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Financial development under financial repression: the case of Iran

Abstract

The purpose of this article is to investigate the determinants of financial development in Iran to assess whether financial repression has a significant impact on financial development using annual data spanning the period between 1965 and 2006 using Autoregressive Distributed Lag (ARDL) bounds testing procedure and Error Correction Models (ECM). The results suggest that trade openness, savings and economic growth have a positive impact on financial development. On the other hand, composite financial repression index has a negative impact on financial development, which suggests that repressive financial policies have a negative impact on financial development process.

Keywords: financial development, financial repression, ARDL bounds tests.
JEL Classification: G10, H20.

Introduction

Iran is among the countries which have a repressed financial system. According to the financial openness index prepared by Chinn and Ito (2008), Iran ranks as the 64th among 181 countries. Among repressive financial policies in Iran are reserve requirement ratios, interest rate controls and directed credit programs. This has resulted in significant shares of savings being transmitted to borrowers via unauthorized market and economy. Besides, a large volume of credits allocated to private sector are channelled by direct command of the government (Taghavi and Ismailzadeh, 2009). Furthermore, as the banking system is under the tight control of the government, it has a number of restrictions on various aspects ranging from interest rates to branch expansion (Hosseini and Shabbani, 2003).

As discussed by Taghipour (2008), Nejad (2010) and Banam (2010), the degree of financial repression in Iran has varied greatly after the 1979 Islamic Revolution. For instance, in early 1980s, it experienced widespread nationalization. In 1990s, on the other hand, it experienced a reconstruction of the financial system, concentrating on reforming the regulatory conditions (Taghipour, 2009). For instance, during the years 1995-2000, in the Second Five-Year Development Plan, the improvement concentrated on placing an interest rate on bank deposits at a position that guaranteed positive real returns, giving out investment certificates, and motivating the existence of individual credit institutions. Moreover, in the Third Five-Year Development Plan during the years 2000-2005, the reconstruction concentrated on reducing the use of executive controls on interest rates and credit apportionment, reinvestment of the state banks by issuing securities, and the establishment of private banks and non-bank credit organizations. During this period, the degree of financial repression has decreased considerably with the reduction of reserve requirement ratios, interest rate controls and directed credit programs.

From a theoretical standpoint, government limitations on the operation of the financial system, such as reserve and liquidity requirements, as well as directed credit programs, can adversely affect the quantity and quality of investment and therefore hinder financial development as the McKinnon-Shaw school of thought proposes. It's against this backdrop that the present article investigates the determinants of financial development in Iran using the Autoregressive Distributed Lag (ARDL) bounds testing procedure introduced by Pesaran et al. (2001). It aims to make a contribution to the existing knowledge by investigating whether the repressive policies in Iran have had a significant impact on financial development using annual data spanning the period between 1965 and 2006.

The rest of the article is structured as follows. The next section reviews the related literature. Section 2 sets out the theoretical framework. Section 3 introduces the data and the methodology. Section 4 presents the empirical results, and the final section points out the conclusions that emerge from the study.

1. Literature review

There are many prior studies which investigate the determinants of financial development. Most studies in the existing literature have documented a positive relationship between financial development and economic growth (see, for example, Schumpeter, 1911; Hicks, 1969; Goldsmith, 1969; Mckinnon, 1973; Shaw, 1973; Gelb, 1989; Roubini and Sala-i-Martin, 1992; King and Levine, 1993; Easterly, 1993; Fry, 1997; Khan and Sehadji, 2000; Pagano and Volpin, 2001; Levine et al., 2000; Wang, 2000; Hung, 2003; Christopoulos and Tsionas, 2004 and Ergungor, 2008; Jalil and Feridun, 2010 and Mukhopadhyay and Feridun, 2011). Several other studies, on the other hand, have documented a negative relationship between these two variables (see, for example, Robinson, 1952; Kuznets, 1955; Friedman and Schwartz, 1963; and Lucas, 1988). On the other hand, Demetriades and Hussein (1996) and Rousseau and Vuthipadadorn (2005) have documented a bi-directional relationship for the same variables.

Several other factors have been found to affect the financial development process. For instance, Boyd et al. (2001) report empirical evidence that there exists a significant negative relationship between inflation and both banking sector development and equity market activity. Chinn and Ito (2006) investigate whether financial openness leads to financial development after controlling for the level of legal development and find evidence that a higher level of financial openness spurs equity market development only if a threshold level of legal development has been attained. On the other hand, Huang (2006) reports evidence that private investment has positive impact on financial development. Furthermore, Demetriades and Luintel (2001) and Taghipour (2009) examine the role of financial restraints on financial development. The authors find a positive relationship between financial deepening and the degree of state control over the banking system, confirming the view that government involvement in the financial sector can improve economic growth by positively affecting financial development. Also, macroeconomic stability is found to affect financial development. Bleaney (1996) and Fischer (1993) discover that macroeconomic instability, measured by a mix of high inflation; fiscal imbalances and frequent fluctuations of the real exchange rate has a significant negative effect on investments and, ultimately, on financial development.

A number of other studies have supported the approach that policies which promote openness to external trade tend to improve financial development. For instance, Huang and Temple (2005) employed time-series variation and the cross-country examination in openness and financial development, and they discovered a positive effect of goods market openness on financial development. Besides, Toando and Levchenko (2004) investigate the effects of trade on the financial development, finding that trade openness is associated with faster financial development in wealthier countries, and with slower financial development in poorer ones. Likewise Jbili et al. (2004) found evidence using Granger causality test that there is a feedback relationship between trade openness and economic growth.

The present article aims at making a contribution to this growing literature by investigating the determinants of financial development in Iran.

2. Theoretical framework

From a theoretical perspective, the potential determinants of financial development can be listed as financial liberalization, trade openness, economic growth, savings and inflation. More specifically, trade openness, economic growth, financial liberalization and savings are theoretically expected to have a positive impact on financial development whereas inflation is expected to have a negative or, in same cases, a positive impact on financial development (see Boyd et al., 2001; and Khan, 2002).

The major independent variable of interest in the present study is financial liberalization. The other explanatory variables, namely, trade openness, economic growth, financial liberalization, savings, and inflation are used as control variables.

2.1. Financial liberalization. According to the financial liberalization theory, deregulating the domestic financial market and allowing the market to define the interest rate and controlling the capital i.e., credit, will help in macroeconomic stability and economic growth of countries. This theory is well explained by McKinnon (1973) and Shaw (1973), who explain that financial liberalization can promote economic growth by increasing investments and productivity. Financial liberalization could be beneficial if it results in greater savings, reduction in cost of capital and adoption of improved governance practices (Mandel, 2009). On the other hand, McKinnon (1973) and Shaw (1973) show that financial repression policies will have a negative impact on a country's economy. For example, interest rate ceilings cause an increase in the spread between deposit and lending rates. In this case, the government controls interest rates on bank operations, and, hence, commercial banks cannot compete neither on the market for deposits nor for loans. Furthermore, the regulation of financial markets, which implies interest ceilings, high reserve ratios and credit programs, will lead to lower saving, lower investment and will have a negative impact on economic growth and financial development.

2.2. Economic growth. Greenwood and Jovanovic (1990) and Saint-Paul (1992) explain that as the economy grows the costs of financial intermediation falls because of increased competition, which results in an increase in funds available for productive investments. The importance of income level in financial development has also been addressed by Levine (1997, 2003, and 2005). The author emphasizes that development of financial sector ought to be in place to drive economic growth. This is because; growth leads to promote development of the financial system and provides motivation to deepen and to widen the system for financial intermediation. The most important theory which explains the impact of economic growth on financial development is the demand-driven hypothesis, according to which the growth of an economy will generate new demand for financial services. Such

increase in demand in return, will result in further sophisticated financial intermediaries capable to meet the new demand for their services (Yartey, 2008). Many empirical studies report strong evidence that there is a positive relationship between financial development and GDP per capita. For instance Goldsmith (1969) and King and Levine (1993) report a significant and positive relationship between GDP per capita and various financial development indicators.

2.3. Trade openness. Theoretically, trade openness is expected to have an impact on financial development because a raise in the volume of trade increases opportunities for financial deepening and economic growth. Both these elements are bound to mobilize domestic savings and raise inflows, increasing liquid liabilities in favor of development of financial system. Therefore, capital inflows are also expected to have an impact on financial development because more capital inflows are expected to increase liquid liabilities and support further financial development (Taghipour, 2009). From another theoretical standpoint, trade openness encourages economic activity and capital inflows. In support of credit growth, the former channel raises the pool of resources in the financial system. Also, significant increase in credit to the private sector emerges as a result of the latter channel. Equally, credit expansion is a result of capital inflow, which increases available resources in the financial system (Taghipour, 2009). Svaleryd and Vlachos (2000) reports strong empirical evidence that there is a positive relationship between domestic financial development and openness to trade.

2.4. Savings. Financial intermediaries mobilize savings to investment projects. Consequently, we expect investments and savings to be significant determinants of development of financial sector (Yartey, 2008). Higher level of savings would mean that there are more funds in the economy to be channelled to borrowers (investors) through the financial intermediation process. Hence, savings are expected to lead to increased financial development. This is because, in the presence of investment opportunities, the size of the financial system expands. An increased number of investments mobilizes resources in the banking system, leading to an expansion in private credit growth. In other words, more investment increases demand for credit, increasing financial intermediation. Therefore, savings and investments are expected to result in financial development. On the other hand, savings and investments can be fostered by financial development.

2.5. Inflation. From a theoretical perspective, the rate of inflation interferes with the ability of the financial sector to allocate resources effectively. Hence, maintaining lower inflation is one of the most important national macroeconomic policies which have been documented to be beneficial to financial development. Ben Naceur et al. (2007) and Boyd et al. (2001) empirically, and Huybens and Smith (1999), theoretically, examine the effects of inflation on financial development. They found that economies with higher inflation rates are expected to have smaller, less active, and less efficient equity markets and banks. Furthermore, inflation raises inflationary expectations and promotes capital outflow and discourages decisions for private activity. Therefore, demand for credit falls. Also, the supply of credit may be negatively affected as a result of a shrinking pool of financial savings since agents diversify away from liquid assets to keep away from the risk of the inflationary tax. Therefore, it is theoretically expected that inflation hinders financial development (Naceur et al., 2007). Nonetheless, an alternative theory (see Khan, 2002) argues that low levels of inflation on the contrary of the expectation, may foster financial development rather than hindering it. Therefore, in the case of Iran, for instance, where inflation rate has traditionally been kept low, inflation may as well have a positive impact on financial development. Khan (2002) argues that there is a critical inflation rate, below which, a modest rise in inflation can encourage real activity and promote financial development. Higher than this threshold hinders the efficient allocation of investment capital, and therefore have negative growth consequences. The threshold levels of inflation beyond which inflation significantly obstruct financial development is predicted to be in the range of 3-6 percent annual (Khan, 2002). Also, Boyd et al. (2001) reports evidence that only in economies with inflation rates exceeding 15 percent there is a discrete drop in financial sector performance.

3. Data and methodology

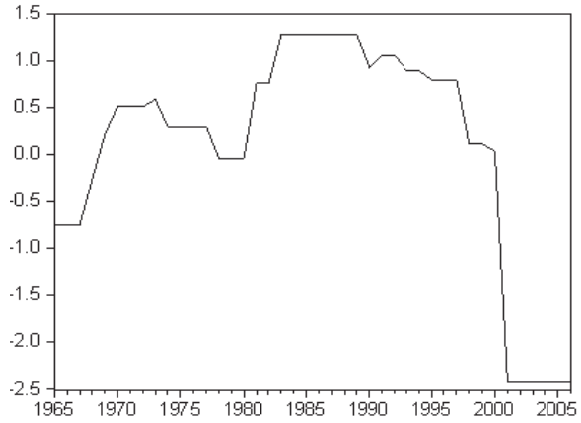
The data series are annual and run from 1965 to 2006. All data have been obtained from the World Bank's World Development Indicators (WDI) database whereas the composite financial repression index has been obtained from Taghipour (2009), who combined reserve and liquidity requirements, interest rate controls, and directed credit programs using a procedure called Principal Components Analysis (PCA)[1]. In Iran the government used two kinds of interest rate controls. One of them is fixed deposit rate and the other one is fixed lending rate. To measure the strength of these controls, Taghipour (2009) used a dummy variable. If the interest rates control is severe, the dummy (denoted by DLR) takes the value of 1 and it takes the value of 0.5 if the interest rates are partially relaxed, and it takes 0 if it is freely determined by banking institutions.

[1] See Feridun and Sezgin (2008) for information on PCA.

Taghipour (2009) also used a dummy variable (denoted by DCP) in order to measure the strength of directed credit program. When there is no evidence of a directed credit program, it is set to 0 and when the directed credit program respectively covers up to 5%, 5%-15% and more than 15% of total banks' lending, it is set to 0.5, 1 and 2. Taghipour (2009) also used data on reserve requirement ratio (RR) on bank deposits to capture the impact of the reserve and liquidity requirements. Taghipour's (2009) index contains all financial controls including reserve requirement, directed credits, and interest rate. He achieved the following overall index of financial restrains (FR) by using PCA:

$$FR = 0.358 \times DCP + 0.658 \times DLR + 0.661 \times RR,$$

where the weights for each component of the index is determined by PCA. The lower values represent less severe restrictions and controls on the policy variables, consequently indicating less financial repression, and vice versa.



Source: Taghipour (2009).

Fig. 1. Financial repression index

As can be seen in Figure 1, the index of financial restraints reflects many of the policy shifts that occurred in Iran over the period of 1960-2005. The index indicates a slow increase in the level of financial repression during 1960s and early 1970s. As Taghipour (2009) explains, this behavior coincides with raises of reserve requirement ratio on deposits. In the early 1980s, with the nationalization of banks, the level of financial restraints increased which allowed the government to enforce its directed credits programs, to impose controls on the interest rates, and to impose high reserve and liquidity requirements. Except in the early 1990s, when the government increased the level of directed credits, this policy remained stable over the period of 1983-97. In the following years, nevertheless, the index has fallen significantly which coincides with the partial deregulation of interest rates, relaxation of reserve and liquidity requirements, the elimination of the ceilings on total credits and the fall in directed credits (see Taghipour, 2009).

Turning to the explanatory variables, one indicator is hardly enough to capture financial deepening to represent financial development. In the existing literature, the share of money supply in Gross Domestic Product (GDP) is often used. However, it can be argued that the ratio of broad money (M2) to nominal GDP shows the level of monetization rather than financial development.

As explained by Taghipur (2009), this is especially relevant in an economy such as Iran, where a part of M2 has increased during the sample period because of converting Petro dollars to Rial. As a result, because of monetization process rather than increasing financial intermediation, M2 may have increased relative to GDP during the period under study (see Taghipour, 2009). Therefore, in this article, rather than M2 as a share of GDP, domestic credit provided by banking sector as a share of GDP (*FDEV*) to capture the effectiveness of financial intermediation as well as financial deepening process as represented by the volume of credits (Demetriades and Luintel, 2001; and Taghipour, 2009), so that higher values represent a more developed financial sector. On the other hand, independent variables are listed as *lGDP* (the logarithm of Gross Domestic Product in current US dollars), *INF* (Consumer Price Index in annual percentage changes), *FR* (the composite financial restraints index constructed by Taghipour (2009) by combining reserve and liquidity require-ments, interest rate controls, and directed credit programs using Principal Components Analysis), *lTR* (the logarithm of trade as a percentage of GDP), and *lSAV* (the logarithm of gross domestic savings as a percentage of GDP).

3.1. Methodology. In the ARDL bounds testing procedure (Pesaran et al., 2001), the existence of one or more long-run relationships between financial development (*FDEV*) and its determinants is investigated by estimating an unrestricted error correction model (UECM) by treating *FDEV* as a dependent variable as follows:

$$\Delta FDEV_t = a_0 + \sum_{i=1}^{p} b_i \Delta FDEV_{t-i} + \sum_{i=0}^{q1} c_i \Delta FR_{t-i} + \sum_{i=0}^{q2} d_i \Delta lTR_{t-i} + \sum_{i=0}^{q3} e_i \Delta lGDP_{t-i} + \sum_{i=0}^{q4} f_i \Delta lSAV_{t-i} +$$
$$+ \sum_{i=0}^{q5} g_i \Delta INF_{t-i} + h_i FDEV_{t-1} + i_i FR_{t-i} + j_i lTR_{t-i} + k_i lGDP_{t-i} + l_i lSAV_{t-1} + m_i INF_{t-1} + \varepsilon_t, \quad (1)$$

where *FDEV*, *FR*, *lTR*, *lGDP*, *lSAV* and *INF* denote the variables under study as explained earlier, a_0 is the drift component, Δ is the difference operator, p and $q1$, $q2$, $q3$, $q4$, $q5$ are the optimum lags, and ε is the usual error term with mean zero and finite covariance matrix. Following Pesaran et al. (2001), an ARDL model is specified as ARDL (p, q_1, q_2, q_3, q_4, q_5). The first part of equation (1) with b, c, d, e, f and g represents the short-run dynamics whereas the second part h, i, j, k, l and m represents the long-run dynamics. The existence of a long-run relationship among the variables is investigated using *F*-tests. The null hypothesis of no cointegration amongst the variables is specified as:

$$H_0: h = i = j = k = l = m = 0, \quad (2)$$

which states that there exists no long-run relationship. On the other hand, the alternative hypothesis is:

$$H_1: h \neq 0, i \neq 0, j \neq 0, k \neq 0, l \neq 0, m \neq 0. \quad (3)$$

The estimated *F*-statistics have non-standard distributions irrespective of whether the underlying time series are $I(1)$ or $I(0)$. If the estimated test statistic is above an upper critical value, the null hypothesis of no long-run relationship can be rejected regardless of the orders of integration of the underlying variables.

3.2. Estimation of the long-run coefficients. If the existence of a long-run relationship is established based on *F*-tests, the second step of the analysis is to estimate the long-run and the associated short-run coefficients. The long-run relationship is regarded as a steady-state equilibrium, whereas the short-run relationship is evaluated by the magnitude of the deviation from the equilibrium. The long-run coefficients of the models are estimated using the following model:

$$FDEV_t = \beta_0 + \sum_{i=1}^{p} \beta_1 FDEV_{t-i} + \sum_{i=0}^{q1} \beta_2 FR_{t-i} + \\ + \sum_{i=0}^{q2} \beta_3 lTR_{t-i} + \sum_{i=0}^{q3} \beta_4 lGDP_{t-i} + \sum_{i=0}^{q4} \beta_5 lSAV_{t-i} + \\ + \sum_{i=0}^{q6} \beta_6 INF_{t-i} + \varepsilon_t, \quad (4)$$

where β_1, β_2, β_3, β_4, β_5, and β_6 represent the long-run coefficients of the model.

3.3. Estimation of short-run coefficients. The existence of a long-run equilibrium relationship implies that an equilibrium error-correction model (ECM) exists. In order to estimate the short-run dynamic parameters, the following ECM associated with the long-run estimates is used:

$$\Delta FDEV_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta FDEV_{t-i} + \sum_{i=0}^{q1} \beta_2 lTR_{t-i} + \\ + \sum_{i=0}^{q2} \beta_3 \Delta lGDP_{t-i} + \sum_{i=0}^{q3} \beta_4 \Delta lSAV_{t-i} + \\ + \sum_{i=0}^{q4} \beta_5 \Delta INF_{t-i} + + \sum_{i=0}^{q5} \beta_6 \Delta FR_{t-i} + \pi ECT_{t-1} + \varepsilon_t, \quad (5)$$

where β_1, β_2, β_3, β_4, β_5, and β_6 represent the short-run dynamic coefficients of the model's convergence to equilibrium and π is the coefficient of the one period lagged error correction term, ECT_{t-1}, which captures the speed of adjustment. The magnitude of π determines how quickly the equilibrium is restored.

4. Empirical results

4.1. Unit root tests with and without structural breaks. Prior to the application of the ARDL bounds tests, the order of integration of variables under investigation are established by carrying out unit root tests. Results of the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests are presented in Table 1. As can be seen, all variables are integrated of order one, i.e. they are $I(1)$.

However, a well-known weakness of the ADF and PP unit root tests is their potential confusion of structural breaks in the series as evidence of non-stationarity (Perron, 1989). Hence, Clemente-Montanes-Reyes (1998) unit root tests, which allow for two structural breaks in the mean of the series are also employed. In these tests, the null hypothesis is that the series has a unit root with structural break(s) against the alternative hypothesis that they are stationary with break(s). The advantage of these tests is that they do not require an *a priori* knowledge of the structural break dates.

Table 1. Results of the ADF and PP unit root tests

Variables		ADF		Conclusion at the 5% level	Phillips-Perron		Conclusion at the 5% level
		Levels	Difference		Levels	Difference	
FDEV	Intercept	-1.93	-5.99	$I(1)$	-1.98	-5.99	$I(1)$
	Trend and intercept	-1.63	-6.07	$I(1)$	-1.69	-6.07	$I(1)$
	None	0.34	-6.04	$I(1)$	0.32	-6.04	$I(1)$
FR	Intercept	-0.38	-5.85	$I(1)$	-0.66	-5.89	$I(1)$
	Trend and intercept	-1.02	-6.50	$I(1)$	-0.98	-6.50	$I(1)$
	None	-0.46	-5.88	$I(1)$	-0.75	-5.92	$I(1)$
ITR	Intercept	-2.22	-4.43	$I(1)$	-2.00	-4.46	$I(1)$
	Trend and intercept	-2.18	-4.37	$I(1)$	-1.98	-4.41	$I(1)$
	None	0.40	-4.46	$I(1)$	0.23	-4.49	$I(1)$

Table 1 (cont.). Results of the ADF and PP unit root tests

Variables		ADF		Conclusion at the 5% level	Phillips-Perron		Conclusion at the 5% level
		Levels	Difference		Levels	Difference	
IGDP	Intercept	-1.26	-4.82	*I*(1)	-1.49	-4.81	*I*(1)
	Trend and intercept	-1.34	-4.76	*I*(1)	-1.62	-4.75	*I*(1)
	None	0.53	-4.71	*I*(1)	0.19	-4.70	*I*(1)
ISAV	Intercept	-2.12	-8.07	*I*(1)	-2.15	-8.10	*I*(1)
	Trend and intercept	-2.25	-8.00	*I*(1)	-2.27	-8.04	*I*(1)
	None	0.0008	-8.16	*I*(1)	0.10	-8.18	*I*(1)
INF	Intercept	-2.93	-7.07	*I*(1)	-2.78	-8.74	*I*(1)
	Trend and intercept	-3.06	-7.15	*I*(1)	-2.99	-16.57	*I*(1)
	None	-1.32	-1.32	*I*(1)	-0.98	-8.64	*I*(1)

Clemente-Montanes-Reyes unit root tests offer two models: (1) an additive outliers (AO) model, which captures a sudden change in the mean of a series; and (2) an innovational outliers (IO) model, which allows for a gradual shift in the mean of the series. In this article, both models will be used. Nonetheless, the AO model seems to be more appropriate for the variables as they all seem to have sudden structural changes rather than gradual shifts. According to Baum (2004), if the estimates of the Clemente-Montanes-Reyes unit root tests provide evidence of significant additive or innovational outliers in the time series, the results derived from ADF and PP tests are doubtful, as this is evidence that the model excluding structural breaks is misspecified. The results of Clemente-Montanes-Reyes unit root tests are reported in Table 2.

Table 2. Clemente-Montanes-Reyes unit root tests with two structural breaks

	Innovative outliers				Additive outliers			
	t-stat.	TB1	TB2	Decision	*t*-stat.	TB1	TB2	Decision
IDCPB	-3.46	1973:02*	1980:07*	*I*(1)	-5.49	1973:10*	1980:01*	*I*(1)
FR	-0.23	1973:10	1980:10	-	-1.34	1973:08*	1979:01*	*I*(1)
ITR	-4.43	1973:05*	1979:08*	*I*(1)	-5.28	1973:04*	1979:11*	*I*(1)
IGDP	-4.45	1973:09*	1980:07	-	-6.41	1973:12*	1980:06*	*I*(0)
ISAV	-1.25	1973:10	1979:10*	-	-3.75	1973:01*	1979:09*	*I*(1)
INF	-3.52	1973:11*	1979:03*	*I*(1)	-4.11	1973:11*	1980:10	-

Notes: TB1 and TB2 denote the structural break dates suggested by the tests. * Denotes rejection of the null hypothesis of a unit root at 5% level. *Indicates that the structural break suggested by the respective test is significant at 5% level.

The break dates suggested by the Clemente-Montanes-Reyes unit root tests generally coincide with the oil shock of 1973 due to Arab-Israeli war, the Iranian Islamic revolution of 1979 and the beginning of the Iran-Iraq war of 1980. The results suggest that it is difficult to capture the true order of integration of the variables in the presence of structural breaks in the series but none of the series appear to be *I*(2). Therefore, the use of ARDL bounds testing procedure is appropriate.

4.2. ARDL bounds testing procedure and inclusion of pulse dummies. The results of the ARDL bounds tests shown in Table 3, suggest the rejection of the null hypothesis of no long run relationship at the 1% level of statistical significance when *FDEV* is treated as the dependent variable. As can be seen from the table, the estimated *F*-statistic in this case is greater than the upper bound critical values suggested by Narayan (2005) at the 1% level. As a result, it can be concluded that there exists a strong long run equilibrium relationship among the variables under investigation.

Table 3. ARDL bounds test (dependent variable: *FDEV*)

F-statistic	Lag length	
7.173*	1	
	Critical bounds	
	Lower bound	Upper bound
1%	4.428	5.898[a]
5%	3.368	4.590
10%	2.893	4.008

Note: [a]Critical values obtained from Narayan (2005) from page 1990. The lag selection is based on AIC and SBC. *Denotes the significant level at 0.01.

The selected ARDL specification and the results of the diagnostic tests for residual serial correlation, functional form misspecification, non-normality and heteroscedasticity are reported in Table 4. The model is selected using $\overline{R}^2$ as it passes all of the diagnostic tests. The specifications are estimated using up to a maximum of 3 lags for each variable in the models as the selection of shorter lags has resulted in serial correlation problem and choosing a long lag length means

losing degrees of freedom which leads to misspecified models considering the number of variables and observations used in the analysis.

Table 4. Diagnostic tests of the estimated models with and without impulse dummies

	Without impulse dummies	With impulse dummies
Model specification	(3,3,2,1,2,2)	(3,1,0,2,3,1,1)
χ^2_{LM}	15.361	23.814
χ^2_{RESET}	1.647	0.796
χ^2_{NORM}	58.352*	4.458
χ^2_{HETER}	0.133	0.557

Notes: χ^2_{LM}, χ^2_{RESET}, χ^2_{NORM}, and χ^2_{HETER} are, respectively, Lagrange multiplier statistics for tests of residual serial correlation, Ramsey's RESET test using the square of the fitted values for functional form, normality based on a test of skewness and kurtosis of residuals, and heteroscedasticity based on the regression of squared residuals on squared fitted values. *Denotes significance at 5% level.

As can be seen in Table 4, the diagnostic tests of the selected model suggest that it suffers from the non-normality problem. In this case, the short-run and long-run coefficients of the estimated models are not valid. The presence of non-normality problem can be attributed to the presence of outliers over the sample period stemming from the Arab-Israeli war, the Iranian Islamic revolution of 1979 and the Iran-Iraq war. In order to improve the chances of error normality, we use pulse dummy variables to capture these one-off abnormal observations. Based on this consideration, models are re-estimated by augmenting the cointegrating equations with pulse dummy variables. Separate dummy variables are introduced for each of the outliers. Following the existing literature, the operational definition of an outlier is considered as any data point for which the residuals are in excess of 2 standard deviations from the fitted model. The dummy variables are set equal to zero for all observations except the month in which the observation goes beyond the threshold of two standard errors. In these months, the dummy variable takes on the value of 1.

Table 4 reports the results of the models which are re-estimated using the pulse dummy variables to account for the presence of the outliers. As can be seen, the use of the intervention dummy variables ensured normality of the probability distribution of the residuals, which permitted hypothesis testing on the results of the model. Furthermore, the results also confirm that the re-estimated models do not suffer from autocorrelation, heteroscedasticity, or model misspecification problems.

4.3. Long-run coefficients of the estimated models. The long-run results are reported in Table 5. As can be seen, the pulse dummies are highly significant with large coefficients confirming the importance of the outliers in the estimated models. Furthermore, the independent variables *lTR*, *lSAV* and *lGDP* are significant with a positive coefficient. This suggests that economic growth, savings and trade openness have a positive impact on financial development as expected. Likewise, *FR* is negative which suggest that financial repression has indeed a negative impact on financial development. On the other hand, inflation has a positive coefficient.

Table 5. Long-run coefficients

Variable	Coefficient	Std. err.
lGDP	0.465**	0.112
lSAV	0.638**	0.171
lTR	0.034**	0.005
FR	-0.047*	0.011
INF	0.426**	0.113
Constant	0.331	0.155
D1	2.503*	0.251
D2	3.642*	0.293

Notes: *, ** and *** denote significance at 1%, 5%, and 10% levels, respectively.

4.4. ECM. Turning to the short-run coefficients, the results are generally consistent with the long-run parameters and the signs of the coefficients do not seem to change as can be seen in Table 6. The error correction term ECT_{t-1}, which measures the speed of adjustment to restore equilibrium in the dynamic model, has the expected negative sign and is statistically significant at the 1% level coefficients in all cases. This supports the results obtained by using *F*-statistic that the long-run equilibrium is attainable. In the model, a deviation from the long-run equilibrium level in the current year is corrected by over 85% in the next period. Furthermore, the null hypothesis of no autocorrelation in the errors is not rejected as the calculated Durbin Watson statistic is higher than the upper critical values at the 1% level. On the other hand, the fitness of the estimated model is reasonably well based on the goodness-of-fit indicators R^2 and $\overline{R}^2$.

Table 6. Error correction representation

Variable	Coefficient	Std. err.
$\Delta FDEV_{t-1}$	0.316*	0.033
$\Delta FDEV_{t-2}$	0.394*	0.049
ΔIFR_t	-0.215	0.235
ΔITR_t	0.037*	0.006
$\Delta IGDP_{t-1}$	0.046*	0.004
$\Delta IGDP_{t-2}$	0.044*	0.005
$\Delta ISAV_t$	0.052	0.706
ΔINF_t	0.427*	0.033
Constant	0.259	0.209
D1	1.307*	0.205
D2	1.277*	0.307
ECT_{t-1}	-0.857*	0.021
R^2	0.797	

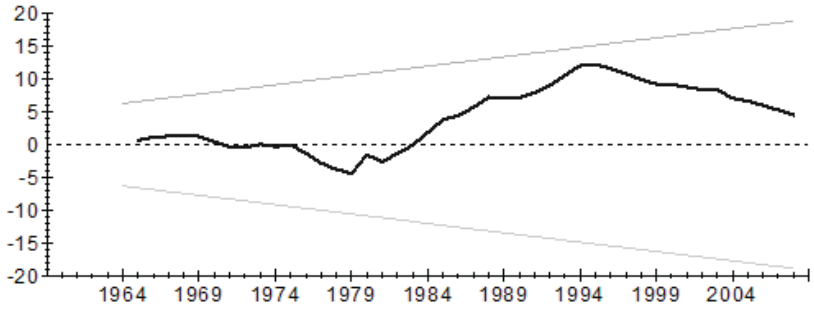
Table 6 (cont.). Error correction representation

Variable	Coefficient	Std. Err.
$\overline{R}^2$	0.756	
F-statistic	23.525*	
DW-statistic	2.052	
Log-likelihood	-153.938	

Notes: *, ** and *** denote significance at 1%, 5%, and 10% levels, respectively.

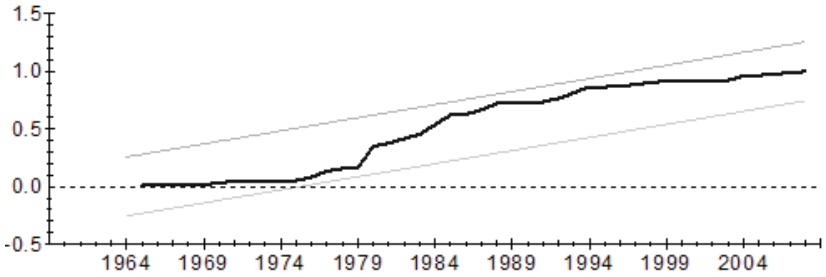
4.5. Parameter stability tests. In order to test for long-run parameter stability, the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests are applied to the residuals of the estimated ECMs to test for parameter constancy. Figure 2 and Figure 3 plots the CUSUM and CUSUMSQ tests, respectively.

As can be seen from the figures, the plots of the CUSUM and CUSUMSQ statistics are confined within the 5 percent critical value bounds, indicating the absence of any instability of the coefficients, thus providing evidence that the parameters of the model do not suffer from any structural instability over the period of the study.



Note: The straight lines represent critical bounds at 5% significance level.

Fig. 2. Plot of cumulative sum of recursive residuals



Note: The straight lines represent critical bounds at 5% significance level.

Fig. 3. Plot of cumulative sum of squares of recursive residuals

Conclusion

The purpose of this article was to investigate the determinants of financial development in Iran to assess whether financial repression has a significant impact on financial development using annual data spanning the period between 1965 and 2006 using Auto-regressive Distributed Lag (ARDL) bounds testing procedure and Error Correction Models (ECM).

The results suggest that, financial repression index has a negative coefficient, which suggest that repressive financial policies have indeed a negative impact on financial development process in the case of Iran. This is in line with the financial liberalization theory which was put forward by McKinnon (1973) and Shaw (1973). Theoretically, financial liberalization is expected to contribute to the efficiency with which markets can transform savings into investment and growth. Hence, according to this view, we should expect lower economic growth, investment and saving rates, as well as underdeveloped financial markets to the extend that the financial system is repressed.

As McKinnon (1973) and Shaw (1973) argue, the results obtained in this article suggest that in the case of Iran, financial repression policies have a negative impact on the country's economy. For example, interest rate ceilings cause an increase in the spread between deposit and lending rates. In this case, the government controls interest rates on bank operations, and, hence, commercial banks cannot compete neither on the market for deposits nor for loans. Furthermore, the regulation of financial markets, which implies interest rate ceilings, high reserve ratios and credit programs, lead to lower savings, lower investments and ultimately have a negative impact on financial development. This is an important issue for the Iranian economy because financial repression distorts the economy and hinders the financial development process.

First of all, financial repression limits the level of bank deposits and mobilizes banks resources and reduces the banks' income. Due to limited financial resources of banks in Iran, the major resources in the banking system consists of public deposits. Deposit interest rates are considered as the benchmark and interest rates are determined with regard to the deposits interest rates. Consequently, reducing the interest rates of credit facilities depends on reduction in deposits interest rates. Secondly, it reduces government revenues by decreasing the number of available credit facilities. Furthermore, financial repression creates unaligned money market, reducing deposits interest rates, causing changes in the combination of deposits and increases activities in parallel markets, such as currency, real estate, and gold. In addition to this, financial repression causes investment repression due to negative real interest rates. Ultimately, financial repression creates economic rant due to low-cost banking facilities. While interest rates of credit facilities are lower than inflation rates, the willingness of people who use bank resources in Iran has increased. In this case, on the one hand, banks face the lack of financing resources and on the other hand, due to the number of applicants demanding facilities, they face a low speed and spend long time and face unnecessary bureaucracy to promote the facilities. These circumstances provide primary creation of economic rant due to low-cost banking facilities (Bagheri, 2008).

The results also suggest that trade openness, savings and economic growth are statistically significant with a positive coefficient, which means that these variables have a positive impact on financial development in the case of Iran. These findings lend support to authors such as Greenwood and Jovanovic (1990), Saint-Paul (1992) and Levine (1997, 2003, and 2005) who emphasize that development of financial sector is crucial to drive growth. This is because growth leads to promote development of the financial system and provides motivation to deepen and to widen the system for financial intermediation. As Gurley and Shaw (1967) and Goldsmith (1969) point out, during periods of economic expansion, the financial sector is more developed, showing that financing needs force further development as reaction to real activity. The finding of this article regarding the impact of economic growth on financial development is therefore in line with this theory. The results suggest that, due to increased demand for financial services with increased per capita income, expansion of the financial system has been fostered in the case of Iran. This is indeed in line with Robinson's (1952) hypothesis, which states that when an economy expands, more financial institutions, financial products and services will emerge in response to greater demand for financial services.

Furthermore, as expected in light of the theory, trade openness has a positive impact on financial development. This suggests that an increase in the volume of trade in the case of Iran increases opportunities for financial deepening and economic growth. From another theoretical standpoint, trade openness encourages economic activity and capital inflows, which expands the pool of resources in the financial system.

In addition, the results suggest that savings have a positive impact on financial development in the case of Iran, which suggests that financial intermediaries in Iran efficiently mobilize savings to investment projects, in which case the size of the financial system expands. This is because increased amount of savings through deposits mobilizes resources in the banking system, leading to an expansion in private credit growth, increasing financial inter-mediation. Therefore, the finding that savings have a positive impact on financial development is in line with the theoretical postulations.

An interesting finding of the article is that inflation has a positive impact on financial development in the case of Iran. This is an interesting result as theoretically inflation is expected to inhibit financial development process. It is normally expected that inflation increases inflationary expectations and encourages capital outflow and discourages decisions for private activity. Therefore, it reduces the demand for credits. Nonetheless, the finding that inflation has a positive impact on financial development is still in line with the theory discussed by Khan (2002) that there is a critical inflation rate (lower than 5% for industrial countries and 18% for developing countries), below which, a modest rise in inflation can encourage real activity and promote financial development rather than obstructing financial development as in the case of Iran. Similarly, Boyd et al. (2001) reports evidence that only in economies with inflation rates exceeding 15 percent there is a discrete drop in financial sector performance. Since Iran did not have excessive levels of inflation in the period under study (the average of inflation rate in Iran during the period under study is 14.35), it seems to have supported financial development rather than hindering it by encouraging real activity.

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