 Trade Intensity with China*

The OCA theory suggests that countries which trade a great deal with each other are good candidates for monetary integration as the benefits in terms of transaction cost savings and exchange rate certainty would be greatly enhanced (McKinnon 1963). Also, the more open the economies are to each other, the less asynchronous would be their output fluctuations arising from demand shocks (Frankel and Rose 1998).

A bilateral trade measure as used by Quah (2015) and Artis and Zhang (2001, 2002) is adopted here to quantify trade openness with China. For a country as denoted by  $i$  trade openness is measured by bilateral trade intensity,  $(x_{i,r} + m_{i,r}) / (x_i + m_i)$  where  $x_i$  and  $m_i$  are the dollar values of exports and imports of goods of that country and subscript  $r$  indicates destination to or source from the reference country, or China in this analysis. Figure 2 puts together 4 lines, each depicting percentage share of goods trade with China over total goods trade from 2000Q1 to 2013Q4.

As shown by Figure 2, in the early years, Russia records the greatest trade with China, standing at around 5 percent. Its growth, however, has been relatively slow and its level has only reached at about 10 percent in 2013. Similarly, India's trade linkage with China has only risen slightly from about 2 percent in the beginning of the period to about 8-9 percent at the end of the period. For Russia and India, their growth trends are increasingly convergent but their pace has virtually stagnated after the global crisis. Quite the opposite, beginning with trade relation with China as small as India's, Brazil has enjoyed greater increase in the post-crisis period. Meanwhile, South

Africa has persisted with its growth pace throughout the entire period despite the crisis.

To summarize, in regard to trade linkage with China, the findings indicate a persistent rise for Brazil and South Africa and a stabilizing trend for India and Russia despite India and Russia's close physical distance with China. Judging by both the growth rate and intensity level in the post-crisis period, Brazil can be ranked first as the closest trading partner with China, followed by South Africa, Russia, and lastly India.

### *2.3 Exchange Rate Variability Against the Chinese Yuan*

Exchange rate variability is one indicator of synchronicity of economic forces between currency zones. It is an important factor for accession into a monetary union because exchange rate changes are clearly measurable and automatically give the appropriate weights to the economic forces of which the changes are the result (Vaubel 1978). These economic forces include inflation, openness, economy size, prices, wage flexibility, factor mobility, commodity diversification, goods market integration, and fiscal integration (Tavlas 1993). Hence, Quah and Crowley (2012a) suggest that stability in nominal exchange rate might indicate lack of asymmetric shocks and presence of business cycle synchronicity.

In brief, since the mid-2000s and ever since the global financial crisis, the Chinese yuan has been more flexible against the US dollar under managed float regime. In contrast, prior to 2005, the Chinese yuan had been pegged to the US dollar.

Figure 3 shows the percentage change in nominal exchange rate against the Chinese yuan for 2000:2-2013:12. Standard deviations for 2000-08, 2009-13, and 2000-13 are collected in Table 2. As signified by the plots and the standard deviations, the Chinese yuan rates of the Brazilian real and the South African rand are somewhat stabler in the post-crisis period. In greater detail, the real has already been much steadier since as early as the mid-2000s. As for the rand, its variation is smaller after the mid-2000s and after the global crisis. On the contrary, the Russian ruble and the Indian rupee have shown larger gyration since the mid-2000s. On top of that, their renminbi rates are remarkably volatile against the Chinese yuan in the post-crisis period.

To conclude, yuan rates of the real and rand have become stabler but only to a relatively small extent. On the other hand, the ruble and rupee have been

significantly more volatile. On the conformity to this criterion of exchange rate stability, Brazil can be ranked first and South Africa the second because of their reduction in variability while India can be ranked third and Russia fourth due to their increase in volatility.

#### *2.4 Convergence in Inflation with China*

The traditional OCA literature originated during the era of ‘fix-price’ economics, so introducing inflation convergence as a criterion can be regarded as a theoretical normalization (Artis and Zhang 2001). Besides, convergence in inflation also reflects similarity in trade union aggressiveness and labor costs, implying lesser need for flexibility of exchange rate in correcting current account imbalances (Fleming 1971). Parallel rates of price inflation also matter in equilibrating real cost of capital between high and low growth areas when interest rates are unified within a monetary union (Quah 2015).

Figure 4 plots the 2000:1-2013:12 CPI inflation rates by contrasting the rate of each country against the Chinese rate. Period averages of absolute difference,  $|x_i - x_{China}|$  where  $x_i$  and  $x_{China}$  are the respective rates of inflation in country  $i$  and China are given in Table 3. Absolute differential is used to quantify extent of convergence regardless of direction. Standard deviation indicating the variability of the differential is also provided in the table.

As the charts and the differential averages show, it is apparent that Brazil is most convergent with China in CPI inflation over the entire period of 2000 to 2013, exhibiting increased convergence in both the movement of the rate and the level in the second half of the period. Notably, India is also highly convergent with China but only in the pre-crisis period. India’s price inflation has noticeably deviated to a higher long-run level after the global turmoil.

Meantime, South Africa closely tracks China in the run-up years to the global crisis but follows China with sharp divergent swings after the crisis. As for Russia, it’s path is converging with China when the entire period is considered. Amid these findings, change of trajectory after the crisis describes India and South Africa of which both have somewhat diverged from China.

With regards to variation in inflation differential, Brazil reports the greatest reduction in variability, followed by Russia. Putting it all together,

Brazil and Russia have increased convergence with China with greater stability. On the other hand, both India and South Africa have deviated with China with greater variation.

To summarize, convergence in inflation, a critical prerequisite stressed by Mundell (2000) for monetary integration has been increasingly satisfied by Brazil and Russia. To rank their conformity looking at their tendencies, Brazil meets this criterion best, followed by Russia, South Africa, and lastly India.

### *2.5 Synchronicity of Real Interest Rate with China*

Though not formally listed as one of the criteria based on the classical OCA theory (Tavlas 1993), this factor is indicated by a “revealed preference” argument (Artis and Zhang 2001). If the monetary policy of a candidate country has historically differed little from that of a partner country, the cost of relinquishing monetary independence should be accordingly low. Thus, synchronicity in real interest rate can be interpreted as a measure of coordination in monetary policy. To compute real interest rate, lending rate and CPI inflation are used. Detrending is accomplished by H-P filter to extract the cyclical component from the series (see Quah 2015; Artis and Zhang 2001, 2002).

Figure 5 compares the detrended real interest rates of 2000:1-2013:12. For comparability over countries, the detrended series are normalized. Correlations with China and the standard deviations of the detrended series are provided in Table 4. As the plots and the correlations reveal, Brazil tracks China at correlation coefficient of .54 in the pre-crisis period but deviates at coefficient of .20 after the global crisis. Quite the opposite, Russia diverges with China at coefficient .19 before the crisis but traces China at .55 after the crisis.

Despite that, both Brazil and Russia are somewhat parallel with China in the run-up to the 2008-09 financial debacle and during the subsequent credit crunch. Meanwhile, India and South Africa have not shown any significant degree of symmetry with China throughout.

Meantime, standard deviation of the detrended real interest rates can indicate extent of certainty in the lending market in the short run. On this evidence, Brazil has increased its variation slightly after the crisis just as China has whilst India and South Africa have varied their real interest rates



by greater extents. Distinctively, the very short-run movement of real interest rate has been somewhat stable for Russia.

In short, only Russia conforms substantively to this interest rate criterion and hence can be ranked first. South Africa can be ranked second since it has progressed from negative correlation to positive correlation with China. India can be ranked third because its divergence with China has diminished. In contrast, Brazil is ranked last because it has shifted from convergence to divergence with China.

## *2.6 Diversity in Export*

As put it by Kenen (1969), when an economic area produces a sufficiently large variety of goods, even if each of its export sectors is subject to adverse shocks, the law of large numbers comes into play so that total production will not suffer much. Accordingly, it is easier to fix the exchange rate of a diversified economy than that of a specialized economy. Logically, change in the diversity level should be more important than the level itself when assessing the potential cost of fixing the exchange rate. If a country has been experiencing decreasing diversity in exports, it will find itself increasingly difficult in mitigating adverse demand shocks to its current account.

Following Quah and Crowley (2010), export diversification is quantified by a diversification index, namely the inverse of the Herfindahl index. The Herfindahl index is a common indicator of degree of specialisation, computed as  $H = \sum_{i=1}^n s_i^2$  where  $s_i$  is share of the export of product  $i$ , and  $n$  being the number of products exported.

The higher the value of diversification index, the more diversified the export sector. Since data of individual export products are unavailable, annual export data according to the first-digit sub-industries of the United Nation Standard International Trade Classification (SITC) Revision 3 are used. The categories are displayed in Table 5. The computed indexes for 2001-2013 are plotted in Figure 6.

Consideration has to be made when evaluating this criterion. Since China is strategically designated as the monetary anchor country for BRICS for present analysis, logically the burden of adaptation is hence largely shouldered by member nations. Nonetheless, since ultimate decision must also take into account the stakes of member countries, the centre China may still need to compromise domestic needs for union-wide interests. Along this

line, it is also crucial to examine the extent of export diversification of the centre country China.

Looking at Figure 6, all five nations have shown gradual decline in export diversity over the whole sampled period. Specifically, Brazil and India lead a declining path after the global crisis whilst those of China, South Africa, and Russia have somewhat levelled off since the mid-2000s through the post-crisis period. This finding is in line with division of labour which predicts that open economies tend to exploit comparative advantage and scale economies by producing fewer variants of goods in a globalized competitive economy.

Another interesting observation is that no apparent change in the level of diversification is seen after the global crisis. This is intuitive since export structure is very much dependent on fundamental factors such as natural endowment, technology, fixed capital, and labour skills which are relatively inelastic to short-term business cycle.

Recall that China is proposed here as the monetary anchor country should a BRICS monetary union is formed. Hence, the burden of adjustment to the policies of the anchor country should largely be borne by peripheral member countries. For this reason, only potential member nations are ranked on suitability. South Africa and Russia can be ranked higher (say rank 1) in terms of conformity to this criterion whilst Brazil and India can be given a lower rank (rank 2) because Brazil and India have shown diminishing export diversity in the most recent years in relation to the relatively stable South Africa and Russia.

### *2.7 Flexibility of Labour Market*

Mundell (1961) argues that within a monetary area, labour mobility is the primary mechanism that restores equilibrium in the labour markets following adverse asymmetric shocks over different economic zones. Meantime, Ingram (1962) and Kenen (1969) reason that labour market flexibility also plays the function. In short, the more flexible the labour market, the easier the adaptation of workers to employment changes, the better the chances of getting a new job, the greater the feasibility of fixing the exchange rates.

Constrained by available data, movement in the national unemployment rate is used as a proxy to indicate change in labour market flexibility. Decline in unemployment rate can be viewed as one indicator of higher

flexibility whereas increase in unemployment can be a result of greater rigidity in the labour market.

The respective unemployment rates for 2001-2013 are plotted in Figure 7. All data are scaled on the left vertical axis except that of South Africa which is scaled on the right vertical axis. Due to data constraint, only four data points are available for India, namely that of 2005, 2010, 2012, and 2013. Meantime, for Brazil, published figure for 2010 is not available.

As the chart shows, Brazil and Russia are noticeably parallel in their falling unemployment since the early 2000s boom up until the post-crisis period. The falling trend is interrupted only by a spike in the 2009 recession. Meanwhile, South Africa experiences an upswing and then a downswing prior to the recession, before reaching to a stable and somewhat greater level after the crisis. The Chinese unemployment rate is substantively stable throughout the whole period except only for a significant drop in 2010. As for India, based on just a few data points, the unemployment rate increased to a higher post-crisis level in 2013.

Looking at the trend and the pace of decline in unemployment rate, Russia can be ranked first while Brazil the second. The post-crisis stable South Africa can take the third place and the recently risen India the fourth position. Again, for meaningful interpretation, China as the proposed anchor country is not ranked.

### *2.8 Adequacy of Reserves*

Based on the currency crisis model of exchange rate, the collapse of a pegged exchange system is associated with an erosion of foreign reserves (Markiewicz 2006). Concerted attacks against a currency deplete foreign reserves and force monetary authorities to abandon the fixation parity. Thus, a country which chooses to fix its exchange rate but that still maintains its national currency must hold sufficient reserves to back its monetary liabilities. For present purpose, this might be essentially true in the early stages of a BRIC monetary integration prior to a full currency union.

To reflect this facet, this section introduces the ratio of money and quasi money (M2) over total reserves, under which the smaller the ratio, the better the coverage of reserves to money supply. In other words, the smaller the ratio, the better the ability of monetary authorities meeting a “redemption run” against its notes and deposits. This measure has been used by Calvo (1998) for similar purpose.

The ratios for 2001-2013 are displayed in Figure 8. Visibly, South Africa boasts a long-run declining trend in M2 ratio, interrupted only in 2003 with a sharp spike probably due to increased lending and property bubble since interest rates were aggressively lowered in that year. Meantime, Brazil shows greater M2 ratios in 2004-2006, a finding consistent with its economic recovery (increased lending) from its previous recession triggered by the Argentine crisis and a confidence crisis due to uncertainties of a new president. Following that, a stable trajectory can be seen through 2013. China too shows a downward sloping trajectory; in particular a relatively steep reduction in the early 2000s and a slight and gradual rise in the recent years. Likewise, India reveals a similar pattern with China but with a much lower level in the beginning of the period. Finally, whilst being parallel with India, Russia's level is the lowest and the stablest throughout the whole period.

Fascinatingly, South Africa, Brazil, China, and India are seen to be converging toward the end of the period. Also, no significant change is signified after the global crisis. In short, boasting the greatest reduction in the M2 ratio, South Africa can be ranked first in respect of conformity to this criterion. By the same token, Brazil the second, India the third, and Russia the fourth.

### *2.9 Convergence in Real Growth*

In regards to the Eurozone crisis since the end of 2009, politicians and intellectuals have blamed the financial failures in Greece, Portugal, Italy, Spain, and Ireland largely on fiscal profligacy and government indebtedness. In addition, substantial reduction in real borrowing costs following harmonization of nominal interest rates across states of low and high price inflations has also helped to fuel housing and asset bubbles in high growth countries (Taylor 1998). Whilst free movements of goods, labour, and capital can restore market equilibriums, natural and political hurdles such as geographic, language, cultural, and trade barriers could perpetuate divergences in real economic growth.

Along these lines, convergence in the paths of real growth should be a matter of consideration if BRICS were to form a monetary union and to harmonize interest rates. For this reason, indexes of real GDP of the countries are hence plotted in Figure 9. Notably, Russia shows a significant

slide in the growth level after the global crisis while the declines of South Africa and Brazil are less noticeable.

In theory, the country of which rate of real growth is closer to that of China should be more fitting to adopt the Chinese monetary policy. On this judgment, the best candidate will be India, followed by Russia, then South Africa, and lastly Brazil. But then again, the fact that China's real growth is increasingly divergent with the rest, as shown by the chart, suggests an increasingly different policy need in China.

### **3. Discussion and conclusion**

Hitherto, the paper has inspected the OCA-related criteria evaluating the feasibility of a monetary integration arrangement between China, Brazil, Russia, India, and South Africa, five of the dominant emerging economies today. In this exercise, China is designated as the monetary anchor country since it is the largest economy with the largest currency zone. The first five dimensions and the last dimension of convergence in real growth are dependent on a reference country, namely China as the monetary anchor. Diversity in exports, labour market flexibility, and adequacy of reserves are meanwhile measured in absolute terms, needing no reference country. A summary of the observations is listed in Table 6.

Findings are mixed. On business cycle symmetry with China, relatively increased convergence has been experienced by Brazil and India. On bilateral trade with China, Brazil and South Africa have enjoyed persistently rising trade intensity. With respect to variability of exchange rates, the Indian and Russian currencies have significantly increased their volatility with the Chinese yuan. On convergence in price inflation, Brazil and Russia have become more parallel with China. In terms of interest rate movement symmetry, only Russia is noticeably synchronous with China. This is an indication of coordination in monetary policy between these two neighbouring states.

For export diversification, Brazil and India have shown diminishing trend whilst for Brazil and Russia, their labour markets appear to have been more flexible. In terms of adequacy of reserves, only South Africa has notably boosted its ratio of reserves to liabilities. Lastly, for convergence of real growth, China is diverging significantly with the rest.

If scores are given for the rankings in accordance with extents of conformity, and if the scores are averaged over the nine criteria for each

country as reported in Table 6, Brazil with the lowest average score at 2.0 will be the most conforming country, followed by South Africa at 2.2, Russia at 2.4, and lastly India at 2.9.

Classifying notable conformity by country, Brazil is relatively compliant in respect of five dimensions, namely business cycle symmetry, trade intensity, inflation convergence, export diversification, and labour market flexibility; Russia is conforming in inflation convergence, interest rate symmetry, and labour market flexibility but is non-conforming in exchange rate stability; India is compliant in business cycle symmetry but incompliant in the exchange rate and diversification criteria; and South Africa is conforming with the trade and reserves adequacy dimensions. In short, Brazil is relatively prepared for a monetary unification with China.

This finding is consistent with present relations between Brazil and China that include sharply increased bilateral trade, foreign direct investment flows, bilateral cooperation agreements, and enhanced cohesion of negotiating positions in international arena (Whalley and Medianu 2012). In particular, Brazil's exports are concentrated in primary goods while imports from China are of manufactured goods, a trade relation which is mutually beneficial (Jenkins 2012). Politically, Brazil and China signed in 2010 the Joint Action Plan Brazil-China 2010-2014 in Brasilia to foster cooperation in arms control, climate change, and coordination in the UN, WTO, and G20 (Haibin 2010).

With sufficient political and social will, Brazil and China can begin monetary integration initiatives first. As the founding nations, they can reap the gains from stabilizing their exchange rates while at the same time providing enormous stability and certainty to the rest of BRICS. Of course, if a monetary bloc between them is to be instituted, it would have to subsume a common market or at least significantly greater liberalizations in movements of labour, goods, and capital (see Stojanović 2011).

Despite the above, it must be noted that the analysis is limited in the sense that consistent measures across the countries are sometimes not available. For instance, the main monetary tool used in China is adjustment of reserves ratios in the banking system and this can be different with other BRICS nations.

Lastly, future scholars may need to corroborate the findings here using other techniques and to explore other aspects of integration such as extents of cross-border movement of labour; social and linguistic barriers; and

compatibility in political systems. Alternative monetary systems proposed in Quah (2016a) are also worthwhile for consideration.

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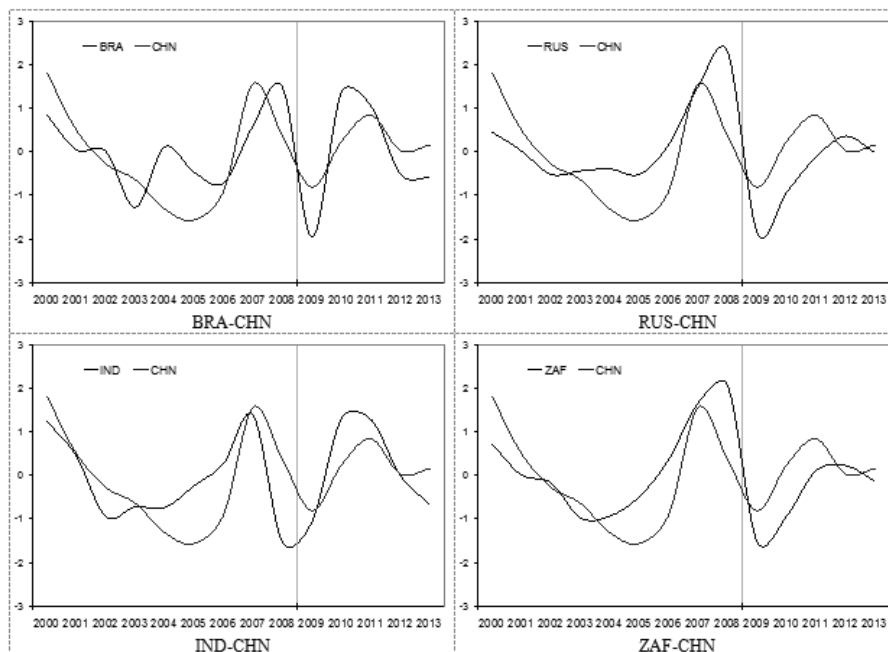
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**Appendix**

**Figure 1. Business cycle using real GDP, 2000-2013.**



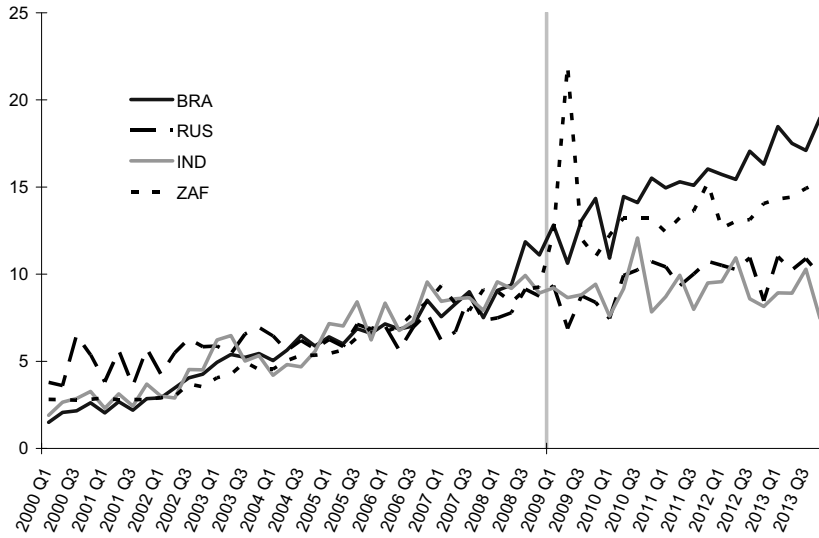
Source: Computed using WDI data.

**Table 1. Correlation coefficient and standard deviation, business cycle.**

		BRA-CHN	RUS-CHN	IND-CHN	ZAF-CHN	
Corr.	2000-08	0.64	0.60	0.61	0.69	
	2009-13	0.86	0.67	0.80	0.72	
	2000-13	0.60	0.52	0.62	0.62	
		BRA	RUS	IND	ZAF	CHN
SD	2000-08	0.83	0.99	1.00	1.07	1.20
	2009-13	1.35	0.88	1.09	0.75	0.59
	2000-13	1.00	1.00	1.00	1.00	1.00

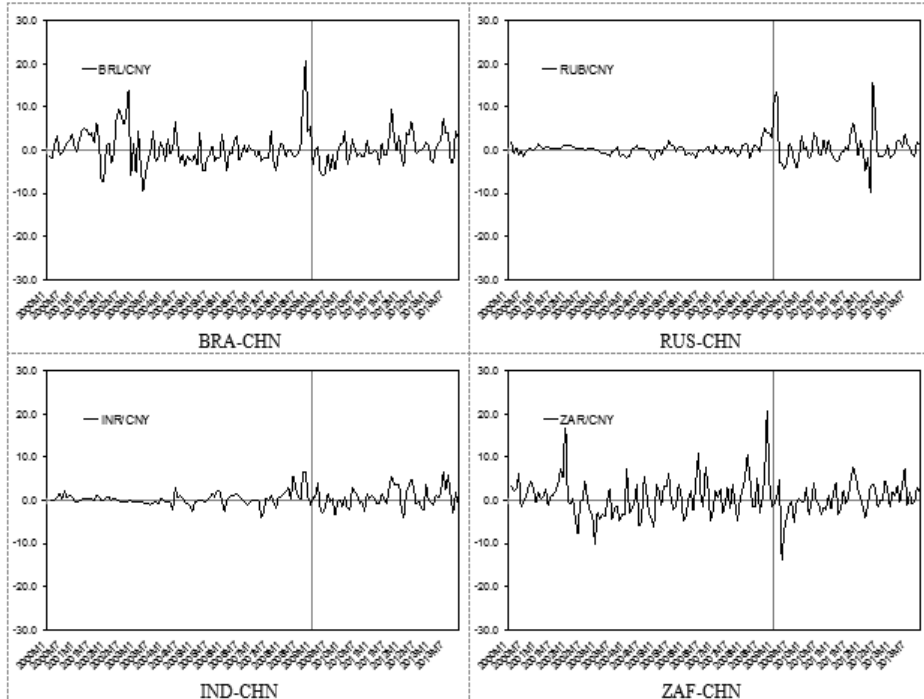
Source: Computed using WDI data.

**Figure 2. Trade openness with China (%), 2000Q1-2013Q4.**



Source: Computed from IMF: DOTS data.

**Figure 3. Percent change of exchange rate against the Chinese yuan ( $\times 10^2$ ), 2000:2-2013:12.**



Note: Original nominal exchange rates are against the dollar. That against the Chinese yuan is computed assuming triangular arbitrage.

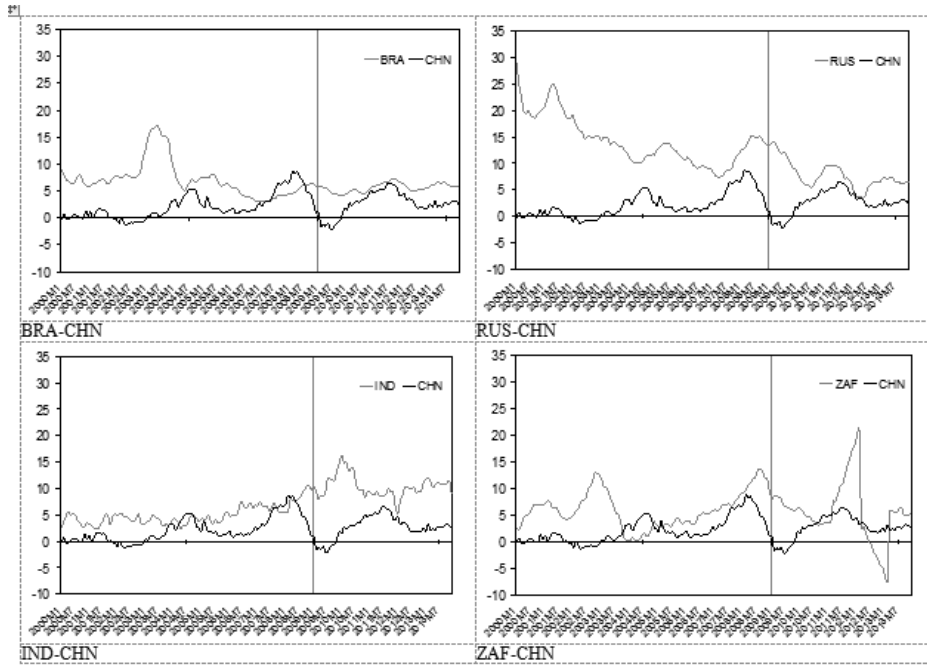
Source: Computed from IMF: IFS data.

**Table 2. Standard deviation, percent change of exchange rate against the Chinese yuan, 2000:2-2013:12.**

		BRL/CNY	RUB/CNY	INR/CNY	ZAR/CNY
SD	2000-08	4.32	1.20	1.50	4.61
	2009-13	3.18	4.15	2.41	3.48
	2000-13	3.94	2.66	1.88	4.24

Source: Computed from IMF: IFS data.

**Figure 4. CPI Inflation (%), 2000:1-2013:12.**



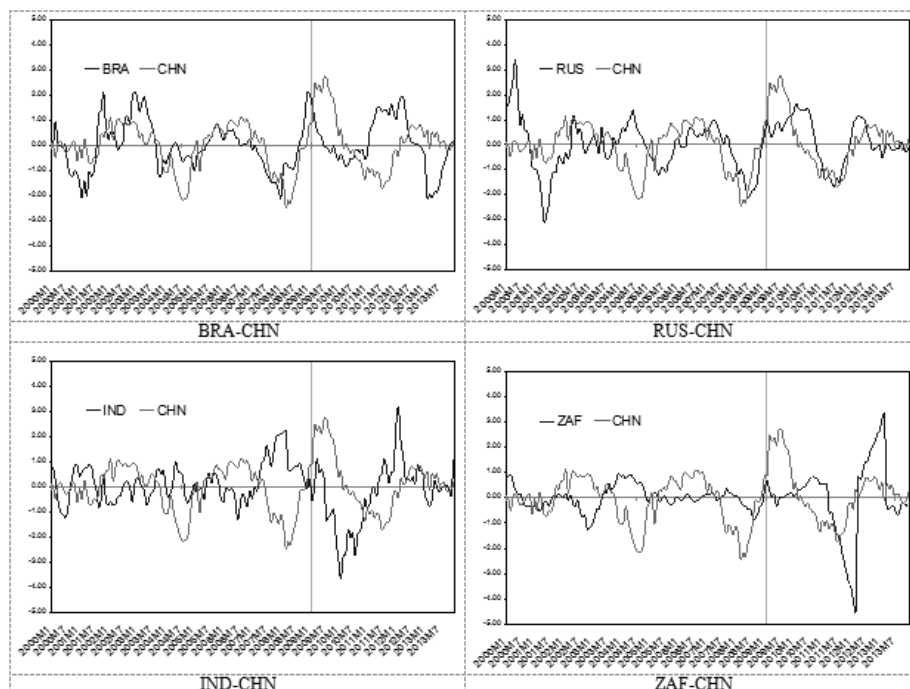
Source: Computed from IMF-IFS data.

**Table 3. Average and standard deviation, inflation differential, 2000:1-2013:12.**

		BRA-CHN	RUS-CHN	IND-CHN	ZAF-CHN
Avg.	2000-08	5.57	12.13	3.16	4.61
	2009-13	2.97	5.12	7.74	5.02
	2000-13	4.64	9.62	4.80	4.76
SD	2000-08	4.03	5.98	1.89	3.07
	2009-13	1.81	4.06	3.36	4.04
	2000-13	3.62	6.33	3.33	3.44

Source: Computed from IMF-IFS data.

**Figure 5. Real lending rate cycle, 2000:1-2013:12.**



Source: Computed from IMF-IFS data.

**Table 4. Correlation coefficient and standard deviation, real lending rate cycle, 2000:1-2013:12.**

		BRA-CHN	RUS-CHN	IND-CHN	ZAF-CHN	
Corr.	2000-08	0.54	0.19	-0.49	-0.32	
	2009-13	-0.20	0.55	-0.02	0.25	
	2000-13	0.24	0.33	-0.26	0.07	
		BRA	RUS	IND	ZAF	CHN
SD	2000-08	0.98	1.05	0.74	0.45	0.91
	2009-13	1.03	0.89	1.31	1.57	1.12
	2000-13	1.00	1.00	1.00	1.00	1.00

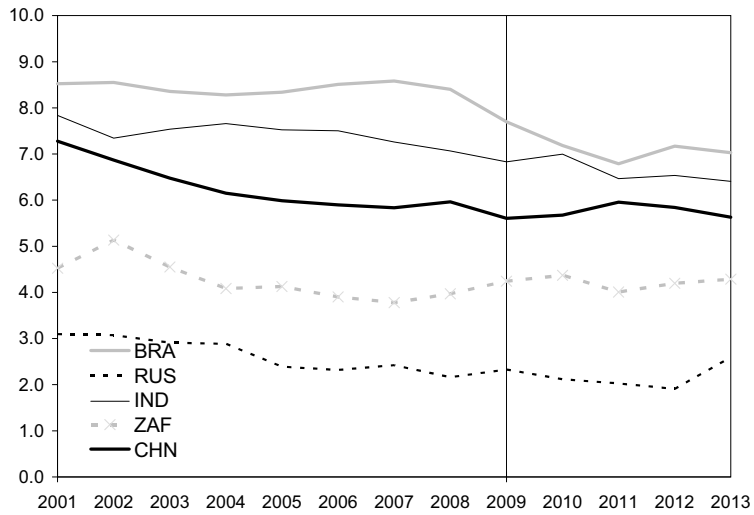
Source: Computed from IMF-IFS data.

**Table 5. United Nation’s Standard International Trade Classification (SITC) Revision 3**

Code	Product type
0	Food and live animals
1	Beverages and tobacco
2	Crude minerals, inedible, except fuels
3	Mineral fuels, lubricants, and related materials
4	Animal and vegetable oils, fats and waxes
5	Chemicals and related products
6	Manufactured goods classified chiefly by material
7	Machinery and transport equipment
8	Miscellaneous manufactured articles
9	Commodities and transactions not classified elsewhere

Source: United Nations Statistics Division Website

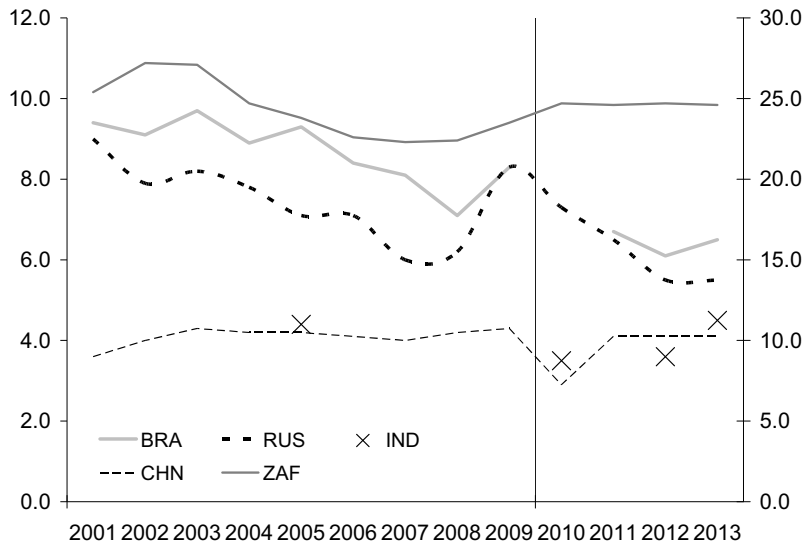
**Figure 6. Diversity of exports, 2001-2013.**



Source: Computed from International Trade Center, Trade Map data.

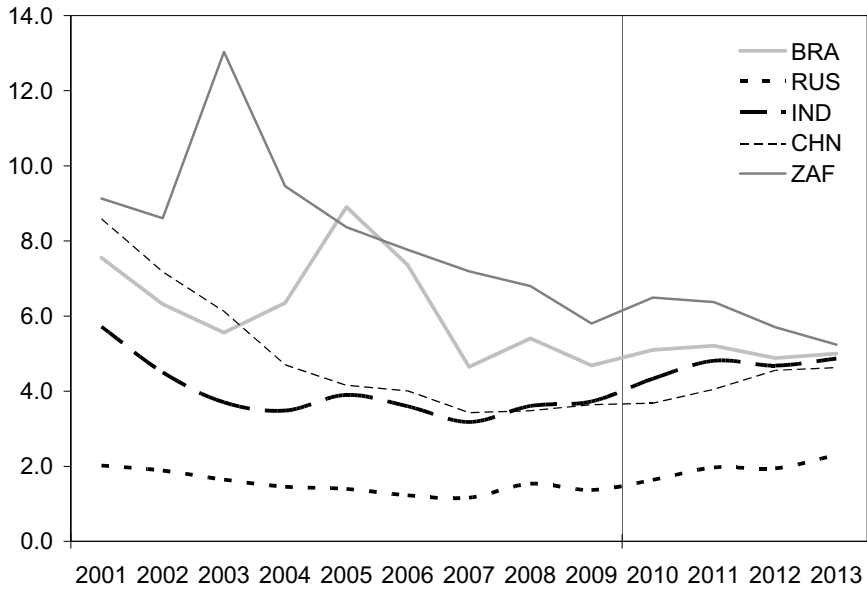


**Figure 7. Unemployment rate, 2001-2013.**



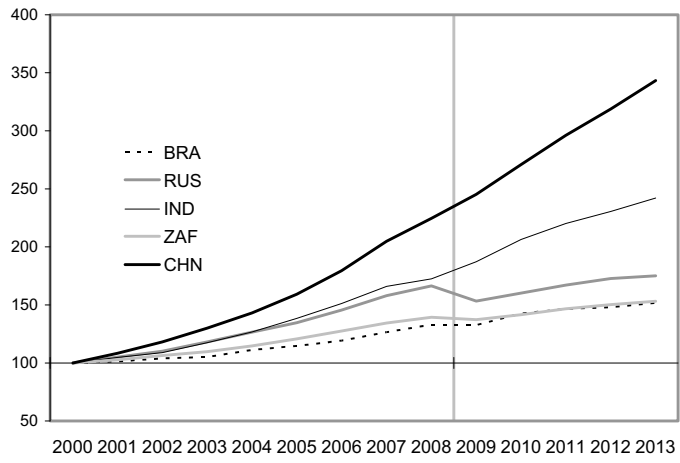
Source: World Bank: WDI.

**Figure 8. Money and quasi money (M2) to total reserves ratio, 2001-2013.**



Source: World Bank: WDI.

**Figure 9. Real GDP, 2000Q1-2013Q3 (2000Q1=100).**



Source: Computed from IMF-IFS data.

**Table 6. Summary of findings**

	Dimensions	Key Findings	Ranking			
			Brazil	Russia	India	South Africa
1	Business cycle synchronization	Brazil and India have increased convergence with China to a greater extent.	1	4	2	3
2	Bilateral trade intensity	Persistent rising trade linkage with China for Brazil and South Africa	1	3	4	2
3	Exchange rate volatility	India and Russia have remarkably greater exchange rate volatility with the Chinese yuan.	1	4	3	2
4	Inflation convergence	Brazil and Russia have increased convergence with China with smaller variability	1	2	4	3
5	Real interest rate symmetry	Only Russia conforms substantively to this interest rate criterion.	4	1	3	2
6	Diversity of exports	Brazil and India have shown falling trend in export diversity.	2	1	2	1
7	Labor Market Flexibility	Brazil and Russia are noticeably parallel in their decreasing unemployment.	2	1	4	3
8	Reserves Adequacy	South Africa has boosted adequacy tremendously over the years.	2	4	3	1
9	Convergence of Real Growth	China's real growth is increasingly divergent with the rest.	4	2	1	3
	Average Rank Score		2.0	2.4	2.9	2.2

Note: The most conforming country to any criterion is given a score of 1, followed by 2, 3, and the least conforming one is given a score of 4.



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Reza Omidipour\* - Jamshid Pajooyan\*

CURRENCY DEMAND, THE UNDERGROUND ECONOMY AND TAX  
EVASION: THE CASE OF IRAN

**Abstract**

In recent years, Iran's government is going to decentralize its financial system from oil revenues and to substitute it by tax revenues. Under such circumstances, due to the existing research gap on the topic, it seems to be an essential necessity to measure the size of underground economy and the level of tax evasion in Iranian economy. To do the task, the present study has used the Currency Demand Approach and VEC Model for 1973-2013 time series data. In this model, "the ratio of currency holdings (C) to money (denoted as M2)" is assumed as the dependent variable and "the ratio of wages and salaries to national income (WSNI)", "real per capita national income (YNR)", "the real rate of interest paid on time deposits (RL)" and "average tax rate (Tax Burden)" are taken as independent variables. Based on the research results, two variables of Tax Burden and WSNI have positive effects on the ratio of C to M2 and the variables of RL and YNR have negative effects on this ratio in the long-run. Moreover, the research results show that the estimated size of underground economy and tax evasion levels have an ascending trend during the period under study.

**JEL CLASSIFICATION:** C32; H30; H26; O17

**KEYWORDS:** TAX EVASION, UNDERGROUND ECONOMY, CURRENCY DEMAND APPROACH, VECM, IRAN

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## **1. Introduction**

Previous experiments of most developed countries indicate that taxes comprise one of their most important revenue resources while in developing countries, the governments mostly rely on the revenues derived from the sale of such natural, underground resources as the raw oil which is, in essence, regarded as the sale of capital. Developing countries typically have inefficient tax systems which are incapable of meeting the governments' financial and fiscal objectives. In Iran, too, taxes have not played a significant role in the economy. Due to the lack of economic agents' databases, non-transparency of economic activities, widespread tax exemptions, weakness of laws enforcement guarantees, nonexistence of required trust in the financial system of the government, lack of a fully mechanized tax system, and the incapability of the tax system in the proper identification of taxpayers' income, the tax amounts typically assessed in the Iranian economy are insignificant and are even incapable of being collected in the end.

Since in the Iranian economy, oil revenues play a critical role in financing the government's expenditures and since the global oil prices are affected by various factors including the global demands, economic shocks, OPEC rationing, etc., so the Iranian oil revenues are out of control of the government and, accordingly, the country's development policy of recent years has been under the pressure of economic sanctions, oil price falls and the resulting budget deficits, moved towards further independence of oil revenues and tended to rely on a system based on tax revenues. Thus, a decrease in the tax evasion levels can be taken as an essential priority in achieving the country's economic goals. Taking such a necessity into account, the present study aims at estimating the tax evasion levels in the Iranian economy in order to make known the widespread prevalence of such phenomenon in the country. Estimating this dimension of the hidden economy inevitably requires linking the existing observations and statistical variables of this unobservable variable. In developing countries, the estimation of such unobservable variables is even more complicated since in such countries, having access to the data required is much more limited than in developed countries. Most research works already completed in the area of tax evasion estimation in developing countries have been based on indirect methods including Monetary Approach (Currency Demand Function), Physical Input Approach, Labor Market Approach, Gap Approach, Multiple Indicators and Multiple Causes Approach(MIMIC).

In the present study, underground economy is operationally defined on the basis of definition already given by Tanzi (1982) whereby we have defined it in terms of activities which, by nature and from the standpoint of their sources, are legal but are not registered and reported to formal authorities due to non-payment of the taxes related to them and non-observance of certain laws and regulations<sup>1</sup>.

Tax evasion, as defined by Tanzi (1980) and Lyons (1996), refers to any illicit measures taken by an individual or an enterprise aiming at non-payment or underpayment of taxes. In contrast, tax avoidance refers to lawful efforts made by an individual or an enterprise aiming at non-payment or underpayment of taxes. In this regard, such scholars as Alm (1998) and Franzoni (1998) argue that the difference between tax evasion and tax avoidance lies in two aspects of legality and being subject to punishment.

In the present paper, we are going to estimate annual time series on tax evasion by using Tanzi's Currency Demand Approach (1980, 1983) and time series estimations already made using the Vector Error Correction Model (VECM) on the size of underground economy in Iran for the period 1352 to 1392 (roughly corresponding to 1973-2013). Vector Error Correction framework, as Perotti (2004) puts it, apart from the identification of structural shocks, is a more suitable method for the determination of equilibrium in terms of the nature of dynamic adjustments. When we aim to analyze the empirical policy, we will be required to get to the short-run dynamics and the adjustment coefficients, in addition to having access to information about the movement towards equilibrium among a set of variables. Accordingly, the main objective of the present study is finding an answer to this question: what are the quantities of "the underground economy" and "the tax evasion" in Iran in any years of the period in question and what has been the dominant trend in that respect?

The paper is structured as follows: in section 2, we first discuss the literature on tax evasion and the factors affecting it and secondly, report some of the most important domestic and foreign empirical studies that have worked on estimating the size of underground economy and the levels of tax evasion in both developing and developed countries through monetary approaches. In section 3, we first explain about methodologies commonly used for estimating tax evasion particularly Tanzi's Currency Demand Approach (1980, 1983) and then, introduce our own model and data. In section 4, we present the results of the estimation of the VECM for estimating the size of underground economy and the tax evasion levels in the Iranian economy, the

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<sup>1</sup>This definition may have a partial overlap with the definition of informal economy provided by Thomas (1992).



results of which are summarized in Section 5. The research findings are expected to be efficiently applied to tax reform programs of the country, increase of the country's tax revenues, more reliability of the existing economic statistics in making macroeconomic policies as well as the state financial policies.

## **2. Review of Literature**

### *2.1. Theoretical Foundations*

By taking a look at the research literature, one may simply recognize two major approaches in explaining tax evasion behavior. On one hand, there are neoclassical models and on the other hand, we can see institutional approaches. The point of departure of theoretical work on tax evasion is the year 1972 when Allingham and Sandmo's famous paper entitled "income tax evasion: a theoretical analysis" was published in the *Journal of Public Economics*. Their theory was later labeled as "Tax Evasion Standard Model" although Allingham and Sandmo, themselves, prefer to call it as "A-S Analysis". This model is based on Garry Becker's Economics-of-Crime methodology and tries to explain the tax evasion phenomenon. In this model, it is assumed that the taxpayer in question is not affected by social and psychological factors involved in compliance behavior. In contrast, it uses the utility maximization expected from the taxpayer's individual decision. In short, the A-S Model concludes that the higher penalty rates or the probability of being caught decrease the levels of tax evasion while higher tax rates do increase them.

Taking into consideration the multi-dimensional nature of tax evasion, models similar to Tax Evasion Standard Model that focuses on economic factors only have been criticized by many scholars. In a reaction to such criticisms, some neoclassical economists made attempts to manipulate the Tax Evasion Standard Model among them, one may particularly refer to Andreoni, Erard and Feinstein (1998), Slemrod and Yitzhaki (2002), Cowell (2002) and Sandmo (2005) to mention only a few.

In reaction to the non-observance of noneconomic factors affecting tax evasion, a group of other theories were developed that did not attribute tax evasion to mere economic factors but, rather, took into consideration such

behavioral parameters as culture, social norms, moralities, taxpayers' perceptions of the operation of formal institutions, etc.

Among scholars belonging to this approach, Alm and Martinez-Vazquez (2001), Torgler (2003), Gërxhani (2002a, 2002b) and Nerré (2004) have studied the role played by institutions in tax evasion and on that basis, tried to reformulate the Tax Evasion Standard Model. Moreover, Gërxhani (2002), in his PhD thesis, has paid attention to the role of institutional vacuum in the prevalence of tax evasion in transition economics, and more specifically, Albania.

The works by Nerré (2001a, 2001b, 2001c and 2004), too, have looked at tax evasion from the standpoint of tax culture and undertook several research works in Russia and Austria. Furthermore, Torgler (2003) has done several case studies about tax moral and tax evasion in the form of survey studies whereby he paid attention to Latin American countries (i.e. Central and South America) in addition to the USA.

## *2.2. Some Empirical Background of the Study*

Tax evasion, as an unobservable phenomenon, has already attracted the attention of many scholars all through the world. In this section, we have reported some of the most important domestic and foreign empirical studies that have worked on estimating the size of underground economy and the levels of tax evasion in developing and developed countries.

Faal (2003) has used the Currency Demand model for estimating the size and consequences of the underground economy in Guyana during 1964-2000. Variables used by him for explicating the Currency Demand Approach include the income, interest rate, tax, inflation rate, and financial innovations. Based on the following equation:  $C = f(Y^d, R, \pi, F, T)$ ,  $Y^d = Y - T$ , where,  $C$  is the sum of currency demanded for the economy as a whole (both official and underground),  $Y^d$  is the disposable income,  $R$  stands for the interest rate,  $\pi$  represents the inflation rate,  $F$  stands for the financial innovations and  $T$  represents the average tax rate that is calculated as direct taxes on income and imports (current prices) expressed as a percent of GDP. The results reported by Faal (2003) prove the existence of a large underground economy in Guyana. Faal multiplies the size of underground economy by the average tax rate in order to attain the tax evasion time series.

Kemal (2007) has first estimated the size of Pakistani underground economy for the years 1999 and 2005 by using the Currency Demand Approach and then, taking into account the existing tax rates of different years, he has managed to extract the tax evasion levels from the underground

economy in different scenarios. He concludes that in Pakistan, there has been a rapidly ascending trend of both the size of underground and the level of tax evasion in the early 1980s which has been accelerated in the late 1990s, but there has been a decrease in 1990, and, again, an increasing trend in 2003.

Ariyo and Bekoe (2011) have identified the determinants of the underground economy and estimated the size of underground economy and level of tax evasion in Nigeria during the period 1975-2010. They used the Currency Demand Approach and though the VECM methodology, managed to attain the speed of adjustment into a long-run equilibrium. The results of this research show that the size of underground economy and the level of tax evasion during the period in question have been 42.54%-79.32% and 2.09%-6.75%, respectively. The results have also indicated a positive relationship between the tax rate, on one hand, and the size of underground economy and the level of tax evasion, on the other.

In addition to the research works by Cagan (1958), Guttman (1977), Tanzi (1980, 1983) as well as the above-mentioned studies, some other scholars including Schneider (1986), Schneider and Enste (2000), Orviská, et al. (2006), Schneider (2006) and Embaye and Yu (2010) have all resorted to monetary methodologies specially, the Currency Demand Approach for estimating the size of underground economy and the level of tax evasion. The difference between the present study and the above-mentioned research works is using the VECM methodology and the taking into account the short-run and long-run effects of the variables in question on tax evasion in the this study. Recently, of course, such researchers as Basile, et al. (2011) and Chiarini, et al. (2013) have also applied the VECM methodology in their research works on the Italian underground economy and tax evasion.

In addition to the studies already done out of Iran, we may also refer to a couple of empirical works on the level of tax evasion in Iran. Among these works, we may mention the works by Khalatbari (1990), Mohammadi (1998), BagheriGarmaroudi (1998), Ashrafzade and Mehregan (2000), Esfandiari and Jamalmanesh (2002), Azarmand (2007), KarimiPetanlar, et al. (2011) and Abdollahmilani and Akbarpourroshan (2012) have used monetary methods of "the Cash Ratio" and "the Currency Demand Approach" for the estimation of the size of underground economy and the tax evasion level. The overall findings of these studies have indicated that the estimated size of underground economy and tax evasion levels have both had an increasing trend over time. The distinctive characteristic of the present study as opposed to the domestic studies in the area of tax evasion, apart from updated the data a longer period time series, is making use of the

VECM methodology and the variable of "the ratio of wages and salaries to national income"<sup>2</sup> adopted from Tanzi's Monetary Approach (1980, 1983) for estimating the tax evasion which is unique in Iran.

### **3. Methodologies for estimating tax evasion**

Many researchers have resorted to either direct or indirect methods for the measurement of tax evasion due to the unavailability of data of tax evasion<sup>3</sup>. In direct methods such as National Accounts Method, Sampling Method, Budget Survey Method, Direct Taxpayer Survey and Tax Capacity, the theories are developed on the basis of the behavior of the individuals evading taxes and then, by replacing suitable variables, tax evasion is measured. In these methods, there is typically a considerable level of information concealment. However, in indirect methods that are very popular in the study of tax evasion, the tax evasion levels are measured through the estimation of underground economy. These methods can be classified into three groups in terms of 1) Reason of Activity [such as Laplace Transform Approach and Fuzzy Logic Method], 2) Consequences [such as Currency Ratio, Gap Approach, Physical Input Approach, and Labor Market Approach] (Bhattacharyya 1990; Thomas 1999), and 3) Cause and Effect [Currency Demand Approach and Multiple Indicators, Multiple Causes Approach (MIMIC&DYMIMIC)](Schneider and Enste 2002; Schneider et al. 2010; Buehn and Schneider 2012; Schneider and Buehn 2013).

Since the estimation methods based on the causes and effects take into consideration the information relevant to the causes and effects of underground economy all at the same time within the framework of one single method, so a major part of the shortcomings with the causes or effects of tax evasion will be removed.

Despite the fact that more than three decades have passed since the Currency Demand Approach has first been introduced but its advantages and the relative ease of its application have derived many scholars to use this method of its revised versions for investigating the size of underground economy in different countries. Taking into accounts such considerations, we have used the Currency Demand Approach to estimate the size of underground economy in Iran. In order to make an estimation of tax evasion accordingly.

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<sup>2</sup>For the "operational definition of this variable", please refer to section 3.2.

<sup>3</sup>For a more detailed discussion, see Richupan (1984) and Alm (2012).

### *3.1. Currency Demand Approach*

Cagan (1958; see also Faal 2003) provided the first effort to explore the size of underground economy using monetary variables as a proxy. Cagan's approach to modeling the underground economy assumed that the ratio of currency to the money supply in a base year was representative of the behavior of economic agents (Ibid). The residuals around this ratio, together with a velocity assumption, were then employed to measure the size of underground economy<sup>4</sup>. Similar approaches based on the assumption that proceeds of the underground economy were laundered through currency and currency substitutes were used by Guttman (1977) and Feige (1979); these approaches did not follow statistical techniques procedures but rather concentrated only on the ratio of currency to demand deposits (Ibid).

Tanzi (1980, 1983; see also Faal 2003) modified Cagan's approach by estimating a currency demand function for the United States for 1930-1980. In his approach, the impact of the underground economy on currency demand, proxied by tax rates to show the incentive to avoid taxes and participate in a cash-based underground economy, was estimated directly in the regressing equation linking currency demand and tax rates. With the key assumption that underground economy transactions are conducted in cash, an increase in the size of underground economy increases the demand for currency and vice versa<sup>5</sup> (Ibid).

The equation is estimated and two estimations for currency holding are made, one when the tax variable is zero and the other when it is not. The difference between the two estimates of currency holding is called the "illegal money" and the difference between M1 and illegal money is taken to be the "legal money" (Tanzi 1980, 1983). The income velocity of money is derived by dividing the GDP by legal money and the size of underground economy is obtained by multiplying the illegal money by the velocity of money. The level of tax evasion is derived by assuming that the incomes in the underground economy would have been taxed at the same average tax rate as income in the regular economy (Ibid).

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<sup>4</sup>The residuals around this ratio were assumed to reflect money laundering, and were used together with the velocity assumption to measure the underground economy.

<sup>5</sup>The Tanzi approach has been criticized by Thomas (1999) and addressed in Bhattacharyya (1999). In general, the Tanzi approach is superior to Guttman's currency deposit ratio in that it does not assume constancy in the currency deposit ratio or a base year.

### 3.2. Description of the Model and Data

In this section, in order to provide an answer to the research question "what are the quantities of the underground economy and the tax evasion in Iran in any years of the period in question and what has been the dominant trend in that respect", the following research hypothesis was tested: "*the size of underground economy and the extent of tax evasion in Iran have followed an increasing trend over time*". To do the task, we first estimated the size of Iranian underground economy and accordingly, the level of tax evasion (taking into account the average tax rate) by using Tanzi's Monetary Approach, by making reference to the time series data of 1973-2013, and through advanced econometric methods of VAR<sup>6</sup> and VECM<sup>7</sup>. The model in question is defined as follows for estimating the underground economy through the regression equations and by using the ratio of Currency Holding (C) to money (denoted as M<sub>2</sub>) based on Tanzi's Currency Demand Approach (taking into account empirical studies such as Faal 2003, Kemal 2007 and Ariyo and Bekoe 2011):

$$\left( \frac{C}{M_2} \right)_t = \beta_0 + \beta_1 \text{Log}(1 + \text{TaxBurden})_t + \beta_2 (WSNI)_t + \beta_3 \text{Log}(YNR)_t + \beta_4 RL_t + \varepsilon_t$$

Dependent variable:

$C/M_2$  = the ratio of currency holdings (C) to money (denoted as M<sub>2</sub>).

Where: C is Currency in Circulation; M<sub>2</sub> is Total Liquidity

Independent variables:

*Tax Burden* = "average tax rate" proxied by T/GDP ratio.

*WSNI* = "the ratio of wages and salaries to national income" = [dividing the total annual wages and salaries of public and private sector by national income at current prices] × 100.

*YNR* = "real per capita national income" = [dividing nominal per capita national income by consumer price index (CPI) at the fixed prices of the year 2004].

*RL* = "the real rate of interest paid on time deposits" = [The rate of interest paid on time deposits minus the inflation rate].

In the present paper, in order to explore the theoretical foundations of tax evasion and different methods for its measurement, we have used a library method including making reference to relevant articles and books. As

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<sup>6</sup>Vector Auto Regressions

<sup>7</sup>Vector Error Correction Model

regards the required statistics and data for the period 1973-2013, we have used the Iranian national accounts as well as the official website of the I.R.I Central Bank<sup>8</sup>, the official website of Iran Statistical Center<sup>9</sup>, macro level schedules of the public budget resources and expenditures, annual statistical reports published by the Statistical Office of the Presidency, socio-economic computations of Social Security Organization. Excel and Eviews software have been applied to analyze and test the research hypothesis.

#### **4. Finding analysis and Results**

##### *4.1 Unit Root Test*

The econometric method used in the present research is an estimation based on time series data through the application of the VECM methodology. First of all, in order to explore the stationary of the model variables, we have used the Augmented Dickey-Fuller (ADF) Test which is one of the most valid stationary tests whereby the results show that all variables are non-stationary at their own levels but all of them are stationary at the first difference at 1% level of significance. Thus, it can be concluded that all variables are integrated of order one denoted I (1).

**Table 1. The results of Augmented Dickey-Fuller unit root test for the model's time series data**

The variable's title	The level of the variable		
	The ADF statistic values	critical values of ADF Statistic	Prob.*
CM2	-2.63	-4.20	1%
		-3.52	5%
		-3.19	10%
TaxBurden	-0.87	-2.62	1%
		-1.94	5%
		-1.61	10%

<sup>8</sup><http://www.cbi.ir/>

<sup>9</sup><http://www.amar.org.ir/>

WSNI	-0.01	-2.62	1%
		-1.95	5%
		-1.61	10%
YNR	-1.39	-4.20	1%
		-3.52	5%
		-3.19	10%
RL	-3.12**	-4.20***	1%
		-3.52***	5%
		-3.19***	10%
The first difference of the variable			
DCM2	-7.58	-4.21	1%
DTaxBurden	-8.58	-2.62	1%
DWSNI	-5.73	-2.63	1%
DYNR	-6.47	-4.21	1%
DRL	-9.98**	-4.21***	1%

Source: Author calculations.

\*\* The Phillips-Perron (PP) statistic value.

\* MacKinnon (1996) one-sided p-values.

\*\*\* critical value of Phillips-Perron (PP) Statistic.

#### 4.2. Determination of Optimal Lag Length

In order to determine the long-run relationships through Johansen's methodology, we first need to estimate the VAR model in appropriateness to the vector of variables (Lütkepohl 1991). The first stage of estimation of the model involves determining the optimal lag length. Therefore, taking into account the results of the test, an optimal lag length quantity was selected for the VAR model the basis of Schwarz information criterion (SC)<sup>10</sup> and, then, we tried to explore the long-run relationships among the variables and to estimate the VECM. Moreover, to explore the normality of residuals, the Auto-correlation Test and Normality Test were administered on the basis of

<sup>10</sup>For more details, see Phillips & Ploberger (1994) and Ivanov & Kilian (2005).



LM and JB<sup>11</sup> tests, respectively, whereby the results obtained verified the optimal lag length selected for the model. A Stability Test was also administered for the estimated model where the results indicated the stability of the estimation system.

**Table 2. Determination of optimal lag length**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-321.16	NA	25.54	17.43	17.86	17.58
1	-207.54	185.37	0.26	12.77	14.27*	13.30
2	-173.10	47.14*	0.163	12.27	14.85	13.19*
3	-143.4094	32.82	0.160*	12.02*	15.68	13.32

Source: Author calculations

#### *4.3. Johansen's Cointegration Test*

For administrating Johansen's Cointegration Test, both the trace statistic and the Max-Eigenvalue Statistic need to be explored. In the present study, Cointegration Test has been under the fourth state circumstances, i.e. when they get into the long-run relationships of the trend and the intercept term enters the short-run relationships. This state is typically used when there is a linear growth in the long-run relationships that cannot be explained by the model variables. According to the results of this test as reported in table (3), the Max-Eigenvalue Statistic which is more valid than the trace statistic, the existence of a long-run relationship among the model variables is verified at a 95% confidence level.

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<sup>11</sup>The Jarque-Bera residual normality test.

**Table 3. Johansen's Cointegration Test Results**

Hypothesized H <sub>0</sub>	Hypothesized H <sub>1</sub>	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
R=0	R>0	0.69	120.71	88.80	0.000
R=1	R>1	0.55	74.24	63.88	0.005
R=2	R>2	0.46	42.57	42.92	0.054
R=3	R>3	0.27	17.92	25.87	0.349
R=4	R>4	0.12	5.22	12.52	0.565
Hypothesized H <sub>0</sub>	Hypothesized H	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
R=0	R>0	0.69	46.47	38.33	0.004
R=1	R>1	0.55	31.68	32.11	0.057
R=2	R>2	0.46	24.64	25.82	0.071
R=3	R>3	0.27	12.70	19.39	0.353
R=4	R>4	0.12	5.22	12.52	0.565

Source: Author calculations.

\*\*MacKinnon-Haug-Michelis (1999) p-values.

Therefore, since the results of Johansen's Cointegration Test verifies the existence of at least one long-run equilibrium relationship among the model variables, an estimation of this relationship under the VEC model (Enders 2004).

#### 4.4. Estimation of Vector Error Correction Model

In order to estimate the VEC model, the first stage is to determine the optimal lag length for the difference of variables in the model. Since the optimal lag length has been selected as "one", so the variables difference lag in the VECM will be "zero". In essence, the VECM was estimated for estimating the tax evasion level in spite of the existence of a long-run relationship, a lag length of zero in the variables difference, and taking into account the trend in the long-run and the intercept term in the short-run relationships where the VECM has been normalized based on the "ratio of currency holding (C) to money (denoted as M<sub>2</sub>) or CM<sub>2</sub>".

The results as reflected in Table (4) show that in the long-run, the tax burden has a positive relationship with the "ratio of currency holding (C) to

money (denoted as  $M2$ ) or  $CM2$  where an increase of 1% in the tax burden, results in an increase of 11.75 units in the quantity of the  $CM2$ . Moreover, the coefficient of the "ratio of wages and salaries to national income (WSNI)" is also positive and equals 0.13 in the sense that an increase of one unit in the WSNI will result in the  $CM2$  for 0.13 units. According to the research results, in the long-run, the "real per capita national income (YNR)" has a negative impact on the  $CM2$  in the sense that one percent of increase in the YNR will result in a decrease of 3.37 units in the  $CM2$ .

Accordingly, the coefficient of the "real rate of interest paid on time deposits ( $RL$ )" is also negative and equals 0.26. In other words, an increase of one single unit in the  $RL$ , the quantity of the  $CM2$  shall decrease for 0.26 units. Furthermore, the trend coefficient, in its long-run relationship with the  $CM2$ , is negative; too, amounting to 0.24. The coefficient related to error arising from long-run equilibrium relationship is called as adjustment coefficient and indicates the speed adjustment from the deviation from the long-run equilibrium. As shown in Table 4, the ECT coefficient in the model is significant with a value of -0.62. The minus value of this coefficient verifies the existence of a long-run relationship among the model variables and its quantity indicates that the disequilibrium of 0.62 in the long-run relationship is adjusted during one single period. In addition, the dummy variable ( $D12$ ) for the years leading to the Islamic Revolution and the years when the country was engaged in the war with Iran indicates a positive relationship in short-run with the  $CM2$  with a coefficient of 4.43. It is worth mentioning that after the estimation of more than twenty VEC models for the estimation of tax evasion levels in the Iranian economy, the final VECM coefficients reported in Table (4) have been perceived as robust. Thus, the results of all these models show that in the long-run, the coefficients of "tax burden" and the "ratio of wages and salaries to national income" have had a positive impact on the  $CM2$  changing, respectively, on a range of 0.48 to 23.84 units and a range of 0.04 to 1.19 units. Accordingly, the coefficients of the variables "real per capita national income" and the "real rate of interest paid on time deposits" have had a long-run negative impact on the  $CM2$  changing, respectively, on a range of 1.45 to 13.78 units and on a range of 0.04 to 1.40 units.

The trend coefficient, too, has all the time been negative in its long-run relationship with the  $CM2$  where it ranges from 0.24 to 0.75. Furthermore, the dummy variable for the years leading to the Islamic Revolution and the years during the Iran-Iraq War, has also had a permanent positive relationship with the  $CM2$  where it ranges from 1.69 to 5.21. Thus, the results

of the estimation of the VECM for estimating the tax evasion levels in the Iranian economy indicate that the relationships among the variables under study are consistent with the expectations proposed by Tanzi's theory in that the two variables of "real per capita national income" and "the real rate of interest paid on time deposits" are negatively related to the *CM2* whereas the two other variables, i.e. "tax burden" and the "ratio of wages and salaries to national income" are positively related to the *CM2*.

**Table 4. The estimation of VEC model results**

The variable's title	description	Coefficients	t-statistics
1+TAXBURDEN (-1)	the lagged logarithm of (1+taxburden)	11.75*	-4.10
WSNI(-1)	the lagged logarithm of the ratio of wages and salaries to national income	0.13*	-2.13
YNR(-1)	the lagged logarithm of the real per capita national income	-3.37*	2.43
RL(-1)	the lagged logarithm of the real rate of interest paid on time deposits	-0.26*	5.40
TREND	Trend(long-run)	-0.24*	5.56
ECT	adjustment coefficient	-0.62*	-4.96
D12	dummy variable for the years leading to the Islamic Revolution and the years during the Iran-Iraq War	4.43*	4.14
CONST	intercept term(short-run)	-1.72*	-3.45

Source: Author calculations.

\* Coefficients are significant at a 95% confidence level.

Therefore, the final model can be presented as follows:

$$D(CM2) = - 0.615820*( CM2(-1) - 11.75401*LOG(1+TAXBURDEN(-1)) - 0.131024*WSNI(-1) +$$

(0.12418)	(2.86503)	(0.06147)
[-4.95893]	[-4.10258]	[-2.13156]

$$3.372965*LOG(YNR(-1)) + 0.259179*RL(-1) + 0.241634*@TREND(52) + 13.517713 ) - 1.715554 + 4.429224*D12$$

( 1.39054)	(0.04799)	(0.04348)	(0.49662)	(1.06954)
[2.42565]	[5.40030]	[5.55786]	[- 3.45446]	[4.14122]

#### *4.5. Measurement of the size of Underground Economy and the Level of Tax Evasion*

After estimating the parameters of the Currency Demand Function derived from VECM, we can estimate the predicted formal economy currency holding, the predicted informal economy currency holding (i.e. illegal money denoted by IM), legal money denoted by (LM), the income velocity of money (V) and finally, the size of underground economy (UE) through the replacement of variables by respective values, according to Tanzi's Monetary Approach (1980, 1983). In the present paper, we have resorted to the Quantity Theory of Money to calculate the income velocity of legal money through dividing The GDP at current prices by legal money. Assuming that the velocity of illegal money is the same as that of legal money, multiplying velocity of money by illegal money gives the underground economy. In the last stage, we have calculated the tax evasion levels through multiplying the annual sizes of the underground economy by the average tax rate (i.e. T/GDP ratio).

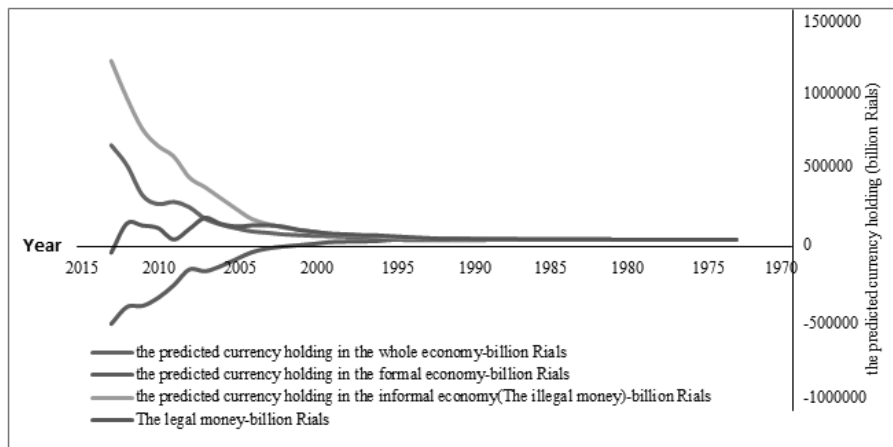
According to the research findings, the Fig (1) reflects the predicted currency holding in the whole economy, the formal economy, the informal economy, as well as the legal money<sup>12</sup>. It can be observed that the trends of changes of the predicted currency holding in the formal economy and those

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<sup>12</sup>For more details, see Tanzi (1980, 1983).

of the legal money are almost similar because both the predicted currency holding in the formal economy (since 1995 onward) and the legal money (since 2006 onward) have experienced descending trends. However, the trends of changes of the predicted currency holdings in the informal economy and in the whole economy have generally been ascending since 1995 onward; in other words, the predicted currency holdings in the informal economy (i.e. illegal money) has increased from 15396.4 Billion Rials in 1995 to 1285639.3 Billion Rials in 2013. Similarly, the predicted currency holding in the whole economy has increased from 15220.1 Billion Rials in 1995 to 680335.4 Billion Rials in 2013.

**Figure 1. Iran-Comparison among the predicted currency holding in the whole economy, the formal economy, the informal economy and the legal money, 1973-2013 (Billion Rials)**



Source: Author calculations

In order to save space in the present paper, we have sufficed as follows to a summary table including selected statistical characteristic of the two variables under study, i.e. the "size of underground economy" and the "tax evasion level" along with their ratios to the "total tax revenue" and the GDP:

**Table 5. Iran-Estimates of underground economy and tax evasion, 1973-2013 (Billion Rials)**

The variable's title	Average	Maximum	Minimum	Standard Deviation
The estimated size of underground economy(Billion Rials)	24950516.5	955285914	- 129809038	151018885
The estimated tax evasion level (Billion Rials)	1909810.6	73611161.3	-6866913.3	11558540.7
total tax revenue(Billion Rials)	71703.2	494249.5	131.2	126867.2
The GDP at current prices (GDP <sub>f</sub> ) (Billion Rials)	1219060.7	9343070	1795.6	2199489.7
The ratio of tax evasion level to total tax revenue (percent)	735.2	24534.2	-1389.4	3823
The ratio of size of the underground economy to GDP <sub>f</sub> (percent)	735.2*	24534.2	-1389.4	3823
The ratio of tax evasion level to GDP <sub>f</sub> (percent)	54.6**	1890.5	-73.5	294.4

Source: Author calculations

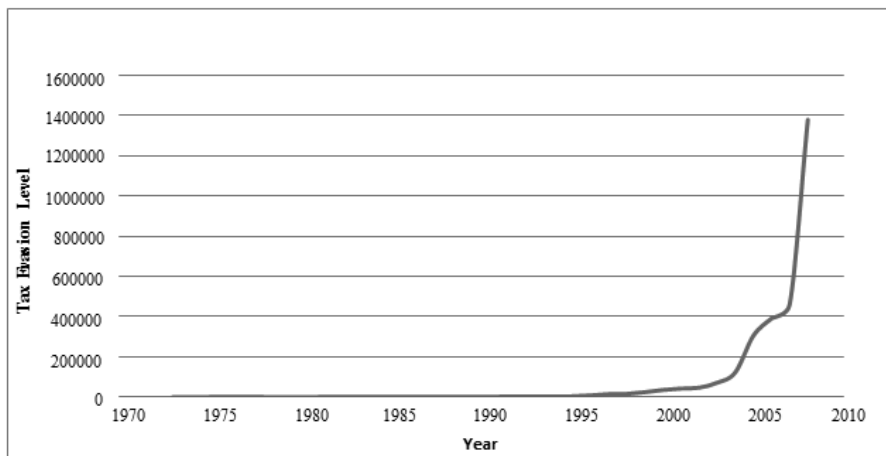
\*This average ratio has been calculated in due regards with unexpected rise of the size of underground economy estimated for 2009. If we exclude the data of 2009, then, the average ratio for the other years would be 140.2 %.

\*\*This average ratio has been calculated in due regards with unexpected rise of the level of tax evasion estimated for 2009. If we exclude the data of 2009, then, the average ratio for the other years would be 8.7 %.

The above Table shows that the average and the standard deviation of the size of underground economy and the tax evasion level as compared with the total tax revenue and the GDP at current prices are considerably huge. In other words, the average ratios of estimated tax evasion to the total tax revenue and GDP have been 735.2% and 54.6%, respectively that imply a very high prevalence of tax evasion in the Iranian economy.

In order to take a deeper look at how tax evasion has moved during the period 1973-2013, we can use descriptive analyses by the figures below:

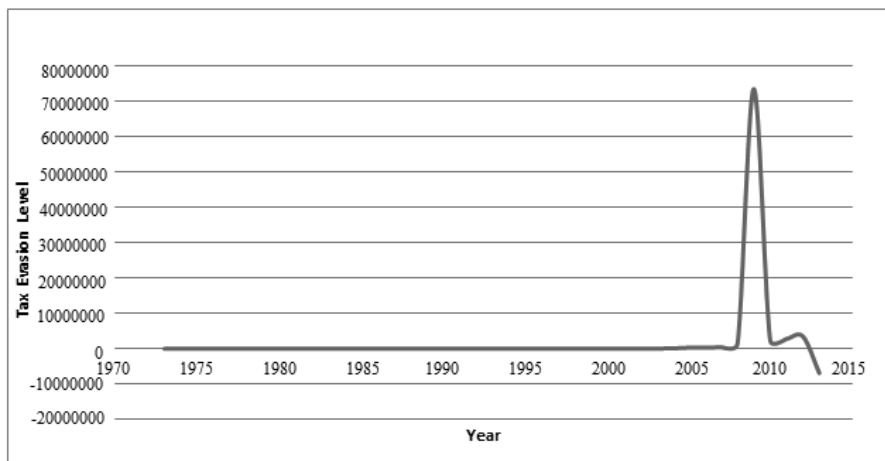
**Figure 2. Iran-the estimated tax evasion level, 1973-2008 (Billion Rials)**



Source: Author calculations



**Figure 3. Iran-the estimated tax evasion level, 1973-2013 (Billion Rials)**



Source: Author calculations

The figures (2) and (3) show that the estimated tax evasion level has had a gradual ascending trend during the period 1973-2008 but in 2009, the tax evasion level has strikingly reached its highest level all through the period in question with 73611161.3 Billion Rials amounting for 1890.5% of the GDP or 18 times the GDP of the year. In the next subsequent years, however, the figure has been back again to its normal trend. The striking increase of tax evasion in 2009 can be attributed to the increase of velocity of money from 48.1 in 2008 to 1594.2 in 2009, the decrease of legal money from 78043.1 Billion Rials in 2008 to 2468 Billion Rials in 2009, and the heavy tax burden imposed in 2009 as opposed to other years after the Islamic Revolution. In addition to these factors, we may also refer to the absence of financial discipline of both the government and the state-owned companies in 2009 since in the year in question there have been neither substantial changes in the tax structure of the country nor major amendments to the tax laws and regulations. Historically speaking, the striking rise of tax evasion in 2009 reminds us of the period 1989-1990 in the former Soviet Union when the communist regime was collapsed after 69 years of centralized governance and state ownership. Before the collapse of the regime, there had been no

obligatory taxation system in the country and there was only a withholding taxation system whereby a tax on salaries and wages was deducted from the money paid monthly to citizens; as a result, the citizens were not accustomed to any tax compliance norms and accordingly, after the collapse of the regime leading to a shift to self-declaration and voluntary payment of taxes, there was a deep non-compliance shock in post-collapse Russia resulting in a striking level of tax evasion<sup>13</sup>. Thus, it can be inferred that the severe rise of tax evasion in 2009 has more or less been similar to the non-compliance shock observed in 1989-1990 Russia where under both circumstances, there were a lack of financial discipline on the part of the government and the state-owned companies.

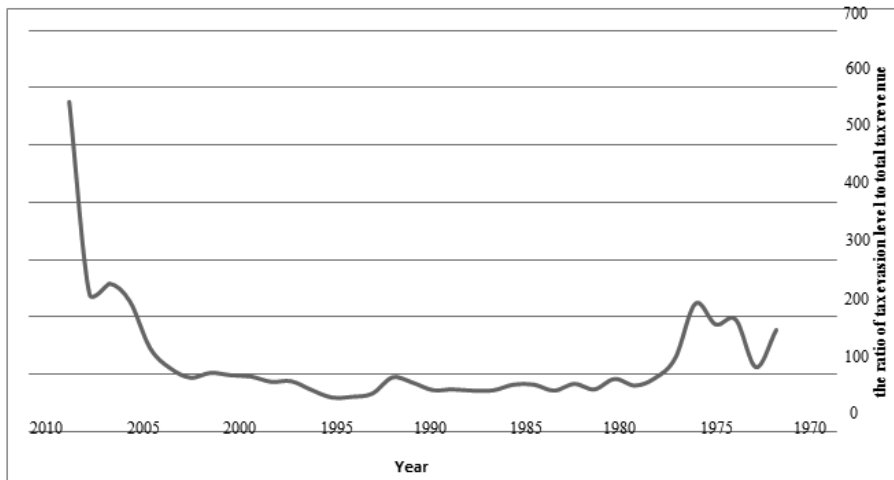
One more point is that for the year 2012, we have observed a negative value for the level of tax evasion that can be attributed to such factors as the negative real economic growth rate (-1.92%), the recession of the market of a large variety of industries, and the decrease in the real per capita national income in the year in question.

Moreover, it can be concluded from the figures (4) and (5) that the trend of changes of the ratio of estimated tax evasion level to the GDP is very similar to the trend of changes of the ratio of estimated tax evasion level to the total tax revenues.

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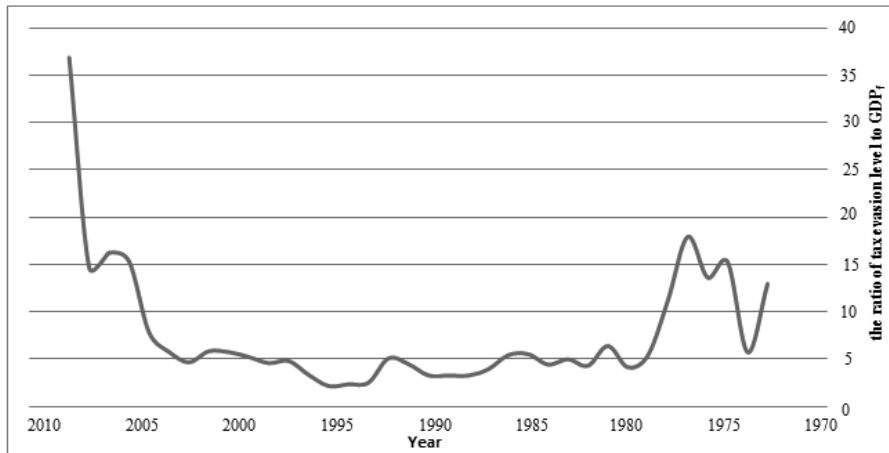
<sup>13</sup> For a more detailed discussion, see Feige (1997), Grossman (1977, 1992) and North (1990, 1994).

**Figure 4. Iran-the ratio of tax evasion level to total tax revenue, 1973-2008 (percent)**



Source: Author calculations

**Figure 5. Iran-the ratio of tax evasion level to GDP<sub>t</sub>, 1973-2008  
(percent)**



Source: Author calculations

## 5. Concluding Remarks

In the present paper, we have tried to provide an answer for this research question: what are the quantities of "the underground economy" and "the tax evasion" in Iran in any years of the period in question and what has been the dominant trend in that respect? To do the task, we first estimated the size of underground economy in Iran within the framework of Tanzi's Monetary Approach (Tanzi, 1980, 1983) by using advanced econometric methodologies (i.e. VAR and VECM) on the basis of annual time-series data of the period 1973-2013. In this model, the "ratio of currency holding (C) to money (denoted as  $M_2$ ) or  $CM_2$ " has been selected as the dependent variable and four variables: the "ratio of wages and salaries to national income (WSNI)", "real per capita national income (YNR)", the "real rate of interest paid on time deposits (RL)" and "average tax rate (Tax Burden)" have been considered as the explanatory variables. Having estimated the size of underground economy based on Tanzi's Currency Demand Approach, tax

evasion levels during the period 1973-2013 were calculated by taking into consideration the average tax rates (i.e. T/GDP ratio) of each year. The results so obtained indicated an ascending trend for most years under study and such a trend verified the research hypothesis. However, the level of tax evasion for the year 2009 was exceptionally high with 73611161.3 Billion Rials amounting for a striking increase of 1890.5% or 18 times the GDP in that year. On the basis of existing evidence in the country's official statistics, we attributed this striking abnormal increase of tax evasion to an increase of velocity of money and a decrease of legal money (in 2009 as compared to 2008), a heavier tax burden (imposed in 2009 in comparison to all other post-revolution years) and the existence of structural problems in the economic system of the country which is the result of a lack of financial discipline on the part of the government and the state-owned companies in that particular year.

Thus, according to the research findings indicating an ascending trend for the size of underground economy and the tax evasion levels and bearing in mind that the Iranian economy has been facing serious budgeting problems during recent years due to specific conditions derived from the economic sanctions imposed on the country and the severe fall of oil prices, the Iranian government is highly recommended to maintain its inflation control policies, follow more disciplinary financial procedures, avoid imposing heavier tax burdens, simplify, make transparent and deregulate the existing rules and regulations, move towards further improvement of the business environment, and plan for the sustainable growth of tax revenues and the decrease of budget deficits through minimizing the tax evasion levels in the country.

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Flavio Felice\*

FOR AN ECONOMIC HUMANISM WILHELM RÖPKE'S  
“*CIVITAS HUMANA*” AND THE SOCIAL MARKET ECONOMY

**Abstract**

*Civitas Humana* is a thoroughly articulated work. In it, Röpke makes interact all the disciplinary spirits that inform the so-called social market economy: economics, both microanalysis as well as macro, sociology, and politics. Wanting to provide an informative introduction, rather than merely presenting a summary of all the topics covered by the book, the writer proposes a reflection on the contribution that the work of Röpke offers to the debate over global *governance* as opposed to global *government*.

The reconstruction of the international order after totalitarian devastation, in the opinion of Röpke, imposes a choice between economic regimes that were incompatible: a market economy or a controlled economy. The tragic experience of the past leads our author to choose, without any hesitation, the way of the market economy, an economy of competition that develops the theory of liberalism given direction by the Freiburg School and that could be implemented in a dynamic Social Market Economy

**JEL CLASSIFICATION:** A14, B31, F02, N44, Y8, Z12, Z13.

**KEYWORDS:** WILHELM RÖPKE, II WORLD WAR, ORDOLIBERALISM, SOCIAL MARKET ECONOMY, EUROPE, FEDERALISM.

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«The solution of the problem of planning thus also presupposes that the “economic will” is autonomous and is formed by the democracy of consumers. All ought to have the unlimited possibility to make their preferences a determining factor of the economic “plan” of the community. Anyone who possesses the most elementary knowledge of economic theory knows that this constitutes the very essence of market economy. That is its definition» (Wilhelm Röpke 1996, 29)

## 1. Introduction

The article aims to present the economic perspective of humanism, from the reflections of one of the major European intellectuals of the Twentieth Century. Wilhelm Röpke went through the so-called “short century,” leaving us an extraordinary legacy of ideas that range from economics to sociology, from political science to social ethics. With this article, we wanted to focus our attention on the notion of “economic humanism,” as it emerges from one of the most important works of our author: *Civitas Humana. Grundfragen der Gesellschafts und Wirtschaftsreform*.

The contribution is divided into five parts, each of which tries to highlight a significant aspect of the Röpke’s work, taken as a whole, searching out the traits that make it a compendium of social sciences and not just an economic treatise.

The first part, *Genesis and reception*, presents the way in which the work appeared as Röpke worked it out, the characteristics of the different editions, and reception it had in some cultural circles. The second part, *The trans-disciplinary dimension of economic problems*, introduces a multidisciplinary interpretation of the economic system, where the economic, political and cultural dimensions come together, confront each other, and interacting, affect each other mutually. In the third part, *The causes of international*

*violence*, we show the reasons for which Röpke rejects a “one-sided economism” that reduces the warlike character of or peaceful relations between peoples to economic causes. The fourth part, “*Civitas Maxima*” and *global Leviathan*, presents a classic theme of Röpke’s: the identification of “centralization” with the collectivist economy. The reason that we should avoid all forms of collectivism is that it, unlike the market economy, requires the complete politicization of economic relations and this politicization translates into “nationalization” within a given territory. The fifth and final part, “*Civitas Humana*” and *global interdependence*, expresses Röpke’s ideal, an alternative to the *Civitas Maxima*: an authentic global economy presupposing that individual nation states cede a portion of their sovereignty to the extent that it is necessary to promote freedom, multilateralism, and mobility. This would then be able to promote the development of international economic processes, making possible the communion of the market and prices, within a monetary system which provides a “payment community.”

Röpke’s reflection is part of a historical context of great change, characterized by the search for a new international order that contemplates economic and political freedom, peaceful relations between states and respect for the dignity of each person. In this regard, Röpke distinguishes between a “competitive economy” and a “controlled economy,” not confusing the first with “historical capitalism.” The tragic experience of the past leads our author to choose the way of the market economy, in the specific form of the social market economy, for which there are three principles: 1. The polyarchic dimension of civil society and the consequent common good (irreducible to its political dimension); 2. The principle of subsidiarity as a principle of order (horizontal and vertical); 3. The rejection of political discretion in the organization of the market (the economic constitu

## 2. Genesis and Reception

The first German edition of *Civitas Humana* was published in 1944<sup>1</sup>. (The English translation by Cyril Spencer Fox, *The Moral Foundations of Civil Society*, appeared in 1948, published by W. Hodge. Citations in this text are from the 1996 edition of that translation from Transaction Publishers.) It is the second book of the so-called “Röpke trilogy” that has ensured the international reputation of the thought of Wilhelm Röpke. The other works are *Die Gesellschaftskrisis der Gegenwart* (1942) (English translation, *The*

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<sup>1</sup>Röpke 1944.

*Social Crisis of Our Time*, 1950<sup>2</sup>), and *Internationale Ordnung* (1945) [English Translation, *International Order and Economic Integration* (1959)<sup>3</sup>]. To these three works, we should ideally add Röpke's spiritual testament, *Jenseits von Angebot und Nachfrage* of 1958 (English Translation, *A Human Economy*, 1960<sup>4</sup>). Together, these can be considered Röpke's intellectual contribution to the political, economic, and social thought that characterized the years during and after World War II.

The second German edition of *Civitas Humana* was published in 1946, for which Röpke added several corrections, changes and additions. The third German edition of 1949 contains only a few bibliographic additions to the second. The fourth edition, reprinting the previous one, appeared in 1979 in the collected works of Röpke from the publishing house Paul Haupt Bern. The first Italian translation of *Civitas Humana* was by Ervino Pocar, based on the second German edition of 1946. It was published by Rizzoli. The English translation by Cyril Spencer Fox, *The Moral Foundations of Civil Society*, appeared in 1948, published by W. Hodge. Citations in this text are from the 1996 edition of that translation from Transaction Publishers.

Röpke considered *Civitas Humana* a continuation and completion of his book *The Social Crisis of Our Time*, but it should also be read in connection with other writings of his that appeared in the Forties of the last century: *Die deutsche Frage* (1945) (*The German Question*, 1946<sup>5</sup>) and *Internationale Ordnung* (1945), both of which appeared in Italian translation from Rizzoli in 1946, as well as the book *Die Krise des Kollektivismus* (*The Crisis of Collectivism*, 1947), published in Italy in 1951 for the publisher Nuova Italia.

*Civitas Humana* shows clearly that the thought of Röpke was a body of work continuously under development, taking shape alongside the various historical events of the Twentieth Century, of which he was an active witness. There are several events that influenced his thinking, motivated the writing of his books, and found an analysis in his writings: the experience of the two World Wars; the economic crisis of the capitalist system in 1929; the emergence of groups seeking totalitarian power; the vanishing of collectivism and socialism; problems of international crises; and, after World War II discussions, issues, and events related to the establishment and implementation of the Social Market Economy model.

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<sup>2</sup> Röpke 1950.

<sup>3</sup> Röpke 1959.

<sup>4</sup> Röpke 1960.

<sup>5</sup> Röpke 1946.

The title *Civitas Humana* and its program for the formation of a humane society substantively represents both the ideal resolution of the social crisis of the time described by Röpke's eponymous volume and its fulfillment. Originally, the work was to bear the title "*Civitas optima*,"<sup>6</sup> as Röpke revealed in a letter to his friend Alexander Rustow. *Civitas Humana* in part contains newly updated and expanded version of certain articles published in the *Neue Zürcher Zeitung*, in the *Neue Schweizer Rundschau*, in the *Gazette de Lausanne* and in *Schweizerische Bauzeitung* in the years immediately preceding. The central core of the book revolves around the relationship between moral and institutional issues, as Röpke highlights in the long preface, which also offers a balance to and an echo of his scientific work, especially concerning the reception of *The Social Crisis of Our Time*.

Within the context of Röpke's thought, *Civitas Humana* should be considered a continuation of his diagnostic analysis in that previous book. Röpke formulates and outlines further the principles and foundations on which a better society should be built. As indicated in the original subtitle of the book – *The fundamental problems of social and economic reform* – Röpke offers a contribution to the reconstruction of an economic and social order that is both efficient and respectful of human dignity, an order restored after the Second World War and opposed to all forms of collectivism and to the degeneration of liberalism and capitalism. His program contains elements of reform, of theoretical foundations, and of suggestions of considerable practical relevance in the context of contemporary society. Into it, Röpke also merges the great and significant thought of Christian Social Doctrine for the establishment of a healthy human society. He also lays out the foundational principles that would form the basis of the Social Market Economy program. Röpke further underscores the value of the principles of subsidiarity and of coordination between the three major subjects of this program: the State, society and the economy.

Röpke presents himself in *Civitas Humana* as a "son of a village of the Lüneburg Heath," who through "many stages, errors, and books and conversations and insights and experiences" eventually became a firm advocate of the liberal worldview (Röpke, 1996, 24). Röpke criticized *laissez-faire*, which failed because it neglected the non-economic factors of the market economy and attributed to it an autonomy without realizing that it needed a moral, political, and institutional framework to guarantee its operation. Röpke does not deny, however, that there is a common aspect between the old liberalism and the neo-liberal, represented by their defense

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6 Röpke's Letter to Alexander Rustow on May 13, 1943, quoted in: Hennecke 2005, 146, f. 74, 269.



of the core value of freedom and the fulfillment of the individual. However, Röpke distances himself from the concept of a market automaton which would be able to bring into existence a natural order on the basis of pre-established harmony. Against forms of collectivist and totalitarian thought, Röpke stresses that the only valid response is the realization of a liberal conception compatible with a *civitas humana*. In this regard, Alfred Müller-Armack states that the error of liberalism is to consider the economic order as something which is in itself capable of “creating a definitive social order.” For Müller-Armack, the economic order is only a “means of organization” and not an order that it can be left to itself (Müller-Armack 1966, pp. 106-107).

Among the various positive reviews *Civitas Humana*, we can highlight those of Friedrich August von Hayek and Alfred Müller-Armack. Hayek, who was related to Röpke through strong intellectual ties and was among the main founders of the Mont Pelerin Society along with Röpke, had this to say: « Professor Röpke has now followed his earlier critical work with a fascinating view of possible liberal society of the future. His *Civitas Humana* is the nearest approach to that positive programme for a future liberal society which is so often asked for by those who sympathise with the new counter-attack against Totalitarianism. That in 1944 such a work, written in the best tradition of the great European civilisation, should come from the centre of the European continent, is an encouraging and significant fact.» (Hayek July 9 1944)

For his part, Müller-Armack also devoted a long commentary – published in the journal *Ordo* in 1950 – to the volumes of the Röpke trilogy. He praised with great esteem the thought contained in these books (Müller-Armack 1950, pp. 253-267). Müller-Armack recalls the widespread and positive reception to the writings of Röpke in Germany during and after World War II. Müller-Armack defines this trilogy as «an expression of our historical and cultural condition, and at the same time as the criterion for the possibility of spiritual renewal and the starting point of an author’s dialogue on the further development of the situation of our time.» (Müller-Armack 1950, pp. 253-254) Müller-Armack defends the new concept of “liberalism” proposed by Röpke, which contains a program that could guide the creation of a new economic and social order. Müller-Armack moreover connects Röpke’s conception of liberalism with Christian Social Doctrine and says: «An important task of Christian Social Doctrine in the near future will be to take greater account of the positions presented by this new conception of liberalism and overcome those prejudices often thrown up against liberalism in ecclesial practice; on the other side, the task of liberalism will be to definitively overcome the era in which it presented itself as a competing

cultural orce and lead its conception into a deep dialogue with the central ethical values.» (Müller-Armack 1950, pp. 264-265)

Röpke defends the concept of a human society, of an economic humanism, and of liberal man. Among features of a liberal man, Röpke recalls that the liberal is one who defends the principles of ownership and competition. The liberal criticizes any accumulation of power, prevents its abuse by creating counterweights, and opts for decentralization. The liberal democrat is one that focuses on the defense of the human person and his rights, and is critical of all forms of collectivism and totalitarianism. The liberal, finally, stands in favor of intermediate classes and small social units. In summary, Röpke—in his criticism of the historical errors of liberalism and capitalism, in his commitment to renewing the liberal tradition and constructing an economic and social order worthy of man, and in his many attempts to find lines of convergence between Christianity and market economy—has shown that a good Christian is a liberal who does not know it. (Röpke 1947)

### 3. The Trans-Disciplinary Dimension of Economic Problems

This study also applied ARDL co-integration and long form test to check the co-integrating variable and long-run relation among the agriculture sector and economic growth of Pakistan and the results obtained from regression analysis of these tests are incorporated in below table (6) and (7).

As one particular motif of Röpke's work, we can trace the relationship between "market economy" and "collectivist economy" in relation to a free and peaceful international order, the only one that in his judgment complies with *civitas humana*. He treats a theme that has interested a wide array of liberal authors who, during and immediately after World War II, asked themselves what order to promote at the end of that devastating conflict<sup>7</sup>. Röpke inserted himself into this debate among European social scientists and sided overwhelmingly in favor of the market economy, highlighting its personalist, humanistic, and peaceful nature.

A similar argument springs from a declaration of method, that the economist should avoid overestimating the weight that the "business side"

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<sup>7</sup> Consider also the positions taken by F. A. von Hayek, L. Robbins, L. Einaudi and L. Sturzo. From the last, we quote a few lines from one of his works from 1946: «Nationalism and Internationalism are today the two poles around which politics has its evolutions and involutions. All other human interests, institutions, social trends, even cultural and religious life, are affected by the influx of nationalist or internationalist policies.» Sturzo 1946, p. viii.

carries in international politics, thus reducing the nucleus of causes that have led and still lead to conflictual situations, breaking “harmony among people.” In fact, Röpke intends to highlight the interpenetration of the economic side with the political and of both with the cultural dimension, to bring out the great responsibility that is vested directly in “politics,” understood as the «terrain of ideas, of power, justice, ambition, of desire for dominion or for independence, of the collision of the peace-loving and aggressive, and of further irresolvable sentiments.» (Röpke 1996, p. 224)

Faithful to a position that can be characterized as a multidisciplinary interpretation of the social market economy model, where the economic, political, and cultural dimensions come together, interact, and affect each other mutually, Röpke describes the "economic regime" that is both the sum of the principles which govern economic life and is, at the same time, never completely autonomous and self-referential. It is conditioned by the "social system," in which all the systems and subsystems of social life confront and affect each other. Such a description, Röpke states, to the extent that is true for the life of a nation, must also be true for international relations.

#### **4. The causes of international violence**

By virtue of this methodological perspective, our author rejects a “one-sided economism” that reduces the warlike character of or peaceful relations between peoples to economic causes, leading us to affirm that human beings necessarily will resort to war and yield to imperialist forces, once the economic system called “capitalism” has been chosen. On the other hand, Röpke does not deny that one can identify the character of the economic systems that promote harmony among peoples and those that compromise it. This is exactly the goal that he seeks, attempting to locate the dividing line between an economic regime conducive to peace and one that instead contributes to international hatred. In this regard, Röpke avoids any delay and without mincing any words decides to “take the bull by the horns” and contest in an absolute manner and in a direct way the statement, an “extremely popular” one, that “‘Capitalism’ is the intrinsic cause of war and capitalism.” Indeed, with a great sense of urgency, Röpke outlines the best way to demonstrate how mistaken this opinion is. (Röpke 1996, p 225-226)

Röpke’s demonstration proceeds from the assumption that we are all agreed that «the profit motive often possesses the tragic tendency to influence governments in a warlike direction, that the secret archives of the armaments industry in all countries must have their darker side, that individual concerns often enough guide colonial policy in an undesirable direction from behind the scenes and so have contributed to world conflict,

that uncontrollable financial forces have spread the poison of nationalism in public opinion by straight or crooked means and so on and so forth.» (Röpke 1996, p. 225) Nonetheless, in what way could everything have to do exclusively with one economic regime rather than with another? For our author, the universal acceptance of such an assumption, indeed, is only to say that there are unscrupulous, greedy and ambitious, raging adventurers and scoundrels – and they are not few. Such figures have always existed and will always exist in any latitude and longitude, as well as in any economic and social regime. Once we recognize this fact, Röpke understands that the problem of the causes of international violence, far from being solved, appears only slightly shifted. The new question that arises is what economic regime favors - although it cannot absolutely determine - international conflict and which instead promotes peace. Again, the most popular response places in the dock the economic regime that arose from the Industrial Revolution, centered on the intensive use of capital, on the division of labor, and on the free market. Röpke objects that it is hard to understand how such a “race of individuals,” sinister and villainous, has been able to bring to an end the era of feudalism and yet has not expressed itself in all its supposed wickedness during the era of totalitarianism or collectivism, brought about in whatever way. The reality, says our author, is that «To speak here of the mischievous influence of “Capitalism” means obscuring the matter, and where it is a question of human guilt indulging a notion divorced from responsibility.» (Röpke 1996, p. 225)

##### **5. “Civitas Maxima” and Global Leviathan**

This is, to our author, the fundamental error of any kind of “radical thought,” the “unfortunate doctrine of Rousseau,” according to which man is in himself good and that it is society that corrupts; from this point of view, it would be sufficient to redesign society to have man again in his pure goodness. «The feeling of guilt which all should share in true repentance is silenced and perniciously blunted in a determinist way, i.e., by means of theories which blame the purely objective force of “circumstances” and absolve humanity. The theory of economic imperialism, the subject of discussions here, can be taken as a pattern of this type of evading guilt.» (Röpke 1996, p. 226) According to Röpke, it follows that the political consequences that are imputed to capitalism would not be typical of this economic regime and that only under certain conditions they manifest themselves. However, this reality would be “concealed” by the «blanket of vagueness covering ideas including that of ‘Capitalism.’ » (Röpke 1996, p. 226).

To avoid misunderstandings and superficial judgments, Röpke proposes to set aside the vague and often indefinable (except ideologically) term of *capitalism*<sup>8</sup> and take the two guiding principles of an economic system, the “market economy” or competition and “controlled economy” and he invites us to keep these principles rigorously distinct. Once the model is built, we have only to rephrase the original question: «which of the two systems is more likely to be conducive to a peaceful, free and just international order?» (Röpke 1996, p. 226). Moreover, Röpke introduces this economic distinction, comparing it to another distinction in the political order, stating that there are two ways of “universal political organization”: a world state that denies the sovereignty of the existing nation-states (“*Civitas Maxima*”), or one that does not negate but rather limits national sovereignty. The *Civitas Maxima*, in economic terms, would mean the construction of a single international economy that would involve all the peoples of the earth. In such a case, the reasons for interstate conflict would be mitigated and the problem of peace would finally be resolved.<sup>9</sup>

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<sup>8</sup> It is interesting to note that John Paul II in the encyclical *Centesimus Annus* assumes a position on the use of the term “capitalism” similar to that of Röpke, and also shared by Luigi Einaudi: « If by “capitalism” is meant an economic system which recognizes the fundamental and positive role of business, the market, private property and the resulting responsibility for the means of production, as well as free human creativity in the economic sector, then the answer is certainly in the affirmative, even though it would perhaps be more appropriate to speak of a “business economy”, “market economy” or simply “free economy”.»; Giovanni Paolo II 1991, n. 42. On the same issue, see L. Einaudi 1942.

<sup>9</sup> About the global *government/governance* debate, see Kennedy 2008, pp. 838-839. Kennedy sees a line of continuity between the so-called Manhattan School, at Columbia and NYU, and Röpke neo-liberalism: «For the Manhattan School, global governance was to be as much a work of the spirit, a work on the self, as a structure of rules and institutions...In this, the Manhattan School echoed Wilhelm Roepke’s famous description of the liberal order of the nineteenth century, held together not by institutions of global governance but by a common appreciation of the “liberal principle” that governments should simply not allow the political to contaminate the economic. For Roepke, this “liberal spirit,” plus the Gold Standard, constituted what he termed an “As-If World-Government” more valuable and ethically compelling than the collectivist fantasies of both European and international lawyers after the Second World War.<sup>3</sup> For the Manhattan school, it was the activist spirit of Dag Hammarskjöld, working flexibly with great, if often contradictory, principles, along the boundaries of law and politics, East and West, guided by the imaginary

It is needless to say how illusory and mystifying Röpke found such a position, since the universal economy that exceeds the reasons of particular (national) conflicts would only be possible under the proviso that a central universal polity was established that would act as an “all-powerful world state.” In the absence of such conditions, the universal economy would lack “an executive political leader.” A universal collectivist economy cannot do without a universal collective State, an institution with universal political jurisdiction that assumes in itself, as a synthetic summit, the negated sovereignty of the nation states and the specific responsibilities of the institutional network, whose pluralism would necessarily succumb to the new global Leviathan. «This World State must be really universal for as long as there remained individual giant empires side-by-side with continental federations the same question of their hostile or friendly relations with each other would arise as is the case at present between national states.» (Röpke 1996, p. 227)

Such a universal collectivism, Röpke reassures us, should not frighten us, or at least should not worry us any more than we can worry about unlikely conjectures. It is so distressing and terrifying that no one will ever achieve it, unless in a partial and so vulnerable manner. All that remains, then, is to consider the second hypothesis, namely, in the aftermath of the Second World War, Röpke sees not so much the birth of a world state, as a series of states or federations of states somehow connected with each other. This means that the same collectivism, if it ever develops, would cover states or federations of States and not an international collectivism, embodied by a universal political institution: «Indeed if a Mephistophelian world spirit were to consider how he might best effect a maximum of irritation between the nations by means of a well-thought-out economic system, this juxtaposition of collectivist states or groups of states would prove the most genial solution.» (Röpke 1996, p. 227) To the “Mephistophelean world spirit” of universal collectivism, Röpke opposes the Christian spirit of freedom, the only one that is able to solve the problem that is inherent to the pursuit of freedom, of justice, and of peace, without falling into the trap of the “world state.”

The reason that we should avoid all forms of collectivism is that, unlike the market economy, it requires the complete politicization of economic relations and that politicization translates to “nationalization” within a given territory. Röpke’s concept of “nationalization,” much like the “statism”

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perspective of an international community, an international judiciary, and an international jury of his peers».

denounced by Luigi Sturzo<sup>10</sup>, is not the same as the notion of public intervention or an active role for the state in economic life. It indicates the maximum strengthening of state power, which implies an equally powerful reinforcement of the state borders and the creation of a bureaucratic network that takes on a similarly nationalistic and despotic tendency. To great effect, our author describes the situation in which one finds oneself living in a city within a collectivist state: «Each individual is so bound to the State for his very existence that even his identity card becomes as it were a sort of soup ticket or insurance policy. This implies the simultaneous shutting oneself off from the outside world; autarky, the strictest control over emigration and immigration, the most rigid and compulsory Foreign Exchange control. And it means furthermore, that, in contrast with market economy, since nation and the economic system have only now become merged, the economic well-being of the nation becomes a function of the size of territory and of the natural resources within the territory which is thus politically governed.» (Röpke 1996, p. 228)

## **6. “Civitas Humana” and Global Interdependence**

Here we come to a fundamental affirmation with which our author declares that anyone who wants collectivism, inevitably, will have to reach out to the collectivist economy that he also defines as the “bloc economy.” Those who want “a world economy” will have to renounce collectivism in every field and move towards a market economy. «*World economy is nothing but the market economy form, and bloc economy the collectivist form of international economy, and in both cases the form of the international economic order must correspond with the national.*» (Röpke 1996, p. 228) Ultimately, for our author, the market economy is the world economy, as the collectivist economy is to that of the bloc, and this occurs both inside and outside of nation states, in international economic relations. You cannot speak at the international level the language of liberalism –

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<sup>10</sup> In the field of economics, Sturzo complains of the undue intrusiveness of the state bureaucracy into private initiative. This is the first of the “three evil beasts of democracy”: “statism”, which would go against freedom. Sturzo wrote on this matter “The error of those of good faith stems from a false vision of the modern economy, believing that the state with its ever-widening interventions can repair inequalities, give work to the unemployed and elevate the level of the working classes; it will be just the opposite.”; Sturzo, 1998, p. 12 (Translation from Italian for this article).

which for Röpke is the language of freedom, peace, and equality – and at the national level promote the language of collectivism. Indeed, to not understand such a discrepancy between domestic collectivism and universal peace, when compared to the incompatibility between world economy and economy of the “bloc,” was the source of the greatest danger for those who would be called to the difficult work of rebuilding democratic institutions after the tragedy of the Second World War.

For “world economy,” Röpke means a model of competition able to contribute to the building of an international order worthy of the name, since the elements of “multilateralism,” of “interdependence,” of “freedom,” and of “equal rights,” if they are present at a national level, transfer into international relations. It is for this reason that for Röpke, a genuine world economy can only be created in the form of an “international community of markets, price and settlement,” whose precondition is an «interdependent, intercommunicating, and multilateral system of international economic relations with an international monetary standard with a minimum of import and export restrictions and with an absolutely free international exchange of the factors of production, capital and labour.» (Röpke 1996, p. 229)

At this point in his reflection, Röpke identifies two possible solutions for giving birth to a true global economy. The first would involve the integration of all the economies of the Earth by means of a union of all the nation states within a “world state”; in this case, the communion of markets, prices, and payments would be realized, resulting in a global national economy. The second solution, to which our author evidently leans, requires an authentic global economy presupposing that individual nation states cede a portion of their sovereignty, to the extent that it is necessary and sufficient to promote freedom, multilateralism, and mobility. This would then be able to promote the development of international economic processes, making possible the communion of the market and prices, within a monetary system which provides a “payment community”<sup>11</sup>: «This implies limiting trade policy to a reasonable measure of protection (“conformable” policy in contrast with the “non-conformable” policy of quotas, clearings and monopolies), Most Favored Nation treatment and an international currency system like the gold standard.» (Röpke, 1996, p. 230). The proposal of Röpke goes in the direction of a union of states that retain a certain amount of sovereignty, out of the fear that a world state might be born that absorbs and synthesizes within itself all individual sovereignty. Though some peddle the birth of this world state as a “dream,” in the eyes of our author it looks like the worst of nightmares.

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<sup>11</sup> For the theoretical framework, see Kehoane – Nye 2012<sup>4</sup>; Jessop 2004, pp. 49-74.



## **7. Conclusions**

The proposal of Röpke goes in the direction of a union of states that retain a certain amount of sovereignty, out of the fear that a world state might be born that absorbs and synthesizes within itself all individual sovereignty. Though some peddle the birth of this world state as a “dream,” in the eyes of our author it looks like the worst of nightmares.

Röpke shows himself fully aware of the difficulties a federation of sovereign states might face, since it runs the risk of replicating outside its borders the same problems that have characterized relations between individual member countries: a conflict between states would be replaced by a conflict between federations. Here the reflection of Röpke meets those of Friedrich August von Hayek (Hayek 1939) and Lionel Robbins (Robbins 1937), where the Austrian and English economist say a federation - both national and international - can only live in an economic system marked by the free market<sup>12</sup>: «Collectivism in fact means the utmost and inescapable piling up of the power of the state which it is possible to imagine, and it should be plain that such a Leviathan can have nothing else for its substance but the utmost nationalism, despotism, and imperialism. If in future the world should become divided up into a system of collectivist clumps of power, nothing is more sure than that these will become involved in annihilating wars with one another until such time as one or other of them shall have achieved indisputable world leadership and so created a World State, that is to say to have realized those conditions on this planet which no words can describe in all its frightfulness.» (Röpke 1996, p. 231-2) Nevertheless, Röpke is confident about the future and is confident that collectivism necessitates such international disorder, such deprivation of freedom, and such absence of peace, that people themselves will “smash...to smithereens” the collectivist nightmare.

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<sup>12</sup> «It is this which is the object of international liberalism. It is an institutional pattern especially designed to meet the difficulties of economic organization on an international scale. If planning is an attempt to create institutions conducive to the satisfaction of the citizens, then international liberalism is a plan»; Robbins 1937, pp. 224-225. «But now when nationalism and socialism have combined-not only in name-into a powerful organization which threatens the liberal democracies, and when, even within these democracies, the socialists are becoming steadily more nationalist and the nationalists steadily more socialist, is it too much to hope for a rebirth of real liberalism, true to its ideal of freedom and internationalism and returned from its temporary aberrations into the nationalist and the socialist camps?»; Hayek 1939, pp. 270-271.

The reconstruction of the international order, after totalitarian devastation, in the opinion of Röpke, imposes a choice between economic regimes that were incompatible: a market economy or a controlled economy. The tragic experience of the past leads our author to choose, without any hesitation, the way of the market economy, an economy of competition that develops the theory of liberalism given direction by the Freiburg School and that, purified from the dross of the “historical capitalism,” could be implemented in a dynamic “social market economy.” This program is possible only through a limitation of the sovereign rights of the individual nation states, in favor of a new political order worthy of *civitas humana*: «We have in fact reached a stage in the history of humanity when a considerable measure of internationality and the limitation of national sovereignty has become a question of existence for the nations themselves[...]. Perhaps we are not hoping for too much if we succeed in convincing people that to the questions which the collectivists are putting to us there is today and always a perfectly good liberal answer even if it be quite a different one from historical liberalism, the sole answer indeed which is compatible with a *Civitas Humana*» (Röpke 1996, pp. 233-234)

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Nicola Mattoscio\* - Iacopo Odoardi†

DEVELOPMENT PERSPECTIVES IN ITALY: REGIONAL  
DIFFERENCES AND THE ROLE OF CREDIT

**Abstract**

The efficiency of the banking system is a major determinant of economic development. The international financial crisis of 2007 had severely affected the financial markets of many countries, causing a prolonged economic recession in Italy. Among the Italian regions, strong differences exist between the Centre-North and the South. Several socioeconomic gaps depict different local socioeconomic and financial systems. In this paper, we investigate the differences among groups of regions starting from the credit markets, extending the analysis to the real issues of the economy and including the main resource for the long-term development in advanced economies: the human capital. The aim is to analyze how the “structural distances” among regions, in terms of potential economic development, have changed after the 2007 crisis and the lack of economic recovery. We compare the analysis referred to two years, representative of the period before and after the bursting of the speculative bubble in the US. In this manner, we can compare two representations of the regional gap.

**JEL CLASSIFICATION:** E51, O10.

**KEYWORDS:** CREDIT, ECONOMIC DEVELOPMENT, HUMAN CAPITAL, REGIONAL ANALYSIS.

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## **1. Introduction**

The consequences triggered by the bursting of the 2007 financial speculative bubble in the US have revealed structural weaknesses of many Western countries, generating difficulties and instability for several years, both in the financial and in the real markets. The problems imported along with the weaknesses of banks and businesses have caused an economic downturn, inducing a prolonged recession in some national markets. The financial origin of the crisis has caused a fast expansion of its effects worldwide due to the interconnections of the global market, and the nature of the crisis provoked persistent adverse effects in several financial systems.

Western economies have responded differently to the negative effects described above; the United States, where the speculative bubble burst, returns to growth in 2010, while in Europe the countries of the Mediterranean area have led to a widening instability originated at least during the period of the introduction of the Euro. In a context of general economic slowdown and rising unemployment, households and businesses have accused banks to have interrupted the regular flow of funding directed to consumption and investment since 2008. In fact, the European financial system has been affected in early 2008, the following year the outbreak of the speculative bubble. However, the structural difficulties of some countries were already evident and therefore appeared for their severity. Limits and constraints were immediately imposed by supervisory authorities to prevent infection by the institutions with balance sheets at risk, thus severely restricting the activities of many banks. The control authorities are faced with a sort of trade-off between restrictive policies on banks activities and the rising risk of bank default (Bernauer and Koubi 2002), in a context of growing risk for the financial system and a general economic slowdown.

Several causes imposed a restriction in the normal functions of the banks: the lack of liquidity in the European banking system, the growing perception of default risk and the more stringent rules on the selection of new debtors. On the opposite side, the demand for credit was influenced from the deterioration of corporate balance sheets and from the difficulty in repaying maturity debts. This has caused the rising share of the so-called marginal borrowers (Woo 2003), with scarce chances of restructuring the bonds to maturity, and a greater risk of bankruptcy. In summary, the financial nature

of the crisis has had a consistent impact on the financial needs of businesses (Bernauer and Koubi 2002) and consumer households.

The continuing adverse conditions in the financial markets have caused problems and instability for many banks, resulted in: the decrease of the value of the banks' assets, the alarm for the future hoarding of capital, the network effects among banks, the uncertainty and the scarcity of private savings caused by the imposed requirement to hold additional funds (among others see Brunnermeier 2009). On one hand, the wrong choices in the composition of the credit securities portfolio of banks have made it difficult to grant further loans during the recession period (e.g. in some cases under-capitalization and low liquidity), risking of going outside the parameters of control of their budget. On the other hand, the economic difficulties for businesses and households have induced delays and difficulties in repaying debts, as well as the consequent structural change in the demand for loans because of missing signs of economic recovery.

The demand and the supply side of credit have both affected the trend of the granting of credit. The increase in costs during the financial crisis and the sovereign crisis have impacted differently on the demand for loans, according to the elasticity of the same demand with respect to the cost, while there has been no different intensity from the side of bank rationing (see, on the Italian case, Del Giovane *et al.* 2013).

In Europe, the above-mentioned problems have occurred in many countries because of the strong austerity imposed on the public accounts. The Mediterranean area has greatly suffered from the international financial crisis and in countries such as Italy and Spain, the well-known structural weaknesses have been worsened by exogenous difficulties. The areas characterized by inefficient financial market were the most affected, decreasing the possibility of intervention in support of local banks. Therefore, the credit rationing was not caused only by the supply side of financing, despite banks have partially interrupted the monetary policy interventions.

This study, with the analysis on the Italian case, is a preliminary investigation to test a research hypothesis. The aim of this paper is to analyze the context of the Italian regions widening the themes of the efficiency of the local credit market with variables related to socioeconomic development. The relationships of mutual needs between the action of the banks, in particular those local, and the process of economic development is known in the economic literature (see Section 2). The complex structural



differences in the field of economic growth and efficiency of financial systems between the Centre-North and the South of Italy are well known and confirmed as described in Section 3. Our analysis is aimed to observe whether the differences in terms of income, economic development and access to credit among the different areas of the country have expanded during the period following the international financial crisis of 2007. In this work, we do not estimate the capacity or the effect of specific socioeconomic variables with reference to the structural weakness of the financial system of precise areas. We know that some regions' deficits are strong and present for years, and that the greater efficiency of the credit market and the economic vitality of some regions may have helped to mitigate the exogenous effects of the crisis.

## **2. The role of credit in the economic development**

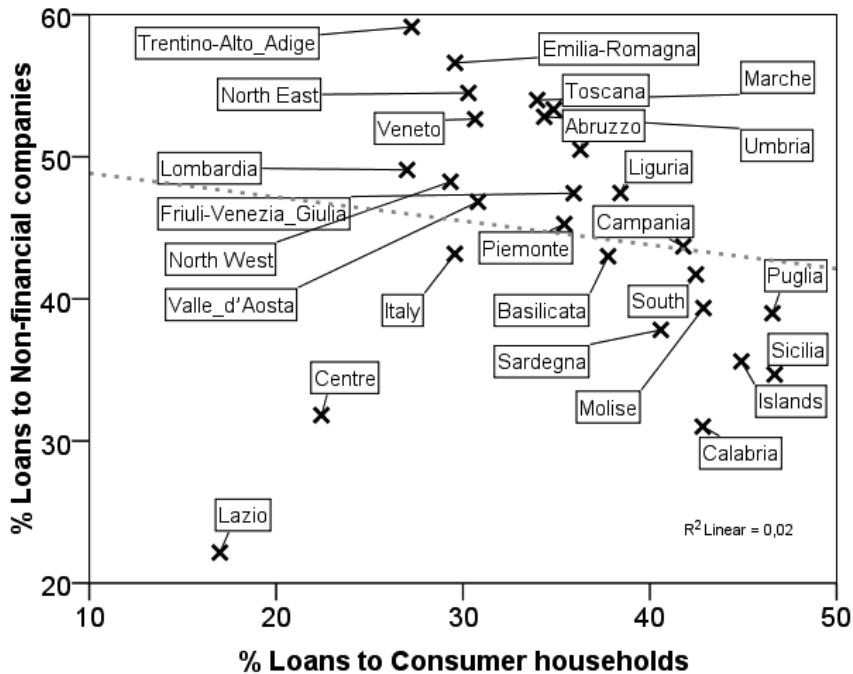
Close interrelations exist between the financial market (in particular the granting of credit) and the economic growth process (Fry 1988). The financial market redirects resources towards the production sector, as it has the information (and economies of scale) to do so efficiently (among others Stiglitz and Weiss 1981), i.e. it moves from areas (or sectors) in surplus to those in deficit. At the same time, the evolution of the economic environment needs and promotes a stronger and more secure financial market. According to this, there is a full efficiency in the allocation of the resources when economic agents are free to act, and for this reason, multiple sources of debt financing must exist, with different levels of investment risk.

The efficiency of financial intermediation affects the degree and the rapidity of development of each economic context (see Castagna *et al.* 2016). Only banks have expertise and utility of structuring financial products for the various categories of borrowers, as well as of reducing the typical limitations and imperfection of the credit market.

Therefore, the credit represents an essential resource for the economic development of a country, and it is necessary to create virtuous circles that base their effect on the local economy especially in conditions of economic recession. As already observed by Schumpeter (1934), the intermediation role of banks, considering the saving of households and the needs of entrepreneurs, has a key role in the innovation and development processes. During recession periods, the (scarce) resources must be allocated according to local development and policy plans. The control of the flows of credit is

also required. It must be considered that a strong expansion of private credit (to households) compared to that for the purchase of real estate, can be a forecaster of crises for the banking system. This happens because of the increasing banks' balance sheets vulnerability, while there is less hazard if businesses credit increases, moderated by the expectation of the associated increase in income due to the financed (productive) investments (Büyükkarabacak and Valev 2010). We show the relationship between the resources for investment and consumption in the following graph.

**Figure 1. Percentage of loans granted to non-financial companies and to households (on total loans) in the Italian regions and macro areas, year 2016**

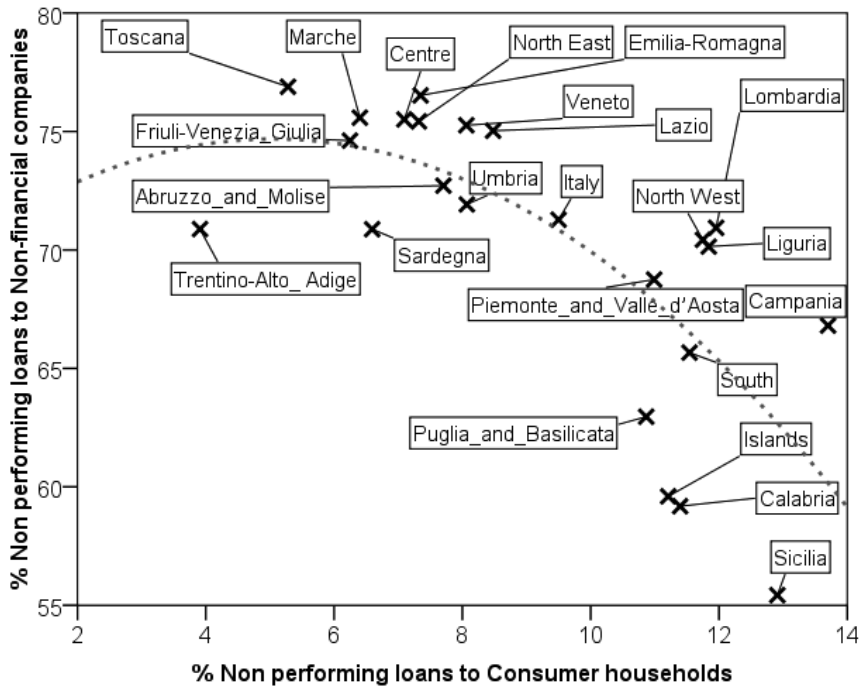


Source: our elaborations on Banca d'Italia data

Companies receive on average more resources (on the total available) in the Centre and North, while the southern families get a higher proportion for

consumption. Of course, the shift of loans to households and the high unemployment rate in the South induce a greater percentage of problems related to the repayment of loans by households, as shown in Fig. 2.

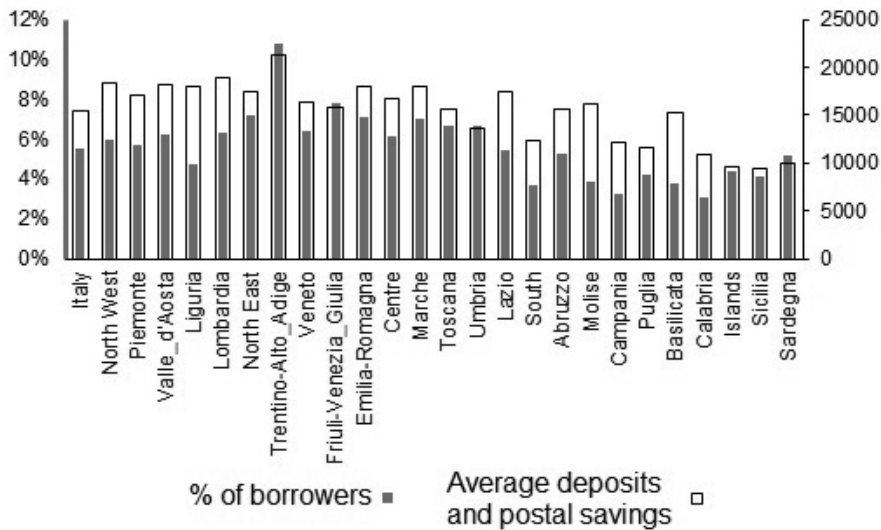
**Figure 2. Percentage of non-performing loans referred to non-financial companies and to households in the Italian regions and macro areas, year 2016**



Source: our elaborations on Banca d'Italia data

As in the previous graph, the division between the Centre-North and South is evident, both for individual regions and for the average of each macro area. Moreover, we observe that lower unemployment and higher efficiency of local systems allow northern citizens to have more savings and a greater capacity to borrow.

**Figure 3. Percentage of borrower on the total population (on bank credit, grey - left vertical axis) and average bank deposits and postal savings (in Euro, black - right vertical axis) in the Italian regions and macro areas, year 2016**



Source: our elaborations on Banca d'Italia data

A relevant aspect concerning local development policies through the equilibrium and control of the financial system is the attention to the smallest local areas.

At the local level, an efficient financial system should include banks which provide the appropriate tools for business and, in the case of small and medium enterprises (SMEs), that support, by consulting, the decision-making processes of production and investment. In countries like Italy, the entrepreneurial system is largely composed of SMEs, severely affected by

the economic recession. In a condition of scarce financial resources, the smallest enterprises could be forced to make greater use of the so-called trade credit (Atanasova and Wilson 2003), that are payment terms agreements between suppliers and customers.

The knowledge of the local area is, on one hand, useful to banks to advise local businesses in a professional manner and, on the other hand, valuable to identify the strengths and weaknesses of the enterprises, thus decreasing the risk of their funding. Moreover, the closer relations among households, businesses and banks expert of the local area would contrast speculative behaviors.

In fact, the presence of a large number of small businesses in the same geographical area, with limited financial resources, requires a higher integration among local banks and businesses' needs. This situation should be present in industrial districts, according to an idea of efficient founding by considering the localized production contexts. In particular, mutual and cooperative banks are more related to industrial districts and organized areas (for the creation and evolution of the districts see, among many contributions, Marshall 1920; Porter 1998; Becattini 1987 and 1989, for the Italian case). Obviously, the role and prerogatives of districts have changed over time, as well as the needs in terms of financial requests to the local banks. Especially in backwards areas, local banks should demonstrate usefulness by financing small enterprises and encouraging the creation of new businesses (Cesarini *et al.* 1997).

### **3. A regional analysis**

The aim of this work is to observe how the connected aspects of the credit market efficiency and the characteristics of the socioeconomic systems have influenced on the many gaps among the Italian regions after the 2007 economic crisis.

We consider the close relationship between the efficiency of the credit market and the degree of economic development of an area by observing how these aspects are verified in the Italian regions. In particular, through an useful analysis to grouping regions into homogeneous groups for economic characteristics, we want to see if the inclusion of different variables from the efficiency of lending (for which regional disparities are well-known, see Colantonio *et al.* 2012; Mattoscio *et al.* 2014) can mitigate the effects of the

international prolonged financial crisis, whose effects have occurred in Italy since 2008.

The case of Italian regions is explanatory because they represent very different socio-economic backgrounds in terms of income and economic development, as it is evident from a comparison of the GDP *per capita* considering as base the average national income (= 100), for which there are values of about 120 for the regions of the North and less than 70 for the South (year 2013, on SVIMEZ data).

The northern regions have been affected by the crisis before the South because of the higher international relations, but the openness to foreign markets helped to recover its economic efficiency more quickly. In addition, the efficiency of banks and the vitality of the entrepreneurial system have led to a positive support from the domestic demand. In this sense, the role of the local credit markets is evident in the possibilities of businesses and consumer households to obtain loans (Colantonio *et al.* 2012).

The lower funding opportunities in the South, in a context of rising unemployment, forced to move credit flows from productive purposes to support consumption. It is evident particularly in the southern area, observing the expansion of consumer credit (Banca d'Italia, Statistic Bulletin, various years), that in advanced economies should represent an alternative type of consumption and in these contexts describes a clear support for subsistence consumption.

In this paper, we use a Multidimensional scaling analysis (MDS) to represent the changes that occurred in the Italian context before and after the international financial crisis, knowing that the structural weaknesses that characterize some areas of the country existed for a long time. The aim is to observe the changes in the "distance" in socioeconomic terms considering the period before the effects of the outbreak of the speculative bubble in the United States, and the period of the failure economic recovery. The integration of several socioeconomic variables can help to reinforce the reflections on the local financial systems, being evident the structural distance of local credit markets (Mattoscio *et al.* 2014).

With the application of MDS, we represent the 20 regions in a two-dimensional graph, in which the positioning of the cases and the possible grouping is influenced by the variables analyzed. This is done by defining relations between regions in terms of proximity (or distance) with respect to the selected data for the two periods.

The three main areas of our interest are represented by the following variables:

*credit*

- loans to financial companies (Banca d'Italia data);
- loans to non-financial companies – industry excluding construction (Banca d'Italia data);
- loans to non-financial companies – construction (Banca d'Italia data);
- loans to non-financial companies – services (Banca d'Italia data);
- loans to producer households (Banca d'Italia data);
- loans to consumer households and others (Banca d'Italia data);

*economic development*

- GDP *per capita* (ISTAT and SVIMEZ data);
- import/GDP ratio (ISTAT, ICE and SVIMEZ data);
- export/GDP ratio (ISTAT, ICE and SVIMEZ data);
- unemployment rate (ISTAT data);
- employment rate (ISTAT data);
- labour productivity in industry excluding construction (ISTAT data);
- labour productivity in business services (ISTAT data);

*human capital*

- adults participating in lifelong learning (ISTAT data);
- secondary education attainment level (ISTAT data);
- young people who dropping out of school (ISTAT data);
- level of education of the adult population (ISTAT data).

The *per capita* values of loans to households and businesses have been obtained considering the values of the resident population (ISTAT data) and of registered businesses (Unioncamere data). For the 2013 analysis, the missing data on the two types of labour productivities were replaced with 2012 data. The first group of variables represents the average granting of credit to major categories of borrowers, the second group represents the economic vitality and the development potential. The last group of variables has been chosen to represent an essential resource of the advanced economies (see, among many contributions, Becker 1964; Levine 1998), i.e. the skills and the abilities embedded in the labour force and obtained through vocational training and educational processes.

In the following tables, indicators on the quality of the results of the analyses (Tab. 1) and the choice of the size of the charts (Tab. 2) are highlighted.

**Table 1. Indicators for the two MDS analyses**

	2007 analysis	2013 analysis
Stress	0,07308	0,08237
RSQ	0,97538	0,97050

Source: our elaborations on Banca d'Italia, ISTAT, SVIMEZ, ICE, Unioncamere data

**Table 2. Selection of the number of dimensions for the representation of the data for the two MDS analyses**

Iteration	S-stress	Improvement
<i>2007 analysis</i>		
1	0,11522	
2	0,07808	0,03714
3	0,07053	0,00755
4	0,06783	0,0027
5	0,06679	0,00103
6	0,06638	0,00041
<i>2013 analysis</i>		
1	0,11824	
2	0,07902	0,03922
3	0,07354	0,00548
4	0,07176	0,00178
5	0,071	0,00075

Source: our elaborations on Banca d'Italia, ISTAT, SVIMEZ, ICE, Unioncamere data



In Table 1, the value of the RSQ is good and the Stress index is acceptable being less than 0,15. Table 2 shows, for both cases, that there is a strong decrease of the index with the second iteration, thus indicating a good approximation of the graph to the two dimensions.

The following table shows the choice of the variables which are represented on the axes and then determine the positions of the 20 regions in the two-dimensional space.

To bring the graphical representation on the convention of the reading of Cartesian graphs, we use a symmetrisation with respect to the vertical axis, which equals to change the sign of the coordinate on the horizontal axis.

This is possible by the consistency of the signs of most of the variables representing the *dimension 1* as observable in the following Table (except, of course, the unemployment rate), placing the regions with higher average values for almost all the variables in the right part of the graphs.

**Table 3. Correlations between variables and dimensions ( $r > |0,6|$ )  
(<sup>a</sup> in case of lower values of  $r$  for a variable, the highest value between the 2 dimensions is shown)**

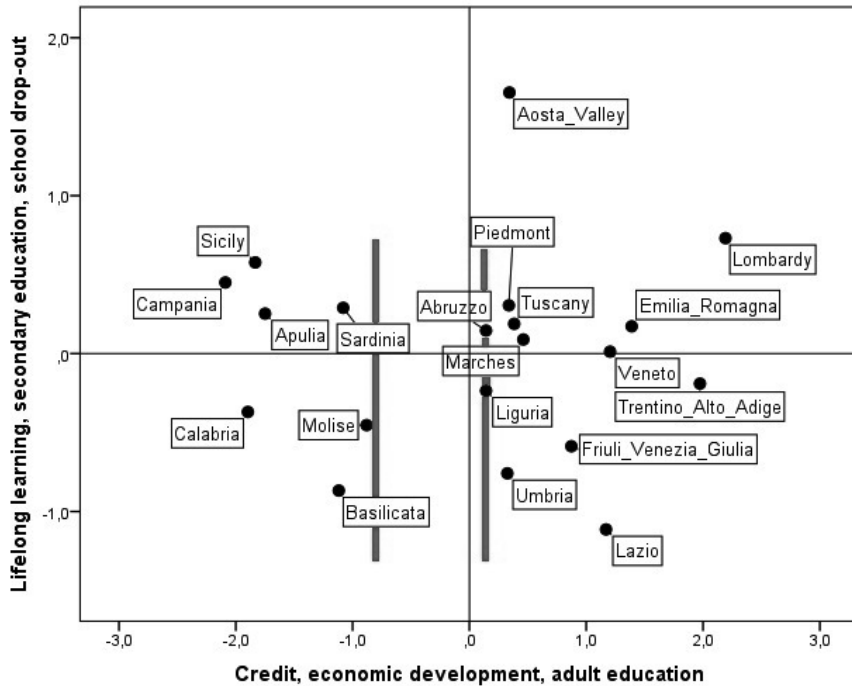
<i>Variables</i>	<i>2007 analysis</i>		<i>2013 analysis</i>	
	<i>Dimension 1</i>	<i>Dimension 2</i>	<i>Dimension 1</i>	<i>Dimension 2</i>
Loans to financial companies	-0,57838 <sup>a</sup>	–	-0,68285	–
Loans to non-finan. comp. – industry	-0,90143	–	-0,92402	–
Loans to non-financial companies – construction	-0,87095	–	-0,95014	–
Loans to non-finan. comp. – services	-0,8804	–	-0,92059	–
Loans to producer households	-0,67472	–	-0,71502	–
Loans to consumer hous. and others	-0,92182	–	-0,90897	–
GDP <i>per capita</i>	-0,9293	–	-0,9441	–
Import/GDP ratio	-0,62285	–	-0,449 a	–
Export/GDP ratio	-0,6776	–	-0,71321	–
Unemployment rate	0,919191	–	0,925106	–
Employment rate	-0,94572	–	-0,95645	–
Labour productivity in industry excl. con.	-0,70902	–	-0,79577	–
Labour productivity in business services	-0,57739 <sup>a</sup>	–	-0,69612	–
Adults participating in lifelong learning	–	-0,78551	-0,60687	–
Secondary education attainment level	–	-0,70278	–	-0,87534
Young people who dropping out of school	0,622566	0,687917	–	0,805879
Level of education of the adult population	0,729612	–	0,715951	0,656245

Source: our elaborations on Banca d'Italia, ISTAT, SVIMEZ, ICE, Unioncamere data

The horizontal axis (*dimension 1*) is the most representative for both analyses, while on the vertical axis variables of residual interest are present. It should be noted that the correlation of the unemployment rate with reference to all the other variables is in the opposite direction. It is also important to note, in particular for the second axis, that the correlation of the school drops-out with reference to other similar variables has the opposite sign, which obviously is a negative factor considering the human capital factor.

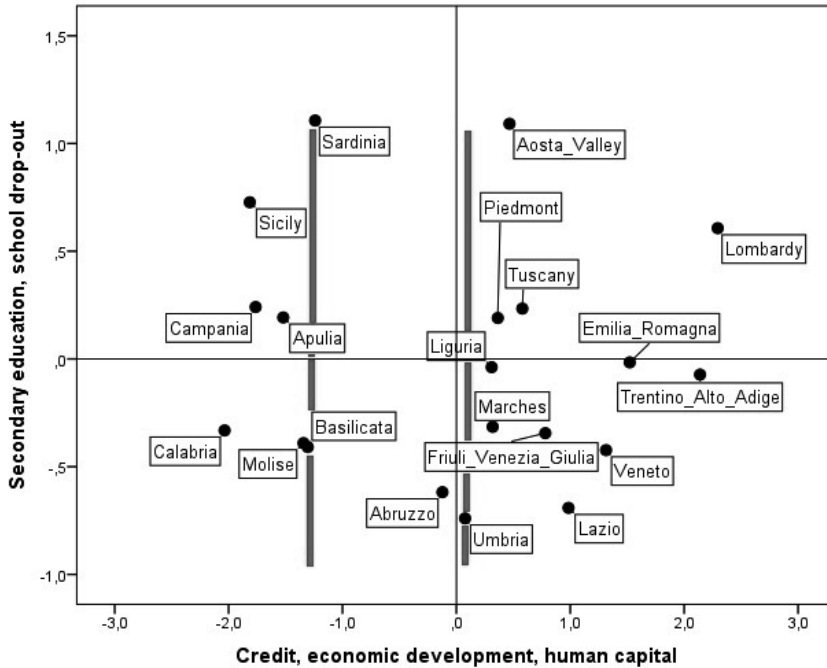
The following two graphs show the results of the analyses described above; in both graphs, the 17 selected variables are represented on the axes.

**Figure 4. Representation of the 20 Italian regions, year 2007**



Source: our elaborations on Banca d'Italia, ISTAT, SVIMEZ, ICE, Unioncamere data  
 Note: the signs of the coordinates on the horizontal axis have been inverted

**Figure 5. Representation of the 20 Italian regions, year 2013**



Source: our elaborations on Banca d'Italia, ISTAT, SVIMEZ, ICE, Unioncamere data  
 Note: the signs of the coordinates on the horizontal axis have been inverted

The two graphs show the extension of the “gap” between the Centre-North and the South of Italy, at the expense of the *Mezzogiorno*. The gap is observed on the horizontal axis because it represents almost all the variables and allows us to observe that both in 2007 and in 2013 the regions are pretty ordered over it, from the most backwards (left side of graph) to the wealthiest (right side). In both analyses, the vertical axis represents only a couple of variables related to human capital with residual interest.

Excluding few outlier cases which are largely due to the second dimension, we see the increasing dispersion of the regions along the axis, so only the Abruzzo region (in the “official” South according to the ISTAT grouping), is located near the central and northern regions. Abruzzo is the only outlier if we consider the grouping of regions on the horizontal axis.

This is a region that is institutionally placed in the southern group while it is geographically located in the Centre and strongly connected with the central regions development path.

Without considering this outlier case, we must note that the “horizontal distance” between the Centre-North and the South in 2007 (see in Fig. 4 between Molise-South and Liguria-North) has increased in 2013 (see in Fig. 5 between Basilicata-South and Umbria-Centre).

The northern area is characterized by a greater possibility for businesses to obtain bank loans and for households to obtain support for consumption. We must also consider that the wealthiest regions of Northern Italy have an income of about twice that of several southern regions. In many cases, the unemployment rate in the South is double than in the North, while the ability to export (observed through the export/GDP ratio) is less than a third in some southern regions respect to the North.

The variables related to human capital are less discriminating, although in the *Mezzogiorno* of Italy (South and major Islands) young people continue their studies in a context of high unemployment, and the NEET rate and the early school dropout are serious social problems. For this reason, the level of education of the adult population does not differ so evident in all regions in the various macro areas, while lifelong learning is more prevalent in the Centre-North (thanks to the presence of the largest and most dynamic businesses).

#### **4. Conclusions**

This work confirms the structural gap between two distinct Italian areas, the wealthiest and most advanced Centre-North and the *Mezzogiorno*. From distinct analyses carried out with reference to 2007, the years before the economic crisis and the prolonged recession, and to 2013, has emerged an increased disparity according to many socioeconomic aspects. The efficiency of the banking system in the North have had an important role in mitigating the adverse effects of the exogenous financial crisis, also thanks to the strength of businesses and the more specific training of human capital.

Furthermore, we notice that there are many variables, in addition to credit, that unite the Italian regions and allow to study the divergence in numerous social and economic aspects. In particular, the differences between the Centre-North and South are shown along the horizontal axis by comparing

the two MDS analysis, since all the regions are aligned and "ordered" along this axis.

After the crisis of 2007 the structural difficulties of the South in the field of local financial systems and the lack of useful resources to encourage business investment and the formation of human capital, have increased the overall gap.

Many considered variables play a key role in explaining the divergence, with reference both to the new variables relating to credit (compare Mattoscio *et al.* 2014), and those linked to the real economy and to the human capital.

In the credit framework, the traditional view that the managers are naturally risk-averse (especially in the South of Italy) and so need different regional incentives to undertake risky may be another explanation of the problem of Italian access credit discrimination (among the many contributions, see Mehran and Rosenberg 2007; Panetta *et al.* 2009; Benmelech *et al.* 2010).

The better organization and efficiency of the financial system in some areas of the country, in addition to greater economic vitality, have allowed a more rapid economic recovery, albeit hampered by international turbulence. In the South, the "distance" from the international markets had initially kept away the effects of exogenous financial markets. Instead, international trade was one of the strengths that allowed the North to reverse the trend, making possible a greater trust in financial markets (and therefore more funding) by supporting domestic demand.

This study is a preliminary analysis to test a research hypothesis to be developed with additional methods and research. Data mining techniques can be used to make possible the study of a larger dataset, extending the analysis to other European countries.

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DOES AGRICULTURE SECTOR HAVE MOMENTOUS EFFECT  
ON PAKISTAN'S ECONOMIC GROWTH? AN EMPIRICAL  
INVESTIGATION FROM 1972-2016

**Abstract**

Agriculture sector prolong to play a vital role in economic growth, development, build-in infrastructure, industrial fabricate up, reduction in poverty, providing employment opportunities, foreign trade, balance of payment and stabilizing the economy of Pakistan. This study applied ARDL model, ARDL Co-integration and Long form co-efficient, Johansen Co-integration and Bound testing approach as analytical techniques to empirically investigate the effect and role of agriculture sector in Pakistan's economic growth from 1972-2016. The study found co-integration between contribution of agri-sector, exports of agri-sector and trade balance of agri-sector with Pakistan's economic growth. Further, the study also found short run relation among agriculture sector contribution, exports and economic growth of Pakistan. The stability and diagnostic test were also applied and their results showed reliability and goodness of fit of the model. This study recommends that as a great proportion of Pakistan's population is directly or indirectly associated with agriculture sector production and earnings, the utmost desire to enhance economic growth of conventional economy like

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*Does agriculture sector have momentous...*

Pakistan is to modernize and transform agriculture sector to international stratum.

**JEL CLASSIFICATION:** F13, F55, Q17.

**KEYWORDS:** AGRICULTURE SECTOR, ECONOMIC GROWTH, AUTO-REGRESSIVE DISTRIBUTED LAG (ARDL) MODEL, STABILITY AND DIAGNOSTIC TEST, CO-INTEGRATION AND ARDL LONG FORM COEFFICIENT.

## 1. Introduction

### 1.1 Background of the Study

Pakistan is known as agriculture country and the government of Pakistan making efforts to make this sector more efficient, contribute-full, productive and fruitfully. The sub-sector of agriculture that significantly contributes to agriculture and GDP of Pakistan during 2014-15 includes crops, cotton ginning and livestock, forestry and fisheries. Crops are the important element of agri-sector of Pakistan and thus to economic growth too via agriculture. The contribution of crops to Pakistan's agriculture sector during 2014-15 was 39.6 percent and 8.3 percent to GDP of Pakistan. Cotton ginning is the important part of agri-sector and it was included to agriculture sector in 2004-05, formerly it was the part of industrial sector of Pakistan. Cotton ginning effectively contributed to GDP and agriculture sector of Pakistan during 2014-15 an approximately 2.9 percent and 7.4 percent. The important crops contain wheat crop, maize crop and sugarcane and its contribution to GDP is 5.3 percent and 25.6 percent to agriculture sector during 2014-15. Livestock, Forestry and Fisheries are the important component of agriculture sector of Pakistan. The contribution of Livestock to GDP and to agri-sector is 11.8 percent and 56.3 percent while Fisheries contributes to an about 2.1 percent to agriculture sector and 0.98 percent to GDP of Pakistan during 2014-15.

Agriculture sector prolong to play a vital role in economic growth, development, build-in infrastructure, industrial fabricate up, reduction in poverty, providing employment opportunities, foreign trade, balance of payment and stabilizing the economy of Pakistan. Agriculture is one of the largest contributing sector's accounting for an annual average growth of twenty percent to overall Gross Domestic Product (GDP) of Pakistan. The enthusiastic with dynamic strengthening and spiraling growth of agriculture sector persuade the momentous contribution to the employment opportunities engaging more than forty-five percent of labor force. More than sixty percent of the total population is living in the rural areas of Pakistan utterly dependent on the agriculture sector directly or indirectly, thus Agriculture sector has sturdy relation with economy.

Pakistan was principally agricultural country now transforming to semi-industrial economy. Pakistan's average economic growth rate has been

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higher than the growth rate of the world economy during the first five decades (1947–1997). In 1960s Average annual real GDP growth rates were 6.8%, for 1970's it was 4.8%, and 6.5% in the 1980s. While in 1990's average annual growth rate declined to 4.6% with considerably lower growth in the second half. Though agriculture sector of Pakistan playing the central role in the economic growth and exports of the country, but the facts and figures are witnessed from few decades that exports were not at the desirable level as the imports of agriculture products of Pakistan were more than the exports causing deficit in the trade balance of the agriculture sector. In order to offset this deficit, the public sector needs to provide an enabling environment to the private sector to promote exports related to agriculture products and leads to rapid economic growth. Most importantly, public sector needs to play a capacity building role to improve the quality and quantity of agriculture products as well as access of farmers to international market enhancing greater exports with surplus in the trade balance.

World trade has been greatly influenced by global economic activities. In 2012 the pace of International trading activities slow down to 2.0 percent from 5.2 percent in 2011 and was projected to be around 3.3% in 2013 attributed towards economic crisis in Europe sluggish economic growth in developed countries. The main reason behind Pakistan's low export earnings is export concentration in few items i.e., cotton and cotton manufactures, rice, leather, chemicals & pharmaceuticals products and sports goods, which contributed about seventy percent of total exports for FY14 (Jul-March) with cotton products contributing 52.9 percent, rice (8.7 percent) and leather (4.9 percent). The extent of concentration of these items is projected to be amplifying in future. To increase export earnings and avoid uncertain supply of exportable items Pakistan has to modify the pattern and nature of its trade.

The government of Pakistan launching prototype growth strategy to boost agriculture sector growth by doing different reforms in agriculture sector, providing facilities to the farmers sector, replacing old technical ways with the modern technical and way of farming to enhance the agriculture productivity, improving the quality of the agricultural products enabling to compete with foreign products and in markets, providing agricultural credits to the farmer and encouraging the private sector invest in agriculture sector. For this purpose, the policy framework must be supportive for the private sector investment accompanying with friendly socio, economic and political conditions. The main cause of slow economic growth and limited investment of private sector in agriculture of Pakistan are the traditional technology, low

quality and quantity of agriculture products, limited access to domestic and foreign markets, problems of credit availability, unavailability of the skilled and train labor, unavailability new equipments and machinery of agriculture sector as well as limited capacity of resources and infrastructures. This study is an empirical attempt to investigate the effect and contribution of agriculture sector to economic growth of Pakistan from 1972-2016.

### 1.2 Objective of the Study

The main objectives of this study are:

- Does agriculture has momentous effect on economic growth of Pakistan?
- To investigate the relation (short/ long run) between agriculture sector and Pakistan's economic growth.
- To find out that both agri-sector and economic growth of Pakistan is co-integrated or not?

## 2. Literature Review

Agriculture sector production and contribution playing a fundamental role to capture capital stock, sustain the economic growth, increase in exports to contribute in foreign trade and earning, development of the country and in providing employment opportunities as well as in reduction in poverty in Pakistan. The agriculture sector has significantly contributed to economic growth (Fan *et al.* 2010; Rattso and Stokke 2003; Ahmed and Amjad 1984; and Josling *et al.* 2010).

The agriculture exports also playing a dominant role in foreign trade, development and growth of the country especially for developing countries. The exports of developing countries mostly consist on agriculture and primary products. A lot of studies have found considerable and noteworthy effect of agriculture exports that effectively contribute to growth and development of the country. The studies of (Fabiosa 2008; Hatab *et al.* 2010; Kargbo 2007; Kwa, and Bassoume 2007; Erdem and Nazliglu 2008; Dawson 2005; Sanjuan-Lopez and Dawson 2010; and Faridi 2012) have found

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significant effect of agriculture sector and primary products exports on economic growth and development of different countries.

The government policies and political condition also affects the role of agriculture sector in economic growth and development of the country. The studies of (Ahmad *et al.* 2008; Zaidi 2005; Jehangir *et al.* 1998; Hamid and Ahmad 2009) have found an influential role of political conditions and government policies in contribution of agri-sector.

Trade liberalization and trade openness policies have considered as engine for growth and it effectively bring increase in growth of many countries. Some of the studies have found significant effect of trade liberalization on economic growth via agriculture sector and the well known studies in this regard are (Akhtar 1999; Robbins and Ferris 2003; Ahmad *et al.* 2008; Anwar *et al.* 2010; and Malik 2010).

Technology and technological change also have dominant role in agriculture sector. Ali and Hamid (1996), Kemal and Ahmed (1992), Kemal *et al.* (2002) and Hamid and Ahmad (2009) have found constructive and momentous effect of technology and total factor productivity on agriculture sector that leads to significant contribution of agri-sector to economic growth and development of the countries.

### **3. Econometric Model and Data Description**

#### *3.1 Econometric Model*

In order to empirically analyze that does agriculture sector of Pakistan has playing momentous effect in Pakistan's economic growth this study used fixed effect econometric model and the idea for developing of the model is taken from the past studies of (Moulton 1986; Santos *et al.* 2006; Mehlum *et al.* 2006; Kolstad 2009; and Burger *et al.* 2009). The model used in this study is the combination of different properties contains basic growth variables, specification, characteristics and proxy variables. The econometric model that represents the combination of dependent and independent variables is:

$$GDP_t = \alpha_0 + \alpha_1 Bg_t + \alpha_2 Pv_t + \alpha_3 C_t + \alpha_4 Z_t + \mu_t \quad (3.1)$$

In the above econometric model “GDP<sub>t</sub>” is the economic growth of Pakistan that are taken as a function (combination) of some basic growth variables “B<sub>gt</sub>”, Proxy Variables “P<sub>vt</sub>”, Characteristics variables “C<sub>t</sub>” and Instrumentals variables as “Z<sub>t</sub>”. While the “μ<sub>t</sub>” is the error term also known as white noise. From the above model (3.1) the theoretical and econometric model for this study is developed by placing the agri-sector variables as basic, proxy, characteristics and instrumental variables that effect the economic growth of Pakistan.

Agriculture sector has played an important role in economic development and growth of Pakistan since independence. But from the last decades this sector has shown downward trends in its contribution to growth. That’s why this study is an empirical attempts to investigate role of agriculture sector and its main determinants in economic growth of Pakistan from 1972-2016. For this purpose, this study assume Pakistan’s economic growth as dependent variable and agriculture sector production and contribution to GDP (P<sub>agri</sub>), exports of agriculture sector (X<sub>agri</sub>), imports of agriculture sector (M<sub>agri</sub>), Trade balance of agriculture sector (B<sub>oT</sub><sub>agri</sub>) and calculated as (X<sub>agri</sub>-M<sub>agri</sub>), Terms of Trade of agriculture sector (TOT<sub>agri</sub>) and calculated as {relative price of X<sub>agri</sub> / relative price of M<sub>agri</sub>\*100} and also used proxy variables for agriculture sector (TOP<sub>agri</sub>) of Pakistan and calculated as {X<sub>agri</sub>+M<sub>agri</sub>/GDP} are taken as independent variables. Though the included variables may not be the whole factors but these may be give help to policy makers. Consequences of decline in the growth of agriculture will harm most of economic sectors and exports as well income, employment and poverty too, especially in the rural areas of Pakistan where the main income and employment generating activity is the agriculture sector.

The theoretical model for the relationship between economic growth and agriculture sector of Pakistan will be:

$$GDP = f(P_{agri}, X_{agri}, M_{agri}, BoT_{agri}, TOT_{agri}, TOP_{agri}) \quad (3.2)$$

The econometric model can be forms of the above theoretical model (3.2) as:

$$GDP_t = \alpha_0 + \alpha_1 P_{agri} + \alpha_2 X_{agri} + \alpha_3 M_{agri} + \alpha_4 BOT_{agri} + \alpha_5 TOT_{agri} + \alpha_6 TOP_{agri} + \mu_t \quad (3.3)$$



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The expected sign of the co-efficient will be:

$$\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 > 0, \alpha_5 < 0, \alpha_6 > 0$$

The Auto-Regressive Distributed Lag (ARDL) model of the above econometric model (3.3) can be form as:

$$GDP_t = \alpha_0 + \alpha_1 P_{agri} + \alpha_2 X_{agri} + \alpha_3 M_{agri} + \alpha_4 BoT_{agri} + \alpha_5 TOT_{agri} + \alpha_6 TOP_{agri} + \sum_{t-1}^{t=n} \beta_0 \Delta GDP_{t-1} + \sum_{t-1}^{t=n} \alpha_1 \Delta P_{agri,t-1} + \sum_{t-1}^{t=n} \alpha_2 \Delta X_{agri,t-1} + \sum_{t-1}^{t=n} \alpha_3 \Delta M_{agri,t-1} + \sum_{t-1}^{t=n} \alpha_4 \Delta BoT_{agri,t-1} + \sum_{t-1}^{t=n} \alpha_5 \Delta TOT_{agri,t-1} + \sum_{t-1}^{t=n} \alpha_6 \Delta TOP_{agri,t-1} + \mu, \dots \dots \dots (3.4)$$

### 3.2 Data description and Sources

This research study uses annual time series data to empirically evaluate the role of agriculture sector and its determinants in economic growth of Pakistan. The period of analysis selected for empirical regression of the variables data is from 1972-2016, as prior to 1972 Pakistan consisted of two parts (East and West Pakistan). The data is collected from different sources, that are Federal Bureau of Statistics, State Bank of Pakistan, Agriculture Development Bank of Pakistan (ZTBL), National Accounts of Pakistan, World Development Index, World Bank, World Economic data Indicator, Global Economy, World Development Index (WDI), Ministry of Finance Pakistan, Economic Affairs Division Pakistan, World Trade Organization (WTO) Statistics Database and Economic Surveys of Pakistan.

## 4. Methodology, Results and Discussions

Firstly, the data used in this study were tested for unit root, spurious relation and for outliers by applying the Augmented Dicky-Fuller (ADF) unit root test. It is important to check the data for level of integration as well as for level of stationarity since the economist and researchers has mainly

remains doubtful about the problem of unit root especially in time series data. As the data used in this study is also consists on annual time series data for all the including variables having period of analysis from 1972-2016, therefore, before going to regression analysis of the variables data it is tested for stationarity and the results of ADF test is incorporated in below table (1).

**Table 1. Augmented Dicky-Fuller Unit root Test Results**

Variables	Acronyms	ADF Values		ADF Critical Values
		At Level	At 1 <sup>st</sup> Difference	
Economic Growth	GDP	2.232998	-5.290931*	-2.948404
Agriculture Production	P <sub>agri</sub>	-0.391463	-5.127740*	-2.948404
Exports of Agri-goods	X <sub>agri</sub>	-2.997342*	-7.209565*	-2.948404
Imports of Agri-goods	M <sub>agri</sub>	-0.751947	-3.443178*	-2.948404
Balance of Trade	BoT <sub>agri</sub>	-1.103501	-4.978477*	-2.948404
Terms of Trade	TOT <sub>agri</sub>	-3.166714*	-5.309475*	-2.948404

Critical value selected at 5% significance level. (\*) showing rejection of null hypothesis at 5%.

The results integrated in above table (1) shows that the variables included in this study shows their stationarity at I(0) and some variable at I(1). Moreover, the data didn't show any spurious relation, outliers or any other sever problem. Whenever, the variables data in the included model has shown stationarity of some variable at I(0) and I(1), the method for this circumstances that best fitted is Auto-Regressive Distributed (ARDL) model for regression analysis of the study developed by (Pesaran *et al.* 2001). The econometric model further developed with ARDL approach (3.4) applied for regression analysis of the variables data through (E-Views 9) and the results are integrated in table (2).

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**Table: 2: Regression Results of Agri-Sector and its Determinates as Independent variables and Economic Growth of Pakistan as Dependent Variable**

<b>Variables</b>	<b>Acronyms</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
Constant	C	0.304918	0.756988	0.402804	0.6916
Agricult. Production	D(P <sub>agri</sub> )	0.234785	0.090927	2.582124	0.0183
Agricult. Production	D(P <sub>agri(-1)</sub> )	0.172597	0.146498	1.178148	0.2533
Exports of Agri-goods	D(X <sub>agri</sub> )	0.426427	0.183950	2.318165	0.0317
Exports of Agri-goods	D{X <sub>agri(-1)</sub> }	0.558962	0.225238	2.481648	0.0226
Imports of Agri-goods	D(M <sub>agri</sub> )	0.346792	0.150642	2.302091	0.0352
Imports of Agri-goods	D{M <sub>agri(-1)</sub> }	0.535461	0.233039	2.297731	0.0331
Balance of Trade	D(BoT <sub>agri</sub> )	0.162805	0.053258	3.056877	0.0065
Balance of Trade	D{BoT <sub>agri(-1)</sub> }	0.106592	0.049960	2.133540	0.0461
Terms of Trade	D(TOT <sub>agri</sub> )	0.109219	0.083234	1.312188	0.2051
Error Correction Term	D(ECT)	0.461496	0.212809	2.168590	0.0430
Error Correction Term	D{ECT <sub>(-1)</sub> }	0.546423	0.283336	1.928532	0.0689
Lag Value of GDP	D(GDP <sub>(-1)</sub> )	0.548768	0.148422	3.697344	0.0015
R-squared		0.927397		Durbin-Watson stat	1.9746 48
Adjusted R-squared		0.894395		Prob(F-statistic)	0.0000

The econometric and ARDL developed for this study has been regressed by applying Auto-regressive distributed Lag (ARDL) model selecting automatic lag length criteria. The model followed AIC and BIC criterion adopting the lag-length as (1, 1, 1, 1, 1, 0, 1). The results integrated in table (2) indicate that the performance of the model is satisfactory as the overall model is highly significant (Prob. F-Stat value is 0.0000). Moreover, there negligible chances of auto-correlation as the Durbin-Watson value is very close to desired value rejecting the chances of auto-correlation and spurious relation {R-squared value is less than Durbin-Watson value ( $R^2 < DW$ )}. The model also explains ninety-two variations between Pakistan's economic growth and agriculture sector proving goodness of fit of the model. The effect of co-efficient estimators of agriculture sector on economic growth of Pakistan is briefly explains one by one below.

Agriculture sector has remains the most important and contributing sector to growth and development for most of the developing countries and for Pakistan too. Agriculture sector of Pakistan has significantly contributing an approximately twenty percent to Pakistan's economic growth since last decade. This study empirically analyze the contribution of agriculture sector in economic growth of Pakistan from 1972-2016 and the ARDL regression results incorporated in table (2) indicates that agriculture sector is significantly contributed up to twenty-three percent at an aggregate level from 1972-2016. The empirical result for the contribution of agriculture sector contribution to economic growth of Pakistan is very close to theoretical and real facts and figures of Pakistan economy. Further, the results of this study regarding the contribution of agriculture sector in Pakistan's economic growth are consistent with the past studies of (Ahmed and Amjad 1984; Rattso and Stokke 2003; Fan *et al.* 2010; and Josling *et al.* 2010).

Exports of agriculture goods in general is considered to be progressive and beneficial for economic development of any economy but it is constrained by the level and condition of economic growth of any economy. Exports of agri-sector works in a constructive way if the economy is competent in quality production of much exportable merchandise, however for less developed countries that are incompetent in manufacturing sector and relies on conventional agriculture sector and imports from other countries cannot easily grab the advantages of open economy. This study empirically analyze the role of agriculture sector exports of Pakistan applying ARDL approach and the regression results integrated in table (2)

shows found positive and noteworthy role of agriculture exports on Pakistan's economic growth. The theoretical literature and real facts and figures of Pakistan's economy also supports the constructive role of agri-sector and sustain the empirical results of this study. The empirical findings of this study for the role of agriculture exports in Pakistan's economic growth is consistent with the earlier studies of (Dawson 2005; Kargbo 2007; Kwa and Bassoume 2007; Fabiosa 2008; Erdem and Nazliglu 2008; Sanjuan-Lopez and Dawson 2010; Hatab *et al.* 2010; and. Faridi 2012).

Pakistan is basically agricultural economy, most of its financial and economic activities directly or indirectly depends on agriculture production. Agriculture facilitates a major part of labor force as well as provides food and besides that also supplies raw materials to industrial production. To have flawless production of agri-products Pakistan relies on the import of fertilizer, insecticides, and medicinal products from other countries. The results integrated in table (2) showing that imports of agriculture related goods have positive effect that can significantly contribute to economic growth. The empirical results of this study for effect of agricultural imports on economic growth of Pakistan is consistent with the earlier studies of (Buzby and Unnevehr 2004; Blalock and Veloso 2007; Kargbo 2007; Erdem and Nazliglu 2008; Dengfeng 2008; Sharif *et al.* 2010; Buzby and Robert 2010; and Faridi 2012).

Trade balance shows the overall strength and performance of the economy in terms of its dependence on foreign imports and self-sufficiency in terms of exports. Generally in old times countries struggled to achieve and maintain favorable/surplus trade however with the passage of time economies realized the importance of equilibrium trade balances for the maximum utilization of available resources. In short BOT is one of the most important and significant indicator of economic growth and development of any economy. This study endeavors the effect of trade balance of agriculture sector on economic growth of Pakistan. The empirical results obtained from ARDL regression analysis of the study shows that trade balance of agri-sector of Pakistan has playing an important and momentous role in economic growth to offset the trade deficit and sustain favorable foreign trade. The result for trade balance via agri-sector of Pakistan and its contribution to economic growth is consistent with the past studies of (Ostry 1988; Egwaikhide 1999; Sugema 2005; Mbayani 2006; Peter and Sarah 2006; Saadullah and Ismail 2012; Shawa and Shen 2013; and Abbas 2013).

Terms of trade (TOT) is simply the comparative value of exports in terms of imports and described as the ratio between prices of export and prices of imports. In other words it is inferred as the quantity imported by an economy against per unit of export merchandise. An improved term of trade is advantageous for the economy, as it can purchase more imports for some certain amount of exports. The terms of trade might be inclined by exchange rate as an increase in the rate of a economy's currency, decrease the import prices domestically however doesn't directly influence the export prices of the country. This study didn't found any significant effect of terms of trade on economic growth of Pakistan, though some studies have found significant effect as the studies of (Cheong and D'Silva 1984; Qureshi 1985; Khan and Ahmed 2005; Hossain 2008; and Niazi *et al.* 2010). The main reason of insignificant result for terms of trade may be that exports of Pakistan is much less as compared to imports (either that of agri-sector or overall imports) and persistently facing trade deficit that may be the cause of insignificant empirical results for terms of trade in case of Pakistan.

The error correction term or speed of adjustment (ECT) is also significant and negative that indicates that the model will come back to its original and equilibrium state at a speed of forty-six percent. The constant term is insignificant while the lag value of GDP is positive and significant indicating that previous year growth has considerable effect on current year growth as integrated in table (2).

#### 4.1 Stability and Diagnostic Tests

To check the sensitivity, goodness of fit, reliability and specification of the model, different stability and diagnostic tests were applied and their results are integrated in tables (3), (4) and (5).

**Table 3. Results of Breusch-Godfrey Serial Correlation LM Test**

F-statistic	0.410437	Prob. F(1,21)	0.6833
Obs*R-squared	1.135270	Prob. Chi-Square(1)	0.5789

**Table 4. Results of Breusch-Pagan-Godfrey Heteroskedasticity Test**

F-statistic	1.659294	Prob. F(11,21)	0.1533
Obs*R-squared	15.34495	Prob. Chi-Square(11)	0.1672
Scaled explained SS	4.755011	Prob. Chi-Square(11)	0.9424

**Table 5. Results of Ramsey RESET Test**

	Value	Df	Probability
t-statistic	1.360662	20	0.4285
F-statistic	2.572725	(1, 20)	0.4285

F-test summary:

	Sum of Sq.	Df	Mean Squares
Test SSR	3.77E+11	1	3.77E+11
Restricted SSR	1.73E+12	21	8.23E+10
Unrestricted SSR	1.35E+12	20	6.76E+10

The results Breusch-Godfrey Serial Correlation LM test is integrated in above table (3) showing the variables data didn't suffers from serial or auto-correlation. Further, the test results also confirm that data is free from spurious relation and the error term is randomly distributed independently of each year.

The model was also check for Hetro-skedasticity and the results integrated in table (4) didn't show any probability of Hetro-skedasticity in the variables data. The results of Breusch-Pagan-Godfrey test integrated in table (4) shows that the variance among the variables data is constant and test results rejects the chances of Hetro-skedasticity in the model. Further, Ramsey RESET test was applied to check the specification and reliability of the model and the results incorporated in table (5) indicates that the model is stable and free from mis-specification or any biasness in selecting variables. In short, the diagnostic and stability analysis of the model confirms that the variable data and regression analysis of the study is reliable and proving goodness of fit of the model.

#### 4.2 Co – integration and ARDL Long Form

This study also applied ARDL co-integration and long form test to check the co-integrating variable and long-run relation among the agriculture sector and economic growth of Pakistan and the results obtained from regression analysis of these tests are incorporated in below table (6) and (7).

**Table 6. Results of ARDL Co-integrating Test**

Variable	Cointegrating Form			
	Coefficient	Std. Error	t-Statistic	Prob.
D(AGRI, 2)	0.334785	0.129654	2.582124	0.0183
D(X, 2)	0.427043	0.184215	2.318165	0.0317
D(M, 2)	0.346792	0.266335	1.302091	0.2085
D(BOT, 2)	-0.162847	0.053272	-3.056877	0.0065
D(TOT, 2)	-0.109921	0.083769	-1.312188	0.2051
D(ECT)	0.461649	0.212879	2.168590	0.0430
CointEq(-1)	-0.451232	0.148422	-3.040192	0.0067
Cointeq = D(GDP) - (0.791743*D(AGRI) + 0.385827*D(X) -0.494333*D(M) -0.124566*D(BOT) -0.243603*D(TOT) + 0.404523*ECT +0. 675747)				

**Table 7. Results of ARDL Long Form Co-efficient Test**

Variable	Long Run Coefficients			
	Coefficient	Std. Error	t-Statistic	Prob.
D(AGRI)	0.791743	0.183574	4.312918	0.0004
D(X)	0.385827	0.137403	2.807979	0.0112
D(M)	-0.494333	0.887041	-0.557283	0.5838
D(BOT)	-0.124566	0.168695	-0.738409	0.4693
D(TOT)	-0.243603	0.206458	-1.179912	0.2526
ECT	-0.404523	0.152066	-2.660163	0.0155
C	0.675747	0.481137	1.404479	0.2904

The results integrated in table (6) shows that there are three co-integrating variables among the selected model of agriculture sector and Pakistan's economic growth. In other words, the results incorporated in table (6)



indicate that contribution of agri-sector, exports of agriculture sector and trade balance of agri-sector has strong co-integration with economic growth of Pakistan. Further, the ARDL long form test was also applied to test the long-run relation between agri-sector and economic growth of Pakistan. The results integrated in table (7) indicating that contribution of agri-sector and exports of agri-sector has short run relation with economic growth of Pakistan, while other variables have found insignificant relation. The Johansen co-integration and ARDL bound testing approach were applied to further confirms the co-integrating relation and long or short relation among the agriculture sector and economic growth of Pakistan. The results of these tests are incorporated in table (8), (9) and (10).

**Table 8. Results of ARDL Bound Testing Approach Test**

Bounds Test Value		Critical Value Bounds	
Test Statistic	Value	I0 Bound	I1 Bound
F-statistic	2.126439	2.45	3.61

*Critical value selected at 5% significance level.*

**Table 9. Results of Unrestricted Co-integration Rank Test (Trace Stat Value)**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.857799	195.3022	125.6154	0.0000
At most 1 *	0.797566	134.8363	95.75366	0.0000
At most 2 *	0.741937	85.31869	69.81889	0.0018
At most 3	0.501185	43.32756	47.85613	0.1248
At most 4	0.348609	21.76641	29.79707	0.3117
At most 5	0.236327	8.478392	15.49471	0.4157
At most 6	0.003873	0.120298	3.841466	0.7287

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

**Table 10. Results of Unrestricted Co-integration Rank Test (Maximum Eigen value)**

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.857799	60.46587	46.23142	0.0009
At most 1 *	0.797566	49.51763	40.07757	0.0033
At most 2 *	0.741937	41.99113	33.87687	0.0043
At most 3	0.501185	21.56115	27.58434	0.2437
At most 4	0.348609	13.28802	21.13162	0.4261
At most 5	0.236327	8.358094	14.26460	0.3435
At most 6	0.003873	0.120298	3.841466	0.7287

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

The results of ARDL Bound testing approach integrated in table (8) verify that there is short run relation between agri-sector and economic growth of Pakistan. Further, the results incorporated in tables (9) and (10) of Johansen Co-integration test confirms that there are three co-integrating factors between Pakistan's economic growth and agriculture sector of Pakistan. the co-integration results of Johansen test is consistent with the results of ARDL co-integration and the results of Bound Testing approach is consistent with ARDL long form results accepting Null hypothesis<sup>1</sup>.

## 5. Conclusions

Agriculture is the main and important sector of the economy for all countries and especially for developing countries. Due to low capital structure, lake of industrial development and heavy machinery developing countries utterly dependent on agriculture sector. Pakistan too, is a developing country dependent on the agriculture sector and known as agriculture country. Though from several decades and increasing problem of the agriculture sector its contribution decreases time to time and stuck to an

<sup>1</sup> Null hypothesis  $H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6$  (There is no Long run relation)  $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6$  (There is Long run relation)

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average of 20% to overall gross domestic product (GDP) of Pakistan. It engages about 45% of the country labor force providing employment opportunities not only helping in reduction in poverty but also in providing food items, improving standard of living especially in rural areas of Pakistan and elevate the economic growth of Pakistan.

To formulate the agriculture sector of Pakistan assisting effectual and fruitful economic growth and development, fulfill the domestic need and requirements of daily food necessities, became more profitable and injective to the economy, considerable effective in poverty reduction and engaged more labor by providing greater employment opportunities, government of Pakistan and policy makers needs to encourage the private sector for investment to enlarge their role to enhance rapid progress and development of agriculture sector in Pakistan. For this purpose, the policy framework must be supportive for the private sector investment accompanying with friendly socio, economic and political conditions. The main cause of slow economic growth and limited investment of private sector in agriculture of Pakistan are the traditional technology, low quality and quantity of agriculture products, limited access to domestic and foreign markets, problems of credit availability, unavailability of the skilled and train labor, unavailability new equipments and machinery of agriculture sector as well as limited capacity of resources and infrastructures.

### **Implications of the study**

The main implications drawn from empirical analysis of this study are:

- There is need of private and public sector investment partnership in agri-sector to support each other for enhances growth of this sector.
- The public sector needs to support private sector morally, financially and providing technical facilities and knowledge of agri-sector.
- Agriculture can be more productive and contributive by increasing domestic purchasing power, by export expansion, by import substitutions through assets redistribution. Government should take into consideration not only the conditions in domestic economy but also the international economy and finally the assets redistribution may be difficult politically.
- Creation of agri-sector demand should be supplemented by the provision of enough fiscal and monetary incentives to the investors. So government

policies, e.g. fiscal, monetary and trade policies should be design in such a way that the investment climate becomes favorable.

- Agri-sector Investment is influenced by the prevailing macroeconomic environment is conducive to public and private investment and therefore to growth. Complete and stable information, sustainable budget, stable and predictable exchange rate, low real interest rate and comfortable foreign reserves are among the indicators of a stable macroeconomic environment.

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