Abstract
In this paper we review the literature on finance-growth nexus and investigate the causality between financial development and economic growth in Turkey for the period 1975-2005. The empirical investigation is carried out in a vector autoregression (VAR) framework based on the theory of cointegration and error-correction representation of cointegrated variables. The results of the cointegration analysis provide evidence of no long-run relationship between financial development and economic growth. The empirical findings in the paper show a one-way causality running from economic growth to financial development in Turkey.

Key Words: Financial development, Growth, Turkey
Jel Classifications: O11, O16, O52

1. Introduction

Academic research on the finance-growth nexus dates back at least to Schumpeter (1911) who emphasized the positive role of financial development on economic growth. The relationship between financial development and economic growth has been a subject of great interest and debate among economists for many years. The debate has traditionally revolved around two issues. The first relates to whether development in the financial system results in a faster economic growth, and the second relates to how financial development affects economic growth. A large body of literature has emerged, both at the theoretical and empirical level, attempting to answer the above questions. Although many empirical studies have investigated the relationship between financial depth, defined as the level of development of financial markets and economic growth, the results are ambiguous (see, Pagano, 1993; and Levine, 1997, 2003 for a survey of the literature).

On the one hand, cross country and panel data studies find positive effects of financial development on output growth even after accounting for other determinants of growth as well as for potential biases induced by simultaneity, omitted variables and unobserved country-specific effect on the finance-growth nexus. On the other hand, time series studies give contradictory results. Demetriades and Hussein (1996) find little systematic evidence in favor of the view that finance is a leading factor in the process of economic growth. In addition they found that for the majority of the countries they examine, causality is bi-directional, while in some cases financial development follows economic growth. Luintel and Khan (1999) used a sample of ten less developed countries to conclude that the causality between financial development and output growth is bi-directional for all countries. Ghirmay (2004) study the causal link between the level of financial development and economic growth in 13 Sub-Saharan African countries. The results of the cointegration analysis provide evidence of the existence of a long-run relationship between financial development and economic growth in almost all (12 out of...
of the countries. With respect to the direction of long-term causality, the results show that financial development plays a causal role on economic growth, again in eight of the countries. At the same time, evidence of bidirectional causal relationships is found in six countries. All these results show that a consensus on the role of financial development in the process of economic growth does not so far exist.

As a matter of fact, the role of financial sector has been well recognized in the development literature. The seminal work of Patrick (1966) has resulted in widespread investigations into the role of the financial sector as an engine for economic growth. Patrick points out two possible relationships between financial development and economic growth. First, as the economy grows, it generates demand for financial services, which he calls a ‘demand-following’ phenomenon. According to this view, the lack of financial institutions in developing countries is an indication of lack of demand for their services. Second, the establishment and the widespread expansion of financial institutions in an economy may actively promote development, which Patrick called ‘supply-leading’ phenomenon. This latter view, which has been dubbed the ‘financial-led’ growth hypothesis, has been popular among governments in several developing countries as a means to promoting development (Habibullah and Eng, 2006).

Moreover, there are two views in which the financial system can be manipulated for enhancing economic growth. The Structuralist School recommends an expansion in the structure of the financial system, such as an increase in the number of financial institutions. This school also encourages an increase in the array of financial instruments made available to the public (Goldsmith, 1969; Patrick, 1966). Neo-liberals on the other hand, advocate the liberalization of the financial system, by which they mean the relaxation of controls imposed on the financial systems by the monetary authorities (McKinnon, 1973; Shaw, 1973). Neo-liberals believe that administratively determined (as opposed to market-determined) low rates of interest may not encourage savings. Without savings there cannot really be any investment. Thus, according to Neo-liberals, the freeing of interest rates is the key to capital formation and growth.

Several theoretical and empirical studies have suggested that the role of financial development in the economy may vary across countries because of differences in institutional and economic structures (see LaPorta et al., 1997; and Bell and Rousseau, 2001, among others).

There are those who argue that, in a given economy, it is the sector with high economies of scale that benefit more from financial development (Kletzer and Pardhan, 1987; Beck, 2002), implying that financial development is much more effective in promoting economic growth in more industrialized economies than in less industrialized or agricultural economies. On the other hand, there are those who contend that countries at their early stage of development benefit more from financial development (see McKinnon, 1973; Fry, 1995). Moreover, it is argued that the effectiveness of financial intermediaries and markets in promoting economic growth depends on the institutions set up to implement financial transactions. For example, LaPorta et al. (1997, 1999) find that the legal system plays a crucial role in determining the financial development and growth relationships. They argue that secure property and contract rights is key for banks and financial institutions to work properly, while weak contract enforcement creates incentives for default by debtors and decreases willingness to lend. On the other hand, corruption in the banking system or political interference may divert credit to
unproductive or even wasteful activities, again implying that economies with developed institutions are likely to benefit more from financial development.

The growing body of empirical research, using different statistical procedures and data sets, produces remarkably consistent results. First, countries with better-developed financial systems tend to grow faster—specifically, those with (i) large, privately owned banks that funnel credit to private enterprises and (ii) liquid stock exchanges. The levels of banking development and stock market liquidity each exert a positive influence on economic growth. Second, simultaneity bias does not seem to be the cause of this result. Third, better-functioning financial systems ease the external financing constraints that impede firm and industrial expansion. Thus, access to external capital is one channel through which financial development matters for growth because it allows financially constrained firms to expand (Levine, 2003).

The present paper addresses the empirical relationship between financial development and economic growth for the Turkey over the period 1975–2005. In Section 2, we present a literature review and brief information about Turkish economy. The methodology and data are presented in Section 3. The empirical results are discussed in Section 4. The paper concludes with a summary and policy implications.

2. Literature Review and Turkish Economy
2.1 A Review of Literature on the Relationship Between Financial Development and Growth

An extensive amount of empirical investigations have been conducted, aimed at testing the conflicting theoretical developments using different techniques. These empirical investigations can be classified into two major groups. The first group consists of those that used cross-country growth regression methods in which the average growth rate of per capita output over some period is regressed on some measure of financial development and a set of control variables (see King and Levine, 1993a, b; Levine and Zervos, 1998; De Gregorio and Gudotti, 1995; Ndikumana, 2000, among others). The second group consists of those that used time series data of individual countries to investigate the causal relationship between the two variables. The problem with the pure cross-country studies is well documented in the literature. In particular, the method may fail to explicitly address the potential biases induced by endogeneity of the explanatory variables and the existence of cross country heterogeneity. These problems may lead to inconsistent and misleading estimates (see Quah, 1993; Casselli et al., 1996). In the light of these problems recent empirical studies have used dynamic panel data methods, such as the first differenced generalized methods of moments (GMM), as a way to control for the potential sources of biased coefficient estimates in cross-country regressions (see Levine et al., 2000; Benhabib and Spiegel, 2000). The results of these studies provide evidence of strong connection between the exogenous component of financial development and long-run economic growth. This is more or less consistent with the classical view on the relation between growth and financial development.

On the empirical side, King and Levine (1993a) use IMF data and various financial indicators to conclude that there is a positive relationship between financial indicators and growth, and that financial development is robustly correlated with subsequent rates of growth, capital accumulation, and economic efficiency. They correctly emphasize that policies that alter the efficiency of financial intermediation exert a first-order influence on growth. This is a standard implication of models of endogenous
growth with financial intermediation. Atje and Jovanovic (1993) examine the role of stock markets on development, and conclude that there is positive effect on the level as well as on the growth. They could not, however, establish a significant relationship between bank liabilities and growth. Levine and Zervos (1996) use various measures of stock market development, and conclude that there is a significant relationship. When they include banking depth variables in their regressions, they turn out to be non-significant. They emphasize their results are indicative of partial correlation only, and more research would be needed in the area. Arestis and Demetriades (1997) use time series analysis and Johansen cointegration analysis for the US and Germany. For Germany, they find an effect of banking development on growth. In the US, there is insufficient evidence to claim a growth effect of financial development, and the data point to the direction that real GDP contributes to both banking system and stock market development.

Levine et al. (2000), using a sample of 74 developed and less developed countries over the period 1960–1995. They found that the strong positive relationship between financial development and output growth can be partly explained by the impact of the exogenous components like finance development on economic growth. They interpreted these results as supportive of the growth-enhancing hypothesis of financial development. Goldsmith (1969), McKinnon (1973), Shaw (1973), Fry (1988) and more recently King & Levine (1993a, 1993b) are among others who have provided evidence that financial development is a prerequisite for economic growth.

Levine (1998) using a sample of 44 developed and less developed countries during the period 1975–1993, examines the links between banking development and long-run economic growth. The usual GMM estimation procedure is used to account for simultaneity bias. The degree to which legal codes emphasize the rights of creditor and the efficiency of the legal system in enforcing laws and contracts are considered as instruments. The empirical evidence is supportive for a strong positive relation between the exogenous component of banking development with output growth, physical accumulation and productivity growth. Demirguc-Kunt and Maksimovic (1998) estimate a financial planning model to find that financial development facilitates the firm’s growth. In this context an active stock market and a well-developed legal system are crucial for the further development of the firms. Neusser and Kugler (1998) and Levine et al. (2000) represent two different poles in the literature. Neusser and Kugler focuses on time series properties of the data ignoring the simultaneity issue, while Levine et al. (2000) deal with simultaneity without accounting for the time series properties of the data.

In a simple endogenous growth model, Pagano (1993) uses the AK model to conclude that the steady state growth rate depends positively on the percentage of savings diverted to investment, so one channel through which financial deepening affects growth is converting savings to investment. Berthelemy and Varoudakis (1996) use a theoretical model with banks acting as Cournot oligopolists to find that, in the stable equilibrium, the growth rate depends positively on the number of banks, or the degree of competitiveness of the financial system. Their results show that educational development is a precondition of growth, and financial underdevelopment is an obstacle when the educational system is not successful. Greenwood and Jovanovic (1990) consider a model that allows examining the relation between growth and income distribution, as well as between financial structure and economic development. The fundamental reason for a positive
effect of financial structure on growth is the more efficient undertaking of investment, and more efficient capital allocation because agents can have better information about the nature of shocks that hit particular projects.

The theoretical work linking the financial sector to economic growth was provided in later years, among others by Greenwood & Jovanovic (1990), Levine (1991), Bencivenga & Smith (1991), Saint-Paul (1992), Pagano (1993), and King & Levine (1993a, 1993b) indicate that efficient financial markets improve the quality of investments and promote economic growth. Bencivenga & Smith (1991) contend that banks as liquidity providers permit risk-averse households to hold interest-bearing deposits and the funds obtained are then channeled to productive investment. By eliminating self-financed capital investment by firms, banks also prevent the unnecessary liquidation of such investment by firms who find that they need liquidity. In other words, financial intermediaries permit an economy to reduce the fraction of its savings held in the form of unproductive liquid assets, and to prevent misallocations of invested capital due to liquidity needs. This suggests that financial intermediaries may naturally tend to alter the composition of savings in a way that is favorable to capital accumulation, and if the composition of savings affects real growth rates, financial intermediaries will tend to promote growth.

Levine (1991) demonstrates that stock markets help individuals’ manage liquidity and productivity risk and, as a result, stock markets accelerate growth. According to Levine, in the absence of financial markets, firm-specific productivity shocks may discourage risk-averse investors from investing in firms. The more resources allocated to firms, the more rapid will be economic growth. Saint-Paul (1992) relates the relationship between the financial sector and economic growth by emphasizing the complementarity role between financial markets and technology. According to Saint-Paul, an economy that possesses highly developed financial markets, that allow the spreading of risk through financial diversification among the economic agents, will be able to achieve a higher level of development than an economy in which the financial markets are not well developed.

The role of the financial sector as the engine of growth or supply-leading one in enhancing growth goes far back to the work of Schumpeter (1934). Schumpeter argues that financial sector leads economic growth by acting as a provider of fund for productive investments and therefore could lead to accelerating economic growth. The theoretical argument by Bencivenga & Smith (1991), Levine (1991), and Saint-Paul (1992) support the proponents of the supply-leading hypothesis proposed by Schumpeter (1934) and Patrick (1966). In addition, most of the models argue that the process of growth has a feedback effect on financial markets by creating incentives for further financial development, which means that the two variables are endogenously determined. Goldsmith (1969) and a number of the endogenous growth models reviewed above (Greenwood and Jovanovic, 1990; Saint Paul, 1992; Berthelemy and Varoudakis, 1996; Greenwood and Smith, 1997; Blackburn & Hung, 1998; and Harrison et al. 1999), show a two-way relationship between financial development and economic growth. According to these models, economic growth reduces the importance of fixed costs associated in joining the financial market thereby facilitating the creation and expansion of more financial institutions.

On the other hand, Harrison et al. (1999), and Blackburn & Hung (1998) argue that financial intermediation encourages economic growth because it reduces the cost of...
project appraisal. As the number of projects increases in a growing economy, more banks enter the markets as banks’ activity and profit increases. This entry reduces the average distance between banks and borrowers, promotes regional specialization and may reduces the cost of intermediation. Goldsmith (1969), McKinnon (1973), Shaw (1973), Fry (1988), Jung (1986), Gupta (1984) and King & Levine (1993a, 1993b) are among those who have provided evidence that financial development is a prerequisite for economic growth. Nevertheless, other researchers are skeptical with respect to the financial-led growth hypothesis.

Demetriades & Hussein (1996), Arestis & Demetriades (1996), Murinde & Eng (1994) and Thornton (1996) are among the few studies that have tested the financial-led hypothesis on several Asian countries. Using annual data from 1965 to 1992, Demetriades & Hussein found that among the Asian countries covered under the study; only in the case of Sri Lanka did the evidence support the financial-led growth hypothesis. For Pakistan, their result indicates that economic growth causes financial development. Further, Demetriades & Hussein’s study suggests that bidirectional causal relationships are evident for India, South Korea and Thailand. In another related study, Arestis & Demetriades (1996) further support the evidence that the relationships between financial development and economic growth for India and South Korea are bidirectional. Murinde & Eng (1994) test the financial-led hypothesis on Singapore using quarterly data for the period 1979 to 1990. Using an array of financial indicators, they found that the results strongly support the financial-led hypothesis for Singapore. On the other hand, Thornton (1994) provides some empirical evidence on the supply-leading hypothesis in several Asian countries. Using annual data as far back as 1950s to 1990, Thornton found that the financial-led hypothesis was supported by monetary data of Nepal, Malaysia, Philippines and Thailand. The demand-following hypothesis was supported by Myanmar and Korea monetary data. However, a bidirectional relationship between the monetization variable and economic growth is evident for Malaysia.

On a sample of six Asian countries, Luintel & Khan (1999) examine the long-run causality between financial development and economic growth employing the multivariate VAR framework. They found bi-directional causality between financial development and economic growth in all six countries; namely; India, Korea, Malaysia, Philippines, Sri Lanka and Thailand. In another study on Asian economies, Al-Yousif (2002) found that Philippines and Korea support the financial-led hypothesis; Sri Lanka and Pakistan support the demand-following hypothesis, while Malaysia and Singapore show a two-way causal effect between financial development and growth, but the result for Thailand suggests finance is irrelevant for growth. Habibullah’s (1999) study on seven Asian developing countries suggests that only the Philippines support the financial-led growth hypothesis. The cases of demand-following growth hypothesis are supported by Malaysia, Myanmar, and Nepal. On the other hand, a bi-directional causality between growth and finance are evident for Indonesia, Sri Lanka and Thailand. Using annual data from 1970 to 2001 for Turkey, Unalmis (2002) found that, in the long-run, the test results in the context of VECM for the coefficients of all cointegrated series show a two way causality between financial deepening and economic growth. Al-Zubi et al. (2006) applied a model developed by Levine in 1997 using panel data for eleven Arab countries during the period 1980-2001. The results show that all financial indicators are insignificant and do not affect economic growth. The modified model shows that only public credit to domestic credit indicator has a significant and positive effect on economic
growth, indicating the dominance of the public sector in economic activities and the financial sectors are still underdevelopment and need more efforts to be able to exert its functions effectively in the Arab countries. Apergis et al. (2007) investigate the causal linkages between financial development and economic growth in a large sample of 65 countries (15 OECD and 50 non-OECD countries), both developed and developing, over the period 1975–2000. Overall, the results support a positive and statistically significant equilibrium relation between financial development and economic growth for all different financial indicators that we test for and in all groups of countries. Further, the results indicate a strong bi-directional causality between financial development and economic growth. Pinero et al. (2005) test the hypothesis of a positive impact of democratization on growth, economic development and changes in well-being. They constructed an empirical model to explain the impact of political institutions (democracy), economic institutions, financial market efficiency, scientific achievements and “financial or FDI” geography on growth. The empirical work based on a wide database including several indicators assessed by the authors support the hypothesis of decisive role of democratic political and efficient economic institutions in stimulating economic growth for over 80 countries. The main results also highlight the importance of effective allocation of financial resources.

Further evidence on the financial-led hypothesis is documented by Fase & Abma (2003). Using pooled data on Bangladesh, India, Malaysia, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, and Thailand. They conclude that financial development matters for economic growth and that causality runs from the level of financial intermediation and sophistication to growth. The supply-leading hypothesis is also supported by more recent studies by Calderon & Liu (2003) on 109 developing and developed countries, and Christopoulos & Tzionas (2004) on 10 developing countries. Both studies conclude that the supply-leading hypothesis is the dominant force behind the relationship between finance and the sources of growth; in particular, financial depth contributes more to the causal relationship in developing countries.

2.2 Overview of the Turkish Economy

Turkey has witnessed three major crises since 1994, and the 2001 financial crisis was one of the worst economic downturns Turkey has ever experienced. Although the average historical growth rates have been more than satisfactory, political instability, problems in foreign affairs, populist domestic policies and a major earthquake (1999) at an industrial centre have all contributed to these crises.

Growth rates since 2001, on the other hand, have been the highest in the OECD area. What is different from the past is the fact that in the period since 2001, Turkey has carried out some of the most impressive and long-awaited structural reforms, which were recognized by the international community: the EU has agreed to open full membership negotiations with Turkey and the IMF declared Turkey a success story. The economy is growing by around 7.5% annually, now for the fifth consecutive year. As of 2006, the Turkish GDP was USD 390 billions, while the per capita income was over USD 5,000, which corresponds to USD 9,000 in PPP terms. The improved outlook of the economy promises a new potential growth rate around 6% annually for the next decade. After a very strong devaluation in 2001, the New Turkish Lira (YTL) has been left to float freely
– with minor interventions – and has become overvalued against major currencies by some 45 per cent, according to the exchange rate index at the end of 2005.

This high growth performance of Turkey, should be evaluated from the perspective of speeding up of the growth rates in the emerging economies. In the 2000-2005 period, the annual growth rate of per capita income in Turkey had been 2.7% while it was only 0.9% in the Euro-zone. The IMF forecasts that in the next five years emerging economies will grow at an average of 6.8% a year, whereas the developed economies will notch up only 2.7%. The continued strong growth performance of Turkey, can bring fresh impetus to the slower growth in Europe.

The level inflation has reached in recent years is another success story in the economic programme. Despite numerous domestic and international pressures such as high oil prices, the steady decrease in inflation levels has not only boosted confidence in the domestic market, but also allowed all the players in the economy to be able to plan ahead, perhaps for the first time in the last 30 years. The inflation rate was brought down to 9.6% at the end of 2006. And as a result of the fiscal austerity, the budget deficit and gross public debt, were brought down to 2% and 72% at the end of 2005, indicating a thriving convergence toward the Maastricht Criteria.

Improved predictability and business conditions boosted the investor confidence. Private sector investments has grew by an average 21% in the 2002-2005 era while the foreign direct investments reached to record high levels. The country received an FDI amount close to USD 10 billion in 2005 alone.

Another source of the robust economic growth has been the foreign trade, of which the volume surged to more than USD 190 billions and the ratio to GDP climbed to 53%. Turkish foreign trade has increased tremendously over the past decade, growing almost 20 per cent annually, although in terms of Exports per head it is already below the OECD average, as seen in Guisan and Cancelo (2002) and Guisan (2004). According to WTO figures, Turkey ranks fifth in the world in terms of exports growth. In fact, Turkey’s exports have more than doubled in the last three years, reaching to USD 91 billion for 2006. Its imports have also been growing at an impressive rate (USD 131 billion for 2006).

The share of foreign investors in the banking sector is the 26.16 percent for the 2006 and it is expected to be 35 percent in 2007 by selling the Oyak Bank and Halkbank to the foreign investors. In addition to these developments in the banking sector, the share of the foreign investors in the Istanbul Stock Exchange is also increasing everyday.

The only serious concern in the major economic indicators relates to the current account deficit, which is high by any standards at its annual current level of USD 22.8 billion as of end of 2005. Historical data suggest that although the current account deficit is higher compared to last year, the rate in which it is growing is slowing down and the possibility of financing it is definitely improving. Any correction to such a high figure carries its risks. The general attitude of the government towards financing the deficit is to keep calm, carry on with the IMF programme and the EU integration process and continue to improve the quality of financing over time.

As part of the economic reform programme, the Turkish government began a series of privatizations, some of which are in strategic industries. Out of the privatization programme, three transactions, namely Türk Telekom’s sale to Saudi Oger, Tüpras’ (petroleum refinery) sale to the Koç and Shell Consortium, and Erdemir’s (steel) sale to OYAK group of Turkey, attracted a great deal of attention from international investors,
and this has been a milestone for growing confidence in the government’s economic programme. The privatization programme raised USD 9.65 billion in 2005. It seems that the government’s persistent attempts in the privatization programme will continue in the future, creating further and profitable opportunities in the energy, telecoms, agribusiness, transport and real estate industries. These achievements towards economic stability and increased competitiveness are highly acknowledged among the international economic and business circles.

3. Data and Methodology

The empirical analysis employs annual data for Turkey over the period of 1975-2005. The data is obtained from the World Bank Development Indicators online (WDI). Following the literature, economic growth is measured by an increase in real GDP (Y), and financial development is represented by the level of credit to the private sector by the financial intermediaries (Private sector credits, % of GDP at nominal prices, see Graph 1).

Graph 1. Plot of Change in Domestic Credit as Percent of GDP (BC) and the Growth Rate of Real GDP

![Graph 1](image1.png)

Graph 2 shows the relationship between GDP and Credit in Turkey, in levels and real terms for the period 1975-2005 (Billion dollars at 2000 prices and exchange rates).

Graph 2. GDP and Credit in Turkey (Bn $2000)

![Graph 2](image2.png)
The empirical investigation into the long-run causal relationship between financial development and economic growth is carried out in a VAR framework. Estimation of cointegration vectors and testing for long-run causal relationships in the context of error-correction representation of cointegrated variables is conducted using the Johansen (1988) and Johansen and Juselius (JJ) (1992) procedure. Following the maximum likelihood approach of Johansen (1988), a vector error correction (VECM) representation of a VAR(p) model can be written as:

\[
\Delta Z_t = \Pi Z_{t-1} + \sum_{i=1}^{p+1} \Gamma_i \Delta Z_{t-i} + \delta \Phi + E_t \quad (1)
\]

where \(Z_t\) is an \(n \times 1\) vector composed of non-stationary variables, \(\Pi\) and \(\Gamma\) are \(n \times n\) matrices of coefficients, \(\Phi\) is a set of deterministic variables such as constant, trend, and dummy variables, and \(E_t\) is a vector of normally and independently distributed error terms. The rank of the matrix \(\Pi\) gives the dimension of the cointegrating vector. If its rank, \(r\) is \((0 < r < n)\), then \(\Pi\) can be decomposed into \(\Pi = \alpha \beta'\) where \(\alpha\), \(\beta\) are \(n \times r\) matrices containing the adjustment coefficients and the cointegrating vectors respectively. Hence, model (1) reduces to:

\[
\Delta Z_t = \alpha \beta' Z_{t-1} + \sum_{i=1}^{p+1} \Gamma_i \Delta Z_{t-i} + \delta \Phi + E_t \quad (2)
\]

This means \(\alpha \beta' Z_{t-1}\) contains all the long-run information on the process of \(Z_t\). Specifically, the rows of \(\beta'\) are interpreted as the distinct cointegrating vectors and the rows of \(\alpha\) are loading factors which indicate the speed of adjustment of the dependent variables towards the long-run equilibrium state.

4. Empirical Results

Cointegration analysis necessitates that the variables under consideration be integrated of the same order. Hence it is necessary to undertake unit root tests before cointegration analysis. In this study the Augmented Dickey–Fuller (ADF) and the Phillips–Perron (PP) tests are employed to determine the degree of integration of the data series. A number of approaches have been suggested in the literature including the Akaike Information Criterion (AIC), Schwartz’s Bayesian Information Criterion (SIC), and the general to specific procedure advocated by Ng and Perron (1995) to ensure that the residual in the ADF regression is white noise. Maximum lags based on Schwarz information criterion (SIC) for the ADF tests. For the PP test, Newey-West bandwidth selection using Bartlett kernel is used to determine maximum lags. Based on the results, the null hypothesis of unit-root cannot be rejected at levels but rejected at the first differences. The unit-root test results for log level of real GDP (LY) and financial development (LFD) are reported in the table 1.

Table 1. Unit Roots Tests

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<th>ADF test</th>
<th>PP test</th>
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<td></td>
<td>Levels</td>
<td>Differences</td>
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<tr>
<td>GDP</td>
<td>-2.6186 (0)</td>
<td>-6.3627 (0)***</td>
</tr>
<tr>
<td>FD</td>
<td>-1.3643 (0)</td>
<td>-5.0238 (0)***</td>
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Notes: Maximum lags based on Schwarz information criterion (SIC) for the ADF tests. For the PP test, Newey-West bandwidth selection using Bartlett kernel is used to determine maximum lags. *** indicates significance at the at 1% level, ** 5%, *10%.
The next step is to test for the presence of long-term relationship between LY and LFD in Turkey, having verified that the two variables are integrated of the same order. Table 2 reports the results of cointegration tests using the maximum likelihood approach of Johansen (1988) and JJ (1992). The maximal eigenvalue and the trace statistic tests for each of the variables are reported in the table 2. The null hypothesis is that there is no cointegrating vector, and the alternative is there is one cointegrating vector. The specification of the VAR models is made based on a number of diagnostic tests. Since the validity of Johansen’s cointegration estimation technique is based on an assumption of white noise errors, the selected lag lengths represent the minimum lag length for which there is no significant autocorrelation in the estimated VAR residuals. The Lagrange Multiplier (LM) technique is used to determine whether the residual of the model approximates white noise.

The results in Table 2 reveal that both the trace and maximum eigenvalue tests reject the null hypothesis of zero cointegrating vectors in favor of one cointegrating vector under investigation at the conventional 5 per cent significance level or better. These results provide evidence of a long-run equilibrating relationship between the two variables. However, although cointegration suggests the presence of Granger causality of some form between the variables, it does not provide information on the direction of causal relationships. The next task is, therefore, to identify the direction of causality using the VECMs derived from the long-run cointegrating vectors.

<table>
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<th>Table 2. Johansen Cointegration Test Results</th>
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<td>Cointegrating Vectors</td>
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<tr>
<td>r=0</td>
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<td>r≤1</td>
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Notes: The number of lags (k) applied in cointegration test is based on information provided by the sequential modified LR test statistic, final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion. All of them indicate that k is 1. LM(1) and LM(2) are serial correlation tests for first and second order autocorrelation of the VAR residuals and p-values are under the null of no serial correlation.

Overall, the results do not provide evidence of a long-run causal relationship between financial development and economic growth in Turkey. It is found that there is a one-way causality from economic growth to financial development (see Table 3).

<table>
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<th>Table 3. Granger Causality Tests Results</th>
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<td>DFD does not Granger Cause DGDP</td>
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<td>DGDP does not Granger Cause DFD</td>
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Note: * indicates significance at the at 10% level
5. Conclusion
In this study, we review the literature on finance-growth nexus literature survey and investigate the direction of causality between the financial development and economic growth for Turkey for the period 1975-2005. The empirical methodology is based on the theory of cointegration and error-correction representation of cointegrated variables. The main findings of the paper can be summarized as follows: First, the VECMs which incorporated the cointegration effect into the causality analysis yielded evidence of one-way causality from economic growth to the financial development. Second, the results do not provide evidence of a long-run causal relationship between financial development and economic growth in Turkey. The paper suggests for promoting growth to benefiting more from financial development.

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