International Review of Economics and Finance 27 (2013) 597–610

Contents lists available at SciVerse ScienceDirect

International Review of Economics and Finance

journal homepage: www.elsevier.com/locate/iref

# Bank credits and non-oil economic growth: Evidence from Azerbaijan☆

Fakhri Hasanov [a,b,1], Fariz Huseynov [c,*]

[a] Department of Economics, Director of the Center for Socio-Economic Research, Qafqaz University, Azerbaijan
[b] The Institute of Cybernetics, Baku, Azerbaijan
[c] North Dakota State University, Dept. 2410, P.O. Box 6050, Fargo, ND 58103, United States

ARTICLE INFO

*Article history:*
Received 21 February 2012
Received in revised form 21 November 2012
Accepted 25 February 2013
Available online 4 March 2013

*JEL Classification:*
E44
G21
O16

*Keywords:*
Non-oil economy
Cointegration
Bounds testing approach
Financial development
Azerbaijan

ABSTRACT

We examine the impact of bank credits on non-oil tradable sector output using aggregate data from Azerbaijan. We apply ARDL Bounds Testing approach, Engle–Granger two-step methodology, and Johansen's approach while correcting for small sample bias to test for cointegration and construct error correction models. Results from all three approaches are similar indicating that bank credits have a positive impact on non-oil tradable sectors output both in the long- and short-run. Short-run deviations are corrected to the long-run equilibrium within one quarter. Our results are useful for the macroeconomic policy makers and contribute to the literature that studies the relationship between the financial sector development and economic growth in the resource driven small open transition economies.



## 1. Introduction

Financial development is considered one of the most vital sources of economic growth (Beck, 2009; Levine, 2005 provide excellent overviews). Prior literature suggests that financial sector influences economic growth by two channels: improved resource allocation and acceleration of technological development (Beck, Levine, & Loayza, 2000; Schumpeter, 1911; Wurgler, 2000). These effects originate from the financial institutions' role of intermediation that mobilizes savings for investment purposes, facilitates a low-cost transfer of external funds, and provides efficient allocation of capital. Previous theoretical and empirical studies use different indicators, including the level of bank credit, interest margin, and productivity in financial sector to identify the effects of bank intermediation and financial development on economic growth.

Greenwood and Jovanovic (1990) develop a theoretical model to find that the impact of financial intermediation on economic growth is dependent on the transitional cycles in the economy. Austrian-based credit cycle theories (Hayek, 1933, 1935; von Mises, 1912) and capital-based macroeconomics (Cochran, Call, & Glahe, 1999; Garrison, 2001) generally argue that financial intermediation and credit expansion, especially through money creation may cause overinvestment problems that lead to unsustainable economic growth. The economic growth, especially in small open economies may experience larger fluctuations

☆ We are grateful to Carl Chen (Editor) and an anonymous referee for their helpful comments and suggestions.
* Corresponding author. Tel.: +1 701 231 5704.
*E-mail addresses:* fhasanov@qu.edu.az, hasanov@gwu.edu (F. Hasanov), fariz.huseynov@ndsu.edu (F. Huseynov).
[1] This paper started when Hasanov was a visiting scholar at George Washington University, United States.

1059-0560/$ – see front matter 
http://dx.doi.org/10.1016/j.iref.2013.02.005

according to the credit boom explanation of the business cycle (White, 2006). Thus, the relation between financial development and economic growth in small open economies is a non-trivial question and yet to be empirically investigated.

Several empirical studies using macro and industry-level data have concluded that the development of financial intermediation has a significantly positive effect on economic growth. King and Levine (1993) provide the most comprehensive empirical work where using cross-sectional data from 80 countries. They find a positive relationship between bank credit and economic growth. Efficient allocation of funds through financial institutions leads to economic growth. Other studies including Levine and Zervos (1998), Levine (1998), and Beck and Levine (2003) find similar results. Eschenbach (2004) reviews the majority of empirical studies and concludes that the direction of causality between financial development and growth varies across countries, regions and even variables employed by these studies.

The purpose of this study is to investigate the impact of financial development measured by bank credit on non-oil tradable sectors using aggregate data from Azerbaijan. Specifically we ask the following question: *do bank credits stimulate growth in non-oil tradable sector in a resource-based small open transition economy?* Although there is an extant literature on the "blessing" or "curse" of natural resources, (Ploeg, 2011 reviews this literature), the literature studying the impact of financial sector on economic growth in resource-based transition economies is rather limited. The case of resource-based transition countries is interesting from several aspects. First, measures of financial development may be misleading and not necessarily indicate the level of financial development. For example, several studies show that regardless of the level of financial development, resource-based countries experience credit boom when world commodity prices rise (Algozhina, 2006; Sturm, Gurtner, & Alegre, 2009). Second, these countries usually experience appreciation in real exchange rate and a higher rent in non-tradable sectors that absorb most of economic and financial resources, cause non-resource tradable sectors decay, and lead to a well-known "Dutch Disease Syndrome." Therefore, timely development of non-resource tradable sectors and retaining balance across industries are required for a sustainable economic growth. Third, along with shifts in macroeconomic factors, resource-based transition economies experience lack of institutional development that is crucial for sustainable economic growth driven by natural resource wealth. Mehlum, Moene, and Torvik (2006) suggest that countries above a threshold of institutional development benefit the most from resource wealth. On the other hand, natural resource wealth can also explain the variations in institutional development across transition economies (Beck & Laeven, 2006). Therefore, transition countries should not only achieve an efficient financial intermediation, but also develop strong institutions to ensure proper governance. Ergungor (2008) finds that countries that have an inflexible judicial system grow faster when they have a more bank-oriented financial system. Wang (2000) analyzes whether the economic growth is caused by the supply of financial assets or by the demand of investors and savers in Taiwan and concludes that the financial-supply-leading version is prevailing. Overall, there is a necessity to search for the most crucial financial or institutional indicators of economic growth in transition countries, especially where simultaneous development of several indicators is not possible (Macedo & Martins, 2008). In this context, the examination of the link between financial sector and non-resource economic growth is further necessary.

Our choice of country distinguishes this study from others found in literature. Most prior studies focus on cross-country analyses and therefore, do not provide insight on the role of country specific factors (Ang, 2008; Arestis & Demetriades, 1997; Demetriades & Andrianova, 2004). To avoid these issues, our study focuses on a single country. Despite the exclusion of Azerbaijan almost in all prior studies, except Koivu and Sutela (2005), several reasons make this country interesting to study. Being a small open resource-based transition country, Azerbaijan is one of the few economies that combine several aspects of our research question. Since the country gained independence from Soviet Union in 1991, Azerbaijani economy has passed through several macroeconomic and financial reforms, especially in banking and insurance sectors. As a result, bank loans to GDP ratio doubled during 2003–2009. Besides structural reforms, recently unprecedented surge in oil prices fueled Azerbaijani economy by windfall of oil export revenues. Along with opportunities to grow, oil revenues cause threats to sustainable fiscal and monetary policies (Wijnbergen & Budina, 2011). Therefore, to avoid resource-related socio-economic problems and achieve a sustainable growth, policymakers in Azerbaijan need to develop non-oil sectors to prevent resource-related economic and social illnesses. As discussed above, prior literature finds that providing funds to non-resource sectors is one of the ways a resource-based country can reach economic diversification. Overall, Azerbaijan provides us with a unique environment to investigate the impact of growing lending capacity of commercial banks, a proxy for financial sector development on the growth of non-oil tradable sectors.

We find that there are both long- and short-run relationship between bank credits and non-oil tradable sectors output. In the long run, 1% increase in bank credits leads to 0.31–0.36% increase in non-oil tradable sectors output. This impact is almost twice stronger in the short-run. About 87–88% of short-run fluctuations are corrected to the long-run equilibrium within one quarter. We also find that 1% appreciation in the real effective exchange rate causes 0.61–0.65 (2.80–3.21) percent long-run (short-run) reduction in the non-oil tradable sectors output.

Our study contributes to the literature in several ways. First, our study fills the gap between the literature on transition and resource-based economies. Different from most prior studies, our paper focuses on non-resource economic growth and examines the role of financial sector in mitigating the natural resource curse in a transition country.

Second, to our best knowledge, we are the first to apply autoregressive distributed lag bounds testing (ARDL) approach to test for cointegration between bank credits and non-oil tradable sectors output. Most resource-rich transition economies rapidly grow in a relatively shorter period. Because small sample properties of the ARDL approach are more superior to its alternatives (Jalil, Feridun, & Ma, 2010; Pesaran & Shin, 1999) our analysis differs from others found in prior literature.

Third, our study provides a comparative analysis by applying three types of cointegration approaches such as single equation-based (ARDL), residual-based Engle–Granger (EG) and system-based (Johansen's) cointegration methods, while correcting the small sample bias, which is usually missing in prior literature.

Fourth, our study uses a more recent data than most found in literature. Because financial developments in transition countries mainly occurred after 2000 and recent surge in commodity prices tremendously affected resource-based transition economies, we conduct a more up-to-date analysis of finance–growth relationship in resource-rich transition countries. Our study also has implications for policymakers in countries, such as Kazakhstan, Turkmenistan and Russia that share similar macroeconomic characteristics.

The paper proceeds as follows: Section 2 discusses the prior literature, Section 3 presents the economic background of Azerbaijan, Section 4 presents the data and econometric methodology, Section 5 presents the empirical results, and Section 6 concludes.

## 2. Related literature

Our study is related to a rather limited literature that examines the link between financial development and economic growth in resource-based transition economies. While resource-based economies need to fight negative effects of resource curse, transition countries suffer from lack of financial development and integration. Resource-based transition countries face both challenges simultaneously forcing policymakers to look for the most effective and comprehensive policies to foster economic growth. Recently, Beck (2011) analyzes finance and growth relationship in resource-based economies and finds some indication of natural resource curse in financial development in form of limited funding supplies for enterprises, because banks prefer lending to household. Although firms' demand to external financing is comparable to non-resource based economies, in general, they use internal financing and some bank loans. Ploeg and Poelhekke (2009) consider the role of financial development in mitigating the natural resource curse and suggest that analyzing the role of financial sectors in resource boom and bust periods is important and a clear understanding of the role of financial system in resource rich economies requires separate analysis of lending to household and enterprises.

Most prior studies use cross-country panel regressions to identify the link between financial development and economic growth in resource-based economies. For example, Gylfason (2004) using cross-correlation of broad money GDP ratio finds that financial development is negatively related to resource dependence, while it positively affects economic growth. Bakwena and Bodman (2010) analyze the role of financial development in oil versus non-oil (mining) economies and find that financial development plays a crucial role in influencing the efficiency of investment, thus economic performance; however, the potency of financial institutions is higher for non-oil producer. Prior studies have mixed results on whether financial development causes growth or vice versa. Calderon and Liu (2002) study 109 developing and industrial countries, including resource-based countries and find bivariate causality between financial development and economic growth. Nili and Rastad (2007) investigate financial–growth nexus through investment in 12 oil-exporting countries along with 80 non-oil developing countries and find that financial development has a net dampening effect on investment in oil economies. This may be due to the weakly developed financial institutions. However, Bakwena, Bodman, and Sandy (2008) apply cointegration and ECM models to 14 resource-based economies and find a unidirectional long-run causal relationship from financial development to growth. Christopoulos and Tsionas (2004) find similar results for 10 developing countries. Several studies use data from a single country, such as Yazdani (2008) from Iran, Rodriguez (2006), Bekaert and Harvey (1998) from Venezuela and find that in general, bank credit and financial development positively affect non-resource sectors. Bekaert and Harvey (1998) suggest that studies of finance–growth relationship in resource-based economies should focus on non-resource growth, rather than total GDP growth, because the latter is affected by windfall resource revenues.

Several studies examine the link between financial development and economic growth in European transition economies. For example, Hagmayr, Haiss, and Sümegi (2007) and Fink, Haiss, and Vuksic (2004) find evidence that domestic credit and bond markets together with real capital stock growth have positive effect on growth in transition countries. Fink, Haiss, and Mantler (2005) compare market and transition economies and find support for a weak and fragile finance–growth link in market economies, but for strong financial sector-induced short-run growth effects in transition countries. These findings suggest that funds supplied through credit markets stimulate economic growth in transition countries.

According to the credit boom theories of Mises and Hayek (Hayek, 1935; von Mises, 1928), too much bank credit may cause excessive investment and unsustainable economic growth with boom-and-bust cycles. Especially, when global liquidity conditions are eased, foreign credits entering into a small open transition economy can cause macroeconomic instability. Overinvestment increases the expectations about the future returns inducing banks to fund riskier investment projects. Hoffman (2010) analyzes the credit cycles through increased foreign capital flows and finds that overinvestment due to easy liquidity contributed to the crisis in Central and Eastern European countries. Credit cycles is more likely to effect the economic growth in countries where, in addition to foreign based capital inflows, large influx of windfall revenues encourage domestic banks to take excessive risks and allocate credit lines to mal-investment projects.

Only few studies analyze finance–growth relationship in resource-based transition countries and find differing results depending on the variables used. For example, Dawson (2003) finds no significant impact of financial sector, measured by liquid liabilities (M3), on economic growth in 13 transition countries, while Masten, Coricelli, and Masten (2007) find market capitalization and domestic bank credits have a positive impact on real per capita GDP growth in resource-based transition countries. Koivu and Sutela (2005) find that qualitative financial development and lower financial costs, but not the size of loans fostered economic growth over the period 1993–2000 in 25 transition economies, including resource-based economies, such as Azerbaijan, Kazakhstan and Russia. Thießen (2005) studies a single country, Russia and finds that the development of financial system compensated the diminishing economic growth during 1998 financial crisis and concludes that the financial development has a significant impact on the growth. Although Bonin and Wachtel (2003) find support for a positive relationship between financial development and economic growth in transition countries and Akimov and Dollery (2007) find similar impact of structural changes and reforms in the banking sector on Kazakhstan economy, these studies are mostly descriptive and lack rigorous empirical tests.

Overall, after reviewing the prior literature, we can conclude that: (a) the level of financial development is an important factor for economic growth in resource-based countries; (b) with few exceptions, the role of financial intermediation in mitigating resource curse needs further studying; (c) few studies focus on resource-based transition countries that significantly differ from non-resource economies. Our study using a more recent data from Azerbaijan, a resource-rich transition economy, contributes to the literature on the impact of bank credits on non-oil economic growth by applying single-equation based, residuals-based and system-based cointegration methods, namely, ARDL, EG and Johansen approaches, respectively, and by accounting for a small sample bias correction.

## 3. Economic background

After gaining independence from Soviet Union in 1991, Azerbaijan has experienced several socio-economic and political shocks ranging from the military occupation of its lands by the neighboring country, Armenia and resettlement of about a million refugees to currency devaluation and hyperinflation. These problems negatively affected the transition to market based economy and necessitated comprehensive macroeconomic reforms and stability programs. Development of oil and gas production industry was considered a key factor in future macroeconomic stability of Azerbaijan. During the year after the establishment of the major oil consortium in 1994, Azerbaijan managed to attract billions of dollars to develop its export-oriented oil and gas industry. These developments and surge in oil prices sparked the economic growth to turn Azerbaijan into the fastest growing country in the world with 34.5% real growth of economic output in 2006 (Fig. 1).

The economic dependence on oil and gas has brought problems, such as dependence on a volatile source of income, loss of competitiveness and diminishing share of non-oil economic sectors in total output. During 2000–2009, the real growth of non-oil economy traced hump-shaped and generally downward sloping trend (Fig. 2). This period can be divided into two sub-periods — 2000–2004 when the average share of non-oil economy was 62% per year, and 2005–2009 when the share of non-oil economy became U-shaped and averaged 42%. Thus, while non-oil economic growth benefited from the spill-over effect of windfall oil revenues in 2005–2008, the share of non-oil GDP in overall economy diminished during the same period. The 2008 global economic crisis reduced the world demand to crude oil decreasing oil revenues to Azerbaijan. As a result, the Azerbaijani government decreased the public spending to non-oil economy and as a result, non-oil economic growth declined to 3%. Meanwhile, the share of non-oil economy rose to just below 50% of overall GDP. In general, growth in non-oil economy is considered vital, because oil production is predicted to decline gradually after 2015 and non-oil budget deficit has already grown to 20% of GDP.

Over-dependence on oil revenues creates a problem, when non-tradable sectors attract most of available non-oil capital investment causing the real exchange rate to appreciate. State-funded investments into non-oil economy may accelerate this shift of capital among non-oil sectors. These issues are analyzed by Hasanov (2011) who concludes that the “spending effect” is stronger than “resource movement effect” and finds some evidence of appreciation of the real exchange rate.

Commercial bank loan is the main source of external funds in Azerbaijan where capital markets are rather limited. Bank loans to GDP ratio doubled during 2003–2009 while GDP per capita quadrupled during the same period (Fig. 3). In 2009, about 60% of total loans were received by private enterprises; however, the share of consumer credits increased faster during the last 2003–2009 years.

It is crucial for a natural resource-dependent country to increase the amount of bank loans to tradable sectors and reduce the likelihood of Dutch Disease Syndrome by making capital more accessible to non-oil tradable sectors and contribute to their export potential. In 2003–2009 bank loans to tradable sectors accounted for smaller portion of total commercial loans. The percentage of loans to tradable sectors ranged from 15 to 25% while non-tradable sectors attracted 30 to 43% of total loans. However, the trend is increasing in favor of tradable sectors since 2007.

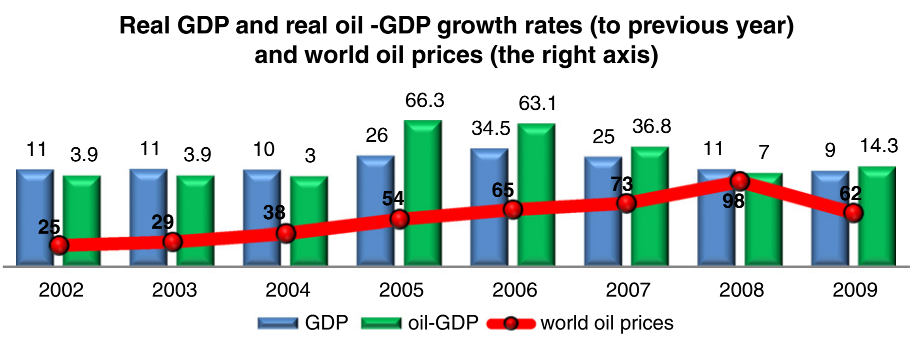


**Fig. 1.** Real GDP and real oil-GDP growth rates in Azerbaijan and world oil prices.

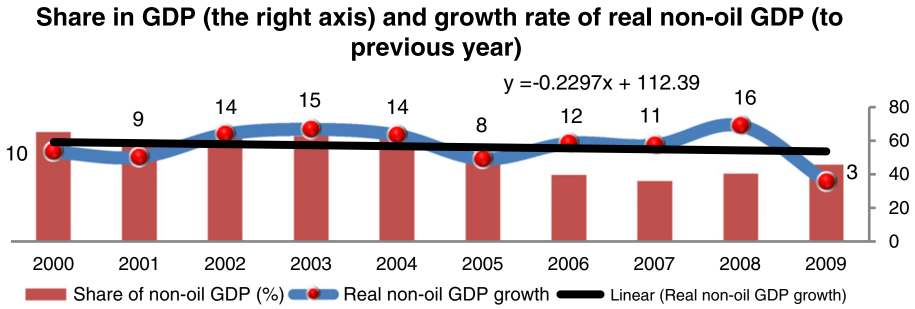


**Fig. 2.** Share in GDP and growth rate of real non-oil GDP.

Prior literature finds that development of financial sector can increase bank credits and reduce the cost of capital to support the economic growth in non-resource sectors. Our study aims to extend this literature by investigating the impact of bank credits on the economic growth of non-oil tradable sectors using data from Azerbaijan.

## 4. Data and methodology

### 4.1. Data

We use time series of three macroeconomic variables quarterly ranging from 2000 to 2009. Since the purpose of the study is to examine the role of financial intermediation on the development of non-resource sector, our dependent variable is the sum of seasonally adjusted non-oil industrial and agricultural output deflated by the producer price index (*PPI*),[2] *NOILTRAD*. We obtain time series of these variables from the State Statistical Committee of Azerbaijan Republic.

Our key independent variable is *CRED*, bank credits to non-oil tradable sector divided by producer price index. Prior literature (e.g., Ang, 2008; Demetriades & Hussein, 1996; Jalil et al., 2010; Levine, 2002; Oluitan, 2009) finds that commercial bank credit to private sector is a better stimulant to the economic growth than other forms of loan. This is also true for resource-based economies (Beck, 2011). Additionally, Beck (2011) suggests that in order to understand the impact of financial intermediation on non-resource sector, bank credits to enterprises and household should be separately examined. We obtain times series of bank credits to three main sectors — "Energy, Chemistry and Natural Resources", "Agriculture and Processing" and "Industry and Production" reported by the Central Bank of Azerbaijan (CBA) and deflate by the producer price index.[3] Our independent variable is the sum of bank credits to these sectors.

We use the real effective exchange rate, *REER*, to control for other factors that may have an impact on the economic growth. Prior literature (e.g. Aziakpono, 2004) suggests that human capital, state budget expenses, trade openness, export potential and exchange rates are the examples of these factors. Several studies on resource-rich small open economies (Egert, 2009; Habib & Kalamova, 2007; Sturm et al., 2009) suggest that *REER* is one of the main factors that have a significant impact on competitiveness and productivity of non-resource tradable sectors. In the case of Azerbaijan, several studies, such as Hasanov (2010), Hasanov and Samadova (2010), Hasanov (2011), Hasanov and Huseynov (2009), find that *REER* has significant impact on various key economic factors. We obtain the time series of *REER* variable from the monthly statements released by the CBA. Fig. 4 illustrates time profiles of the variables.

### 4.2. Methodology

To examine the long- and short-run impact of bank credits on non-oil tradable sectors, we apply three different cointegration methods, ARDL Bounds Testing Approach (ARDL), Engle–Granger approach (EG) and Johansen approach. Thus, we are able to limit our exposure to the shortcomings of a single approach.

#### 4.2.1. Autoregressive distributed lag bounds testing (ARDL) approach

ARDL is a single equation-based cointegration method developed by Pesaran, Shin, and Smith (2001). Several advantages make this approach more preferable to its alternatives (Fosu and Magnus, 2006; Pesaran et al., 2001; Muhammad and Umer, 2010). First, ARDL is relatively simple and can be estimated by ordinary least-squares model. Second, this approach is robust to endogeneity issues. Third, it is possible to estimate short- and long-run coefficients simultaneously (Jalil et al., 2010; Pesaran & Shin, 1999). Fourth, this approach is irrespective whether the regressors are I(0) or I(1) or both. Fifth and the most important for our study, ARDL is preferred to examine variables with small sample of time series data (for example, Jalil et al., 2010; Fosu and

[2] Because quarterly price indices for agricultural and non-oil industrials are not available, we used producer price index as a deflator for non-oil tradable value added.

[3] Since the share of credits to "Energy, Chemistry and Natural Resources" sector is significantly small, we consider sum of these three sectors as non-oil tradable sector.

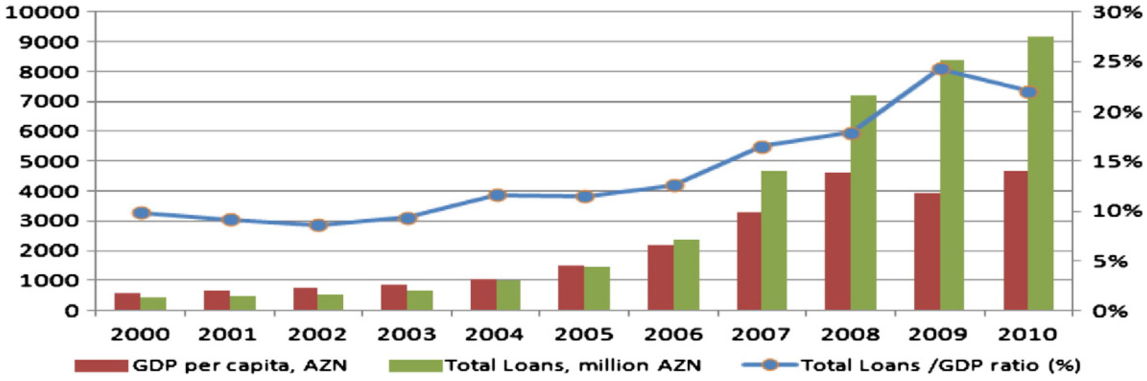


**Fig. 3.** GDP per capita and total loans in Azerbaijan.

Magnus, 2006; Pesaran & Shin, 1999; Pesaran et al., 2001; Muhammad and Umer, 2010). One shortcoming of ARDL is that this approach does not account for number of cointegrating relationships between the underlying variables and the issue of weak exogeneity. Therefore, we also use Johansen's approach to improve the robustness of our results.

Following abovementioned studies, we develop a cointegration test between bank credits and non-oil tradable sectors output while controlling for the real effective exchange rate. First, we estimate unrestricted error-correction model (ECM) as shown in Eq. (1).

$$\Delta y_t = c_0 + \theta y_{t-1} + \theta_{yxx} x_{t-1} + \sum_{i=1}^{n} \varpi_i \Delta y_{t-i} + \sum_{i=0}^{n} \phi_i \Delta x_{t-i} + u_t \tag{1}$$

where $y_t$ is the natural log of *NOILTRAD*, $x_t$ is vector of natural logs of *CRED* and *REER* respectively, $\theta_i$ are the long-run coefficients and $\varpi_i$ and $\phi_i$ are the short-run coefficients. $c_o$ denotes an intercept, $\Delta$ — stands for first difference operator, $u$ — is residuals, and n denotes the lag order.

Pesaran et al. (2001) emphasize that the correct lag order (length) is crucial for accurate analysis of cointegration. Optimal lag size is the lag size that minimizes Akaike (AIC) and Schwarz (SBC) information criteria and ensures serially uncorrelated residuals in Eq. (1). Pesaran and Shin (1999) and Fatai, Oxley, and Scrimgeour (2003) among others suggest Schwarz criterion for smaller samples.

Next, we use Wald Test to test for cointegration between bank credits and non-oil tradable sector output. The null hypothesis is that there is no cointegration between the variables, in other words, $\theta_i = 0$, while the alternative hypothesis is that there is cointegration between the variables ($\theta_i \neq 0$). The critical values of F-statistics for ARDL are provided in Pesaran and Pesaran (1997) and Pesaran et al. (2001). Narayan (2005) concludes that Pesaran's critical F-values tend to reject falsely the null hypothesis of no cointegration when number of observations is small and provides the critical values for the small sample sizes ranging from 30 to 80 observations. Because our study has a small number of observations, in order to correct for the small sample bias, we use the critical values reported in Narayan (2005). We reject (accept) the null hypothesis when F-statistics from our test is greater (lower) than the critical value. If our F-statistics falls between upper and lower critical values, ARDL approach is inconclusive about the existence of cointegration.

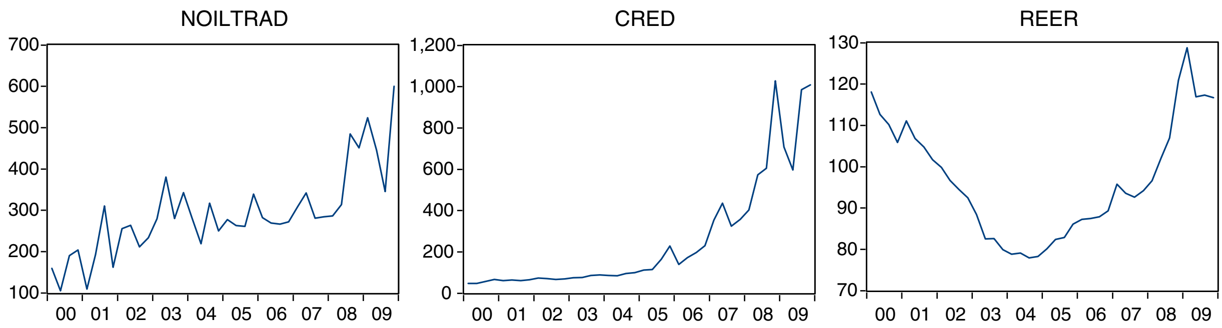


**Fig. 4.** Time series of seasonally adjusted real non-oil tradable sector output, total bank credits to tradable sectors and non-oil trade weighted real effective exchange rate.

After cointegration between variables is confirmed, we obtain the long-run coefficients from Eq. (1) as follows (Jahan-Parvar & Mohammadi, 2008):

$$c_0 + \theta y_{t-1} + \theta_{yxx} x_{t-1} = 0$$

and solving for $y$ as below:

$$y = -\frac{c_0}{\theta} - \frac{\theta_{yxx}}{\theta} x + u \tag{2}$$

The last stage in ARDL approach is the estimation of ARDL-ECM model by using $u_t$ with one lag in place of lagged level regressors and by excluding statistically insignificant contemporaneous and lagged values of the first differenced variables in Eq. (1):

$$\Delta y_t = c_0 + \gamma u_{t-1} + \sum_{i=1}^{n1} {}_i \Delta y_{t-i} + \sum_{i=0}^{n2} {}_i \Delta x_{t-i} + e_t \tag{3}$$

where, $y$- is error correction coefficient; and $u_t = y_t + \frac{c_0}{\theta} + \frac{\theta_{yxx}}{\theta} x_t$ is the ECM variable.

#### 4.2.2. Engle–Granger approach

Our second approach is Engle–Granger test of cointegration (Engle & Granger, 1987). The estimation process in EG approach consists of the following stages (Enders, 2004). First, to establish the order of integration we perform both Augmented-Dickey Fuller (ADF) and Phillips–Perron (PP) Unit Root tests (Dickey & Fuller, 1981; Gujarati and Porter, 2009; Phillips & Perron, 1988). After we determine the order of integration, we estimate the following model between the variables that are integrated in the same order:

$$y_t = \beta_0 + \beta_1 x_t + \varepsilon_t \tag{4}$$

where, $\beta_0$,$\beta_1$ — are the coefficients; $\varepsilon_t$ — are the residuals from the model at time $t$. In the second stage, we check the stationarity of the residuals obtained in Eq. (4) using unit root test.[4] If the residuals are stationary, we can conclude that there is a cointegrating relationship between the variables and the coefficients can be interpreted as long-run elasticity in Eq. (4). As a final stage, we construct an ECM using the stationary residuals from Eq. (4) as below:

$$\Delta y_t = \alpha_0 + \alpha_y \varepsilon_{t-1} + \sum_{i=1}^{p1} \alpha_{1i} \Delta y_{t-i} + \sum_{i=1}^{p2} \alpha_{2i} \Delta x_{t-i} + \nu_t \tag{5}$$

where $p1$ and $p2$ are the lag orders; $v_t$ — is the residuals that are assumed to be white noise. If $\alpha_y$ is between $-1$ and 0 and statistically significant, we can conclude that variables exhibit a stable cointegration and short-run deviations are corrected to the long-run equilibrium.

#### 4.2.3. Johansen approach

Our third approach is Johansen (1988) and Johansen and Juselius (1990) full information maximum likelihood of a Vector Error Correction (VEC) model as below:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta y_{t-i} + \mu + \psi_t \tag{6}$$

where, $y_t$ is a $(n \times 1)$ vector of the $n$ variables of interest (*NOILTRAD*, *CRED* and *REER* in our case), $k$ denotes lag order, $\mu$ is a $(n \times 1)$ vector of constants, $\Gamma$ represents a $(n \times (k-1))$ matrix of short-run coefficients, $\varepsilon_t$ denotes a $(n \times 1)$ vector of white noise residuals, and $\Pi$ is a $(n \times n)$ coefficient matrix. If the matrix $\Pi$ has reduced rank $(0 < r < n)$, we can separate a $(n \times r)$ matrix of loading coefficients $\alpha$, and a $(n \times r)$ matrix of cointegrating vectors $\beta$. The former indicates the importance of the cointegration relationships in the individual equations of the system and of the speed of adjustment to disequilibrium, while the latter represents the long-term equilibrium relationship, so that $\Pi = \alpha\beta'$.

Testing significance and stationarity of the variables imposes linear restrictions on the long-run coefficients. For example, significance of *noiltrad* implies that the null hypothesis that its $\beta$ is zero can be rejected, while stationarity or trend stationarity of *noiltrad* assumes that the restriction on the cointegrating vector that $(100)^{/}$ holds. Weak exogeneity test checks whether a given $a$ is zero. If the null hypothesis of $a = 0$ cannot be rejected, it means that the associated variable is weakly exogenous, in other words, disequilibrium in the cointegrating relationship does not feed back onto this variable.[5]

[4] According to Enders (2008) and Gujarati and Porter (2009), because the residuals are not observable, MacKinnon (1991) critical values have to be used in testing stationarity of them.

[5] Johansen and Juselius (1990) and Johansen (1992a, 1992b) discuss the details of this test.

**Table 1**
ADF and PP unit root tests results.

| Variables | Test method | In the level | | | | In the first difference | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | $k$ | $C$ | $t$ | Actual value | $k$ | $C$ | $t$ | Actual value |
| *noiltrad* | *ADF* | 7 | Yes | Yes | −2.08 | 1 | No | No | −9.36*** |
| | *PP* | | Yes | Yes | −5.39*** | | No | No | −9.93*** |
| *cred* | *ADF* | 5 | Yes | Yes | −0.84 | 1 | Yes | No | −6.30*** |
| | *PP* | | Yes | Yes | −1.98 | | Yes | No | −8.85*** |
| *reer* | *ADF* | 0 | Yes | Yes | −0.86 | 0 | No | No | −4.66*** |
| | *PP* | | Yes | Yes | −0.90 | | No | No | −4.65*** |
| $\hat{\varepsilon}$ | *ADF* | 0 | No | No | −5.22*** | | | | |
| | *PP* | | No | No | −5.42*** | | | | |

Notes: $k$ is the lag order; $C$ and $t$ are the intercept and linear trend respectively; *** indicates statistical significance at the 1% significance levels. Note that in testing the first three variables, the critical values are taken from MacKinnon (1996). However, since $\hat{\varepsilon}$ is unobservable, critical values in the case of no intercept and no deterministic trend in the test equation, are taken from MacKinnon (1991) and are −4.68, −3.97 and −3.61 at the 1%, 5% and 10% significance levels respectively.

In the case of small sample size, the Johansen's test statistics are prone to reject the null hypothesis of no cointegration (Johansen, 2002). We use two methods to correct for the small sample bias. One is proposed by Reinsel and Ahn (1992) and Reimers (1992) that expresses multiplication of the Maximum or Trace test statistics by the scale factor of $\frac{T-kn}{T}$. Where $k$ is the lag order of the underlying Vector Autoregression (VAR) model in levels, while $n$ and $T$ are the number of endogenous variables and observations, respectively. Alternatively, Johansen (2002) argues that assuming that $\frac{kn}{T}$ is less than 0.20, then the test will give robust results.

## 5. Empirical results

### 5.1. Unit root test

First, we check the stationarity of the variables using ADF and PP tests for unit root. We present test results in Table 1. ADF test results show that *noiltrad*, *cred*, and *reer* are non-stationary in the level, but stationary in first difference of level.[6] In other words, the variables are integrated in the order of one, I (1). PP test results are similar to ADF results with the exception that PP test statistics for *noiltrad* is significant at 1% suggesting that *the variable* is trend stationary. However, after visually inspecting the time series of this variable and conducting multivariate stationary test in the framework of Johansen cointegration analysis (discussed in Section 5.4), we conclude that *noiltrad* is I (1) process.

### 5.2. ARDL approach

Based on criteria of *AIC* and *SBC* and absence of serial correlation in the residuals we determine the optimal lag order for the right hand side differenced variables in the Eq. (1) by starting from four lags as a maximum. According to the test results, presented in Panel A in Table 2, we cannot use three lags due to serial correlation in the residuals. Under the condition of no serial correlation in the residuals, *AIC* suggests optimal lag order of four, while *SBC* prefers one. When sample size is small and *AIC and SBC* indicates different lag orders, previous studies prefer to choose the lag order determined by *SBC*.[7]

Thus, we choose optimal lag size to be one for the right hand side differenced variables and test for cointegration between the variables in Eq. (1). Panel B reports the cointegration tests results.

We find that F-statistics from Wald Test is greater than both Pesaran's and Narayan's the corresponding upper bound critical F-values at 10% significance. Moreover, following Pesaran et al. (2001), we conduct bounds $t$-test to examine the existence of a cointegration between the variables. The t-statistics of the coefficient on *noiltrad* is greater than the corresponding upper bound critical t-value of −3.21 at 10% significance level. Therefore, based on the results from these two ARDL cointegration tests, we can reject the null hypotheses and conclude that there is a cointegrating relationship between the variables of interest.[8]

After excluding statistically insignificant variables from Eq. (1) we obtain final ARDL specification as below:

$$\begin{aligned}\Delta noiltrad_t = {} & 5.12 - 0.87 noiltrad_{t-1} + 0.27 cred_{t-1} - 0.36 reer_{t-1} + \\ & + 0.29 \Delta cred_t + 0.36 \Delta cred_{t-1} - 2.79 \Delta reer_t\end{aligned} \tag{7}$$

[6] As reported in Table 1, the ADF equation of *reer* has a time trend that is inconsistent with Enders (2008, p. 212). Additional analysis also indicates that time trend is present in the Data Generating Process of *reer*. Inclusion of time trend in ADF equation of *reer* is consistent with the prior studies of transition economies and may be related to the specific historical development factors in these economies.

[7] Our results exclude the deterministic trend because it is statistically insignificant. In addition, when we test Eq. (1) with four lags, as suggested by AIC criterion, ARDL finds no cointegrating relationship between the variables.

[8] Similarly, Ang (2008) and Duasa (2007) also find existence of cointegrating relationship at 10% significance level in Malaysia using ARDL approach.

**Table 2**
ARDL tests results.

Panel A: Statistics for optimal lag size

| $k$ | $AIC$ | $SBC$ | $\chi^2_{SC}(1)$ | $\chi^2_{SC}(4)$ |
|---|---|---|---|---|
| 0 | 0.0642 | 0.3201 | 0.1782 [0.1398] | 0.0865 [0.0544] |
| **1** | −0.0839 | **0.3040** | 0.9653 [0.9592] | 0.7241 [0.5743] |
| 2 | −0.1783 | 0.3442 | 0.7888 [0.7371] | 0.2034 [0.0670] |
| 3 | −0.0067 | 0.6531 | 0.7141 [0.6193] | 0.0759 [0.0089] |
| **4** | **−0.2447** | 0.5552 | 0.5912 [0.4219] | 0.4482 [0.0860] |

Note: $k$ is a lag order while $AIC$ and $SBC$ are Akaike and Schwarz information criteria, respectively. $\chi^2_{SC}(1)$ and $\chi^2_{SC}(4)$ are LM statistics for testing no residual serial correlation against lag orders 1 and 4. P-values are in brackets.

Panel B: Tests for cointegration

$F_W\ (3{,}29) = 4.4712$, $t = -3.3483^{*}$

Notes: $F_W$ is the F-value of the null hypothesis that $\theta_i = 0$ in the Wald Test. t-value is the t-statistics of the coefficient on the lagged level of *noiltrad*. In the case of 38 observations, unrestricted intercept and no trend, 2 lagged level regressors, Narayan's critical values of low and upper bounds for testing the existence of cointegration are 3.393 and 4.410, respectively (see Narayan, 2005, p. 1988), while Pesaran's asymptotic critical value bounds are 3.17 and 4.14 respectively at the 10% significance level (see Pesaran et al., 2001, p. 300). Pesaran's asymptotic critical value bounds of the t-statistics for testing the existence of cointegration at 10% significance level are −2.57 and −3.21 respectively in the case of unrestricted intercept and no trend, 2 lagged level regressors

Panel C: Final ARDL and ECM specification

| Regressors | Coefficient (standard error) | Coefficient (standard error) |
|---|---|---|
| *Intercept* | 5.1247*** (1.7018) | |
| $noiltrad_{t-1}$ | −0.8678*** (0.1585) | |
| $cred_{t-1}$ | 0.2706*** (0.0694) | |
| $reer_{t-1}$ | −0.3569 (0.3084) | |
| $\Delta cred_t$ | 0.2885* (0.1868) | 0.2885* (0.1550) |
| $\Delta cred_{t-1}$ | 0.3603* (0.1896) | 0.3603** (0.1566) |
| $\Delta reer_t$ | −2.7915** (1.0967) | −2.7915*** (0.9010) |
| $\hat{u}_{t-1}$ | | −0.8678*** (0.1457) |

*** denotes significance at 1%, ** at 5% and * at 10%.

Untabulated results confirm that the residuals are robust to serial correlation, heteroscedasticity and pass normality tests. Having established cointegration between variables, we estimate the long-run coefficients from the final ARDL specification in Eq. (7) and cointegrating relation is as follows:

$$noiltrad_t = 5.91 + 0.31cred_t - 0.41reer_t + \hat{u}_t \tag{8}$$

Finally, by replacing lagged level regressors in Eq. (7) with the lagged residuals obtained from Eq. (8) we obtain the final ARDL-ECM as below:

$$\Delta noiltrad_t = -0.87\hat{u}_{t-1} + 0.29\Delta cred_t + 0.36\Delta cred_{t-1} - 2.79\Delta reer_t + \hat{e}_t \tag{9}$$

Detailed test results of both final ARDL and ECM specifications are presented in Panel C. In untabulated reports, we find that the ECM coefficients are robust to Residuals Tests, Misspecification Test, Breakpoint tests, and Parameters Stability Tests. These test results are available upon the request.

Overall, our results from ARDL approach show that there is significant long- and short-run relationship between bank credits and non-oil tradable sectors output. We find that in the long-run, 1% increase in bank credits leads to 0.31% growth in non-oil tradable output. In the short-run, this total positive impact is about 0.65%. The coefficients of error-correction term (ECT) indicate that 87% of short-run disequilibrium in non-oil tradable output growth of the previous quarter adjusts back to the long-run equilibrium within a quarter.

Note that our results on the positive impact of financial development on economic growth are consistent with prior literature. However, our study finds a strong relationship between financial sector and the development of non-oil sectors in resource-rich transition countries. The ECT shows that the causality runs from the financial sector (bank credits) to real economy (non-oil tradable sectors) that is consistent with Jalil et al. (2010). Also, note that ECT indicates a quicker adjustment towards equilibrium that may be related to a number of country specific factors. For example, despite the average lending rate is relatively high in Azerbaijan, the higher profitability in production sectors enables firms to demand bank credits. Moreover, since development of non-oil, particularly non-oil tradable (export oriented) sector is a strategic priority of the socio-economic development of Azerbaijan Republic,[9] there are some privileges (also easy access to credit/financial resources) approved for

[9] To achieve economic diversification, several state committees, such as "National Fund to Support Entrepreneurs", "AzPromo", "Azerbaijan Investment Fund", were established and numerous state sponsored programs, such as "State program for regional socio-economic development", "Plans to stimulate non-oil products export" have been adopted.

firms operating in non-resource related sector. In addition, National Fund for Entrepreneurship Support, a state fund established to provide funding to non-oil sector, especially production and export oriented firms. These factors enable firms to adjust quickly to any market related shocks to credit supply.

Thus our results suggest that resource-rich transition countries should take necessary measures (for example, provide low-cost funds, offer tax breaks etc.) to stimulate bank credits to non-oil tradable sectors that usually become unattractive for capital investment due to the revenue and productivity growth in natural resources sector.

We also find that the real exchange rate has a significantly negative impact on non-oil tradable sectors in the short-run. In the long-run, this effect becomes insignificant. Specifically, when real exchange rate appreciates by 1% short-run non-oil tradable sectors output growth decreases by 2.79%. This negative impact is consistent with prior literature (Hasanov, 2010; Hasanov & Huseynov, 2009; Hasanov & Samadova, 2010) suggesting that the appreciation of the real exchange rate reduces the competitiveness of non-oil tradable goods in Azerbaijan.

### 5.3. Engle–Granger approach

In this sub-section, we discuss our results from Engle–Granger approach (EG) we use to verify cointegration between non-oil tradable sectors output and bank credits.[10] In Section 5.1, we find that our variables are I (1) such that they are non-stationary in the level and stationary in the first difference form. Our estimation of Eq. (4)[11] provides the following result (Table 3, Panel A):

$$noiltrad_t = 7.02 + 0.31cred_t - 0.65reer_t + \hat{\varepsilon}_t \tag{10}$$

Note that the Durbin–Watson (DW) statistics of the estimation is 1.69. Engle and Granger (1987) suggest that if the DW statistics is greater than 0.386, we can conclude that the variables are cointegrated. Next, we check the stationarity of the residuals obtained in Eq. (10). Because ADF and PP statistics are smaller than MacKinnon (1991) critical values at 1% significance level, as shown in the last two rows of Table 1, we can reject the null hypothesis of a unit root in the residuals and conclude that the variables of interest are cointegrated.

The last stage of EG test is the estimation of ECM. The estimation result in a parsimonious specification is given below (Panel B):

$$\Delta noiltrad_t = -0.88\hat{\varepsilon}_{t-1} + 0.26\Delta cred_t + 0.34\Delta cred_{t-1} - 2.81\Delta reer_t + \hat{v}_t \tag{11}$$

The coefficients of Eq. (11) are statistically significant and pass robustness and stability tests on residuals and coefficients respectively. These test results are untabulated but are available upon the request.

The results from EG approach are similar to our findings in ARDL approach. EG approach also suggests that there are both long- and short-run relationship between bank credits and non-oil tradable sectors output. The long-run coefficient has a similar magnitude as in ARDL approach suggesting that 1% increase in bank credits raises non-oil tradable sectors output by 0.34%. Similarly, we find that 88% of short-run fluctuation is corrected to the long-run equilibrium within a quarter. Our findings for the impact of real exchange rate are similar to the results obtained from ARDL.

### 5.4. Johansen's cointegration approach

This subsection discusses the results from Johansen's system-based cointegration analysis. One of the advantages of the Johansen's test is that it provides the number of cointegrated relationships. We account for the small sample bias correction discussed in the methodology section and perform Johansen's cointegration test on the VAR model using one lag.[12] Our results are presented in Table 4, Panel A. According to the test results, both raw and adjusted versions of the Trace and Max statistics (Reimers, 1992; Reinsel & Ahn, 1992) suggest that there is a single cointegrating relation between the variables.[13] In addition, since Johansen's (2002) scale factor of 0.08 is much smaller than 0.20, we can conclude that the Trace statistics are statistically robust. We normalize this long-run relationship for *noiltrad* and obtain the following results (Panel B):

$$noiltrad_t = 6.58 + 0.36cred_t - 0.61reer_t + \hat{\Omega}_t \tag{12}$$

We estimate a VEC model[14] and perform the significance, stationarity and weak exogeneity tests. Statistics of the significance test, presented in Panel C, indicate that *noiltrad* and *cred* are statistically significant at the 1% while *reer* is significant at 10%

[10] We also test for a cointegration between bank credits and non-oil tradable sectors by applying fully modified OLS (FMOLS) method and obtain similar results. Estimation results from FMOLS are available upon request.

[11] We remove the time trend because it is statistically insignificant.

[12] Both *AIC* and *SBC* prefer lag order of one. One lag is also preferable as it saves the VAR's degree of freedom in the presence of the small number of observations. The VAR model, estimated with one lag, satisfies the stability condition and its residuals are distributed normally and are not serially correlated. These test results are available upon request.

[13] Following the prior literature, we include intercept and exclude trend in cointegrating equation and the VAR model.

[14] We transform the VAR model into the VEC model following Johansen (1988) and Johansen and Juselius (1990).

**Table 3**
Estimation results for Engle–Granger approach.

| Regressor | Coefficient (standard error) |
|---|---|
| Panel A: Long-run relationship | |
| *Intercept* | 7.0169*** (1.2206) |
| $cred_t$ | 0.3107*** (0.0414) |
| $reer_t$ | −0.6517** (0.2798) |
| $\overline{R}^2 = 0.5821, \ DW = 1.6856$ | |
| Panel B: Final ECM specification | |
| | S |
| $\Delta cred_t$ | 0.2604* (0.1575) |
| $\Delta cred_{t-1}$ | 0.3433** (0.1591) |
| $\Delta reer_t$ | −2.8064*** (0.9124) |
| $\hat{\varepsilon}_{t-1}$ | −0.8819*** (0.1518) |

Notes: Dependent variable is $noiltrad_t$; $\overline{R}^2$ indicates the adjusted $R^2$; $DW$ is Durbin–Watson statistic; Method: Least Squares; estimation period: 2000Q1–2009Q4.

significance level. The weak significance of *reer* may be due to the small number of observations in our sample or non-linear nature of the restrictions on the long-run coefficients in the test. However, the null hypothesis of the joint insignificance of *cred* and *reer* is rejected at 1% significance level: the sample value of $\chi^2(2)$ of the test is 17.6219 with the probability of 0.0001.

**Table 4**
Estimation results for Johansen approach.

Panel A: Cointegration test results

| Number of cointegrating a equation | Trace statistics | | Critical value | Max–Eigenvalue statistics | | Critical value |
|---|---|---|---|---|---|---|
| | Given | Adjusted | | Given | Adjusted | |
| None | 41.8828** | 38.5763** | 29.7971 | 30.5101 | 28.1014** | 21.1316 |
| At most 1 | 11.3727 | 10.4749 | 15.4947 | 11.0393 | 10.1678 | 14.2646 |
| At most 2 | 0.3334 | 0.3071 | 3.8415 | 0.3334 | 0.3071 | 3.8415 |

Notes: The test type is *Intercept and no trend in cointegrating equation and the VAR*; critical values are taken from MacKinnon-Haug-Michelis (1999) at the 5% significance level; ** denotes rejection of the null hypothesis of no cointegration at least at the 5% significance level; estimation period: 2000Q3–2009Q4.

Panel B: Cointegration analysis

Cointegrating equation: $noiltrad_t = 6.5780 + 0.3599_{(0.0415)}\, cred_t - 0.6113_{(0.2760)}\, reer_t + \hat{\Omega}_t$
Error correction term: −0.83*** (0.1583)

Panel C: Robustness tests

*Statistics for testing the significance of a given variable in the cointegrating space*[a)]

| | *noiltrad* | *cred* | *reer* |
|---|---|---|---|
| $\chi^2$ (1) | 18.8151*** | 15.7498*** | 3.40167* |

*Multivariate statistics for testing stationarity*[b)]

| | *noiltrad* | *cred* | *reer* |
|---|---|---|---|
| $\chi^2$ (2) | 7.1673** | 27.2121*** | 26.3308*** |

*Weak exogeneity test statistics*[c)]

| | *noiltrad* | *cred* | *reer* |
|---|---|---|---|
| $\chi^2$ (1) | 14.4473*** | 0.8882 | 1.9300 |

Notes: a) the null hypothesis is that a given variable is statistically insignificant; b) the null hypothesis is that given variable is trend stationary; c) the null hypothesis is that given variable is weakly exogenous; *, ** and *** denote rejection of the null hypotheses at the 1%, 5% and 1% significance levels respectively; standard errors are in parentheses; Estimation period: 2000Q3–2009Q4

Panel D: Final ECM specification

| Regressor | Coefficient (standard error) |
|---|---|
| $\Delta cred_t$ | 0.2955* (0.1570) |
| $\Delta cred_{t-1}$ | 0.3389** (0.1594) |
| $\Delta reer_t$ | −3.2113*** (0.9218) |
| $\hat{\Omega}_{t-1}$ | −0.8594*** (0.1483) |

We perform Johansen's (1995 p.74) multivariate statistics to test trend stationarity of the variables. De Brouwer and Ericsson (1998) state that because this test is multivariate and involves a larger information set, it is more powerful than the univariate unit root tests such as ADF and PP. Multivariate statistics presented in Panel C reject trend stationarity of the variables.

We also conduct weak exogeneity test following Johansen (1992a, 1992b) because a single equation analysis requires weakly exogenous variables. According to the test results presented in Panel C, *cred* and *reer* are weakly exogenous, while *noiltrad* is not. In other words, disequilibrium in the cointegrating relationship, i.e. $\hat{\Omega}_t$ only feeds back onto *noiltrad* and as De Brouwer and Ericsson (1998) discuss, such a finding allows us to move to a single ECM of the dependent variable instead of a system modeling.

We first, estimate the general ECM of *noiltrad* and then remove statistically insignificant right-hand side variables to obtain the final specification. The results of final ECM specification results are reported in Panel D. We note that our findings on the impact of bank credits and the real exchange rate on non-oil tradable output from Johansen's approach are similar to our results from ARDL and EG models. In the long run, 1% increase in bank credits increases non-oil tradable output by 0.36%. The negative and statistically significant error correction term ($\hat{\Omega}_{t-1}$) suggests a stable cointegration between the variables. The magnitude of ECT from Johansen's approach is also similar to that from ARDL and EG approach and suggests that about 86% of short-run deviations in non-oil tradable output converge to the long-run equilibrium within a quarter. We also find that 1% appreciation in the real exchange rate causes 0.61 (3.21) percent long-run (short-run) reduction in the non-oil tradable sectors output. Untabulated results also show that the residuals are robust to stability, structural break and serial correlation, heteroscedasticity, autoregressive conditional heteroscedasticity, and are distributed normally.

## 6. Conclusion

Prior literature suggests that financial sector stimulates the economic growth through efficient allocation of funds. However, the direction of causality varies across countries, regions and even variables employed in these studies. In developing countries financial reforms, competition in banking industry and increase in bank credits lead to economic growth. Investigation of the relationship between financial sector and economic output is even more intriguing, such that in these countries non-oil tradable sectors become less attractive following the windfall of resource-driven revenues.

We use the aggregate data from Azerbaijan, a transition country with natural resource driven economy and apply autoregressive distributed lag (ARDL) Bound Testing, Engle–Granger (EG) and Johansen's approach to test for cointegration between bank credits and non-oil economic growth. Recent studies prefer ARDL approach due to its specific advantages over other techniques. We also address the small sample bias in all three tests methods. Our results suggest that there is a positive cointegrating relationship between financial development and non-oil economic growth. We also find evidence that appreciation in real effective exchange rate negatively affects non-oil economic growth. Our findings contribute to the literature that studies the determinants of economic growth in resource-rich transition economies, as well as to the literature examining the link between the financial sector development and economic growth. Our results also contribute to the recent debates over what determinants macroeconomic policy makers should focus on to stimulate the economic growth.

## References


Akimov, A., & Dollery, B. (2007). Financial system reform in Kazakhstan from 1993 to 2006 and its socioeconomic effects. *Emerging Markets Finance and Trade*, *44*, 81–97.

Algozhina, A. (2006). Inflation Consequences of "Dutch Disease" in Kazakhstan: The Case of Prudent Fiscal Policy Available at: http://sloc.cafe24.com/upload/publication01/2006B08.pdf.

Ang, B. J. (2008). What are the mechanisms linking financial development and economic growth in Malaysia? *Economic Modeling*, *25*, 38–53.

Arestis, P., & Demetriades, P. O. (1997). Financial development and economic growth: Assessing the evidence. *Economic Journal*, *107*, 783–799.

Aziakpono, M. J. (2004). Financial Development and Economic Growth in Southern Africa, Paper presented at the CSAE Conference 2004. Available at: http://www.oecd.org/dataoecd/38/12/30225204.pdf.

Bakwena, M., & Bodman, P. (2010). The role of financial development in natural resource abundant economies: Does the nature of the resource matter? *Botswana Journal of Economics*, *7*, 16–31.

Bakwena, M., Bodman, P., & Sandy, S. (2008). Making abundant natural resources work for developing economies: The role of financial institutions. MRG Discussion Paper No. 2108, *Macroeconomic Research Group*. Australia: University of Queensland Available at: http://www.uq.edu.au/economics/mrg/2108.pdf.

Beck, T. (2009). The econometrics of finance and growth. In Terence Mills, & Kerry Patterson (Eds.), *Palgrave Handbook of Econometrics*, *Vol. 2*, : Palgrave Macmillan.

Beck, T. (2011). Finance and oil: Is there a resource curse in financial development? Unpublished working paper, International Monetary Fund, Washington, D.C.

Beck, T., & Laeven, L. (2006). Institution building and growth in transition economies. *Journal of Economic Growth*, *11*, 157–186.

Beck, T., & Levine, R. (2003). Stock markets, banks, and growth: Panel evidence. *Journal of Banking and Finance*, *28*, 423–442.

Beck, T., Levine, R., & Loayza, N. (2000). Finance and the sources of growth. *Journal of Financial Economics*, *58*, 261–300.

Bekaert, G., & Harvey, C. (1998). Capital markets: An engine for economic growth. *The Brown Journal of World Affairs*, *5*, 33–53.

Bonin, J., & Wachtel, P. (2003). Financial sector development in transition economies: Lessons from the first decade. *Financial Markets, Institutions & Instruments*, *Vol. 12, No. 1*, MA: Blackwell Publishing Inc (February).

Calderon, C., & Liu, L. (2002). The direction of causality between financial development and economic growth. *Central Bank of Chile, Working Papers N° 184* (October).

Christopoulos, D., & Tsionas, E. (2004). Financial development and economic growth: Evidence from panel unit root and cointegration tests. *Journal of Development Economics*, *73*, 55–74.

Cochran, J. P., Call, T. S., & Glahe, F. R. (1999). Credit creation or financial intermediation: Fractional-reserve banking in a growing economy. *The Quarterly Journal of Austrian Economics*, *2*(3), 53–64.

Dawson, P. J. (2003). Financial development and growth in economies in transition. *Applied Economics Letters*, *10*, 833–836.

De Brouwer, G., & Ericsson, N. R. (1998). Modeling inflation in Australia. *Journal of Business and Economic Statistics*, *16*(4), 433–449.

Demetriades, P. O., & Andrianova (2004). Finance and growth: What we know and what we need to know. In C. A. E. Goodhart (Ed.), *Financial Development and Growth: explaining the links. Basingstoke* (pp. 38–65). : Palgrave Macmillan.

Demetriades, P. O., & Hussein, K. A. (1996). Does financial development cause economic growth? Time series evidence from 16 countries. *Journal of Development Economics*, *51*, 387–411.

Dickey, D., & Fuller, W. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica*, *49*, 1057–1072.
Duasa, J. (2007). Determinants of Malaysian trade balance: An ARDL bound testing approach. *Journal of Economic Cooperation*, *28*(3), 21–40.
Egert, B. (2009). Dutch disease in former Soviet Union: Witch-hunting? *BOFIT Discussion Papers*, *4*.
Enders, W. (2004). Applied econometrics time series. *Wiley Series in Probability and Statistics* (2nd ed.). University of Alabama.
Enders, W. (2008). *Applied econometric time series.* New York, NY, USA: John Wiley & Sons.
Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, *55*, 251–276.
Ergungor, O. E. (2008). Financial system structure and economic growth: Structure matters. *International Review of Economics and Finance*, *17*(2), 292–305.
Eschenbach, F. (2004). *Finance and growth: A survey of the theoretical and empirical literature.* Tinbergen Institute Discussion Papers 04-039/2. Tinbergen Institute (Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=530123).
Fatai, K., Oxley, L., & Scrimgeour, F. G. (2003). Modeling and forecasting the demand for electricity in New Zealand: A comparison of alternative approaches. *The Energy Journal*, *24*, 75–102.
Fink, G., Haiss, P., & Mantler, H. C. (2005). The finance–growth nexus: Market economies vs. transition countries. *EI Working Paper Nr. 64* (February).
Fink, G., Haiss, P., & Vuksic, G. (2004). Contribution of financial market segments at different stages of development: Transition, cohesion and mature economies compared. *Journal of Financial Stability*, *5*, 431–455.
Fosu, O. A. E., & Magnus, F. J. (2006). Bounds testing approach to cointegration: An examination of foreign direct investment trade and growth relationships. *American Journal of Applied Sciences*, *3*(11), 2079–2085.
Garrison, R. W. (2001). *Time and money: The macroeconomics of capital structure.* London, UK: Routledge.
Greenwood, J., & Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *The Journal of Political Economy*, *98*, 1076–1107.
Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics.* New York: The McGraw-Hill.
Gylfason, T. (2004). Natural resources and economic growth: From dependence to diversification. *CEPR Discussion Papers* (pp. 4804).
Habib, M. M., & Kalamova, M. M. (2007). Are there oil currencies? The real exchange rate of oil exporting countries. *European Central Bank, Working Paper Series No 839*.
Hagmayr, B., Haiss, P., & Sümegi, K. (2007). Financial sector development and economic growth-evidence for southeastern Europe. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=968253 (Available at SSRN).
Hasanov, F., & Huseynov, F. (2009). Real exchange rate misalignment in Azerbaijan. *Working paper* (Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1788664).
Hasanov, F., & Samadova, I. (2010). The impact of real effective exchange rate on the non-oil export: The case of Azerbaijan. *ECO Economic Journal*, *2* (Available at: http://www.ecosecretariat.org/ftproot/Publications/Journal/2/jurnal2.htm).
Hasanov, F. (2010). The impact of real oil price on real effective exchange rate: The case of Azerbaijan. *Discussion Paper Series 1041. DIW Berlin German Institute for Economic Research* (Available at: http://www.diw.de/documents/publikationen/73/diw_01.c.359129.de/dp1041.pdf).
Hasanov, F. (2011). Analyzing price level in a booming economy: The case of Azerbaijan. *Economics and Educational Research Concortium, Working Paper Series, No 11/02E*. Ukraine: Kiev (Available at: http://archive.org.ua/archive/2011-07-07/eerc.kiev.ua/paper).
Hayek, F. A. (1933). *Monetary theory and the trade cycle.* 1966. Clifton, NJ: Augustus M. Kelley (Original German 1929).
Hayek, F. A. (1935). *1967, Prices and production* (2nd ed.). Clifton, NJ: Augustus M. Kelley.
Hoffman, A. (2010). An overinvestment cycle in central and eastern Europe. *Metroeconomica*, *61*(4), 711–734.
Jahan-Parvar, M., & Mohammadi, H. (2008). Oil prices and real exchange rates in oil-exporting countries: A bounds testing approach. *The Journal of Developing Areas*, *45*, 309–318.
Jalil, A., Feridun, M., & Ma, Y. (2010). Finance–growth nexus in China revisited: New evidence from principal components and ARDL bounds tests. *International Review of Economics and Finance*, *19*, 189–195.
Johansen, S. (1992a). Testing weak exogeneity and the order of cointegration in UK money demand data. *Journal of Policy Modeling*, *14*, 313–334.
Johansen, S. (1992b). Cointegration in partial systems and the efficiency of single-equation analysis. *Journal of Econometrics*, *52*, 389–402.
Johansen, S. (1995). *Likelihood-based inference in cointegrated vector auto-regressive models.* USA: Oxford University Press.
Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, *12*, 231–254.
Johansen, S. (2002). A small sample correction for the test of cointegrating rank in the vector autoregressive model. *Econometrica*, *70*, 1929–1961.
Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, *52*, 169–210.
King, R. G., & Levine, R. (1993). Finance, entrepreneurship, and growth: Theory and evidence. *Journal of Monetary Economics*, *32*, 513–542.
Koivu, T., & Sutela, P. (2005). Financial systems in transition: Could small actually be beautiful? *Eastern Economic Journal*, *31*, 265–283.
Levine, R. (1998). The legal environment, banks, and long run economic growth. *Journal of Money, Credit, and Banking*, *30*, 596–613.
Levine, R. (2005). Finance and economic growth: Theory and evidence. In P. Aghion, & S. Durlauf (Eds.), *Handbook of Economic Growth*. The Netherlands: Elsevier Science.
Levine, R. (2002). Bank-based or market-based financial systems: Which is better? *Journal of Financial Intermediation*, *11*, 398–428.
Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *American Economic Review*, *82*, 942–963.
Macedo, J. B., & Martins, J. O. (2008). Growth, reform indicators and policy complementarities. *Economics of Transition*, *16*, 141–168.
MacKinnon, J. (1991). Critical values for cointegration test. In R. Engle, & C. Granger (Eds.), *Long-run economic relationships*. Oxford University Press.
MacKinnon, J. G. (1996). Numerical distribution functions for unit root and cointegration tests. *Journal of applied econometrics*, *11*(6), 601–618.
MacKinnon, J. G., Haug, A. A., & Michelis, L. (1999). Numerical distribution functions of likelihood ratio tests for cointegration. *Journal of Applied Econometrics*, *14*, 563–577.
Masten, B. A., Coricelli, F., & Masten, I. (2007). Non-linear growth effects of financial development: Does financial integration matter? *Journal of International Money and Finance*, *27*, 295–313.
Mehlum, H., Moene, K., & Torvik, R. (2006). Institutions and the resource curse. *Economic Journal*, *116*, 1–20.
Muhammad, S., & Umer, M. (2010). The Bound Testing Approach for Co-Integration and Causality between Financial Development and Economic Growth in Case of Pakistan. *European Journal of Social Sciences*, *13*(4), 525.
Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics*, *37*, 1979–1990.
von Mises, Ludwig (1912). *The theory of money and credit.* 1971. NY, USA: Foundation for Economic Education (New York).
von Mises, Ludwig (1928). *On the manipulation of money and credit.* New York: Dobbs Ferry, Free Market Books (1978).
Nili, M., & Rastad, M. (2007). Addressing the growth failure of the oil economies: The role of financial development. *The Quarterly Review of Economics and Finance*, *46*, 726–740.
Oluitan, R. (2009). Bank credit and economic growth: The Nigerian experience. http://www.csae.ox.ac.uk/conferences/2009-EDiA/papers/094-Oluitan.pdf (Available at)
Pesaran, H. M., & Pesaran, B. (1997). *Working with microfit 4.0: Interactive econometric analysis.* Oxford, UK: Oxford University Press.
Pesaran, H. M., & Shin, Y. (1999). An autoregressive distributed lag modeling approach to cointegration analysis. In S. Strom (Ed.), *In econometrics and economic theory in the 20th Century: The Ragnar Frisch centennial symposium*. Cambridge, UK: Cambridge University Press (chapter 11).
Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bound testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*, 289–326.
Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*, 335–346.
Ploeg, F. V. (2011). Nature resources: Curse or blessing? *Journal of Economic Literature*, *49*, 366–420.
Ploeg, F. V., & Poelhekke, S. (2009). Volatility and the natural resource curse. *Oxford Economic Papers*, *61*, 727–760.
Reimers, H. (1992). Comparisons of tests for multivariate cointegration. *Statistical Papers*, *33*(1), 335–359.
Reinsel, G. C., & Ahn, S. K. (1992). Vector autoregressive models with unit roots and reduced rank structure: Estimation, likelihood ratio test, and forecasting. *Journal of Time Series Analysis*, *13*(4), 353–375.

Rodriguez, F. (2006). The anarchy of numbers: Understanding the evidence on Venezuelan economic growth. *Canadian Journal of Development Studies*, *27*, 503–529.

Schumpeter, J. A. (1911). *The theory of economic development.* Oxford: Oxford University Press.

Sturm, M., Gurtner, F., & Alegre, J. G. (2009). *Fiscal policy challenges in oil-exporting countries: A review of key issues.* European central bank, occasional paper series no 104 (Available at: http://www.ecb.int/pub/pdf/scpops/ecbocp104.pdf)

Thießen, U. (2005). Banking crises, regulation and growth: the case of Russia. *Applied Economics*, *37*, 2191–2203.

Wang, E. C. (2000). A dynamic two-sector model for analyzing the interrelation between financial development and industrial growth. *International Review of Economics and Finance*, *9*(3), 223–241.

White, W. (2006). Is price stability enough. *BIS Working Paper No. 205*.

Wijnbergen, S., & Budina, N. (2011). Fiscal sustainability, volatility and oil wealth. *Economics of Transition*, *19*, 639–666.

Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics*, *58*, 187–214.

Yazdani, S. (2008). Financial market development and agricultural economic growth in Iran. *American-Eurasian Journal of Sustainable Agriculture*, *2*, 338–343.