FINANCIAL SECTOR AND ECONOMIC GROWTH: AN EXOGENEITY ANALYSIS

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Finansal Sektör ve Ekonomik Büyüme: Bir Dışsallık Analizi

Özet

Bu çalışmada, Türkiye ekonomisine ait yıllık verileri kullanarak, finansal gelişmenin ekonomik büyüme üzerine olan etkisini dışsallık analizi çerçevesinde inceledik. Ayrıca, bu çalışma *neo-klasik, post-Keynezyen* ve *yeni yapısalcı* görüşlerin finansal derinleşme-ekonomik büyüme ilişkisi hakkındaki teorik yaklaşımlarını özetlemektedir. Bu yazıda ayrıca ülkelerin *hukuk geleneği* ile *finansal gelişme* arasındaki ilişkileri inceleyen yaklaşım üzerinde kısaca durulmaktadır. Dışsallık analizine ilişkin sonuçlar gösteriyor ki, finansal sektör Türkiye'nin uzun-dönemli ekonomik büyümesine katkıda bulunabilecek bir gelişmişlik seviyesine sahip değildir. Bu çalışmada sunulan ampirik bulguların, neoklasik yaklaşımın öngördüğü şekilde finansal gelişmeden ekonomik büyümeye doğru bir nedensellik ilişkisini desteklemediği görülmektedir.

Abstract

In this paper, the impact of financial development on economic growth is explored within the framework of exogeneity analysis by using annual data for Turkey. Moreover, this paper summarizes the *neoclassical, post-Keynesian,* and *neostructuralist* views about the relationship between financial sector and economic growth. The present paper also gives an overview of the *law and finance* approach which investigates the relationship between legal traditions and financial development. The results of exogeneity analysis suggests that financial development has *not* promoted long-run economic growth of Turkey in the past decades. The findings presented in this paper are not consistent with the neoclassical view suggesting that financial development accelerates economic growth.

Financial Sector and Economic Growth: An Exogeneity Analysis

1. Introduction

The relationship between financial deepening and economic growth has been one of the major themes in the traditional growth literature. Neoclassical economists claim that financial development is an important determinant of economic growth. From neoclassical perspective, financial intermediation causes more efficient allocation of capital and facilitates economic development. Alternatively, post-Keynesian economists generally hold the view that financial sector responds passively to the demands of a growing economy. However, the neostructuralist view has advanced the argument that financial development is likely to reduce economic growth by lowering the total real supply of loanable funds available in an economy. On the other hand, it should be emphasized that financial development may not always be 'exogenous' to economic growth. A feedback from economic growth to financial development is possible. This paper examines the exogeneity status of proxies for financial development by employing the methodology of ENGLE et.al. (1983).

In neoclassical theory, it is believed that the functions financial intermediaries perform can increase economic growth through the channels of capital accumulation and technological innovation. These functions disscussed in the following section promote economic growth (see, for example, LEVIN (1997)). Furthermore, neoclassical theory argues that financial liberalization permits financial deepening and positively affects economic growth. The financial liberalization hypothesis, first advanced by McKINNON (1973) and SHAW (1973), claim that government restrictions on financial intermediaries (such as interest rate ceilings, high reserve requirements and directed credit programs) discourages financial intermediation and, consequently hinder economic growth. Similar conclusions are also reached by endogenous growth theorists (BENCIVENGA/ SMITH, 1991) and by some other analysts (KING/LEVINE, 1993).

On the other hand, post-Keynesian thought has launched a critique of conventional theory and financial liberalization hypothesis. The post-Keynesian theory criticizes the view that financial markets are efficient allocators of capital, and proposes interventionist policies. They also stress that financial deepening does not necessarily lead to higher levels of investment and economic growth. Post Keynesians generally believe that financial development follows economic growth (see, for example, ROBINSON (1952) and STUDART (1996)). Although developed financial markets may play a critical role in providing mechanisms to fund investment, financial development may require state-intervention and a long-term strategy. Less-developed financial markets in developing countries are generally highly speculative and lack financial depth. Therefore, financial stability should have priority in these markets and the deepening of capital markets should be realized with careful regulation by the government.

The proponents of neostructuralist view such as TAYLOR (1983) and VAN WIJNBERGEN (1983) stress the growth-impeding consequences of financial liberalization hypothesis. The new structuralist view contends that the curb market are more efficient than the official banking system because reserve requirements generate a leakage in the banking system. Moreover, households substitute curb market loans for bank deposits in the process of financial development. Thus, financial development will impede economic growth by reducing the total real supply of loanable funds available and the level of investment.

In addition to theories mentioned above, one alternative view has been advanced by PATRICK (1966), who claim that the direction of causality changes as economic development proceeds. He concludes that causation runs from financial deepening to economic growth (supply-leading relationship) in the early stage of economic development while the direction of causation is reversed in the later stage (demand-following relationship).

Furthermore, the law and finance approach, advanced by LA PORTA *et.al.* (1998, 1997) and DEMİRGÜÇ-KUNT/MAKSIMOVIC (1998), argues that legal traditions of countries affect financial development and thereby economic growth. A legal system protecting investor rights contributes to the expansion of a capital markets and developed financial markets facilitate economic development.

It is the purpose of this paper to empirically analyze the relationship between financial development and economic growth for the case of Turkey in the light of alternative theories mentioned above. In additon, the present paper attempt to examine the exogeneity status of financial development by utilizing the concepts developed by ENGLE, *et. al.* (1983) by employing the annual data for Turkey covering the period 1968 to 1995. The potential endogeneity of financial development is discussed in Sections 2 and 4.

The remaining part of this paper is organized as follows. Section 2 introduces a survey of the possible effects of financial intermediation on economic growth. In addition, Section 2 presents an overview of law and finance approach. Section 3 includes a brief survey of the literature and previous empirical studies. Section 4 contains the specification of the model framework to be estimated. Section 5 describes the data and empirical methodology utilized in this paper. In Section 6, the empirical results are presented and evaluated. Section 7 contains a summary and concluding remarks.

2. Financial Development and Economic Growth

2.1. Some Fundamental Concepts and Relationships

In a perfectly competitive Walrasian economy, there is no need for a financial system. Without the problems generated by imperfect information and transaction costs, a perfectly competitive capital market will supply the economy with all its needs of financing. The need for financial markets and institutions arises from information and transactions frictions. To examine the effects of financial intermediation on economic growth, it is necessary to define the functions the financial intermediaries perform.

First, the financial intermediaries mobilize savings (or pool capital) from disparate savers. They perform this function by collecting deposits from savers, and they subsquently make these fund available to borrowers. By mobilizing the savings of disparete savers, financial system reduces the transaction costs associated with collecting savings from a diverse group of savers. In addition, financial system overcome the informational costs of savers in evaluating every potential borrower. Mobilization of savings for investment is expected to influence capital accumulation, improve resource allocation, and encourage technological innovation (LEVINE, 1997).

The second function of financial sector is the efficient allocation of recources to investment projects that give the highest marginal return to capital. Financial intermediaries raise the average productivity of capital in two ways: by collecting, processing, and evaluating information on investment alternatives; and by inducing entrepreneurs (through their risk-sharing function) to invest in riskier but more productive technologies. The informational advantages of financial intermediaries contribute to productivity growth. Unlike individual savers who may not have the time, capacity or means to acquire information on investment opportunities and economic conditions, financial intermediaries with their large portfolios have the ability to collect and process information. The more efficient allocation of capital channeled through financial intermediation increase the productivity of capital and thus the rate of economic growth (AGENOR/MONTIEL, 1996).

Third, financial system enables entrepreneurs to pool risks. Financial intermediation provides opportunities for investors to reduce specifically two types of risk: investment risk and liquidity risk. *Liquidity risk* results from the uncertainties associated with converting assets into a medium of exchange. Some high-return investment projects necessiate a long-run commitment of capital, but savers may wish to withdraw their savings early from these projects. The fact that the financial system increase the liquidity of long-run projects will permit the realization of these type of projects. Banks pool the liquidity risk of depositors and invest most of their funds in more illiquid and more productive projects. *Investment risk* arises from the fact that the absence of financial intermediaries may lead to possible losses of investments. Financial institutions have the ability to reduce the risks associated with individual projects by providing risk-sharing and risk-diversification services. Financial intermediaries hold a diversified portfolio of projects so that they can invest in risky but high return projects.

Fourth, financial sector development is also expected to reduce costs of financial intermediation. As a consequence of financial sector development, banks gain experience and an increased supply of financial services encourages more competition among the financial services suppliers. These factors lower the costs which are represented by the spread between bank borrowing and lending interest rates. With lower intermediation costs, larger share of savings can be channelled into investment, leading to faster economic growth (ROTHER, 1999).

Fifth, the financial system facilitates the exchange of goods and services. Financial instruments and markets ease transactions required for economic activities. Financial arrangements that reduce transaction costs will promote specialization and technological innovation, accelerating the rate of economic growth.

Sixth, financial sector lowers the costs associated with monitoring managers and exerting corporate control. For example, outside creditors (banks, equity and bond holders) will monitor inside owners and managers, compelling them to manage firms in accordance with the interests of outside creditors. Since inside owners and managers manage firms on a day-to-day basis, they have an informational advantage over outside creditors. Financial intermediaries can reduce this informational advantage by monitoring managers. Moreover, equity markets may also promote corporate control by allowing shareholders to vote out under-performing managers. On the other hand, financial intermediaries can reduce monitoring costs because an intermediary as a representative of all individual savers have the ability to monitor an entrepreneur. Thus, financial intermediation contributes to capital accumulation and economic growth by

lowering costs associated with monitoring managers and exerting corporate control.

Finally, financial sector development may affect economic growth through the savings rate as well. The new growth literature has demonstrated that the influence of financial development on the saving rate is ambiguous (PAGANO, 1993). The risk-reducing function of financial intermediation leads to higher expected returns for savers at any level of risk. As a result, savers either to save more as saving becomes more attractive or to save less as a smaller amount of saving is now necessary to achieve given goal of savings. The overall net effect depends, in particular, on the economic agents' attitude toward risk. Furthermore, credits for households may generate a negative effect on saving behavior of households. Financial development also tends to reduce the spread between the rate paid by borrowers and that paid to lenders, resulting in higher real interest rates on deposits. Here, an increase in the interest rate may have a positive or negative effect on the saving rate. However, the overall effect of financial development on economic growth is expected to be positive when considering the possible negative effects on the savings rate are not too strong.

On the other hand, some authors such as LEVINE (1997) and ROBINSON (1952) stress that financial development is not always 'exogenous' to economic growth. As the economy develops, it generates increased demand for financial deepening. Thus, the overall economic expansion is a vital pre-condition for financial development. On the other hand, some authors claim that financial and economic development are jointly determined (GREENWOOD/ JOVANOVIC, 1990). In this view, economic development provides the necessary conditions for financial development, while the formation of a developed financial system positively affect economic growth by improving the allocation of capital.

2.2. Law and Finance : The Relationship between Legal Traditions and Economic Growth

By focusing upon legal traditions of countries, the law and finance approach provides some evidence in favor of the view that financial development causes economic growth. LA PORTA, et. al. (1998) compare the legal rights of shareholders and creditors in different legal traditions. Moreover, their paper include a comparison of the quality of law enforcement and accounting standards in different legal traditions. The authors share the view of some legal scholars identifying two broad legal tradition: civil law and common law. The common law is English law and has influenced many former British colonies, including the United States, Canada and Australia. On the other hand, the civil-law tradition includes three currently common families of laws: French, German, and Scandinavian. While the legal influence of France has spread to

most of its colonies during the colonial era, German legal tradition had a significant influence on the legal theory and doctrine in some European and Asian countries[1].

By examining legal rules pertaining to investor protection and the quality of law enforcement across 49 countries, LA PORTA et. al. (1998 and 1997) conclude that legal rules differ across countries from different legal traditions. The results indicate that common law countries tend to protect shareholders and creditors considerably more than French civil law countries. The German civil law and Scandinavian civil law countries are located somewhere in the middle in terms of investor protections. However, German civil law and Scandinavian countries enforce laws better than common law countries. French civil law countries have the the lowest quality of law enforcement .

DEMİRGÜÇ-KUNT/MAKSIMOVIC (1998) emphasize that the lack of investor protection rights negatively influences firms' ability to obtain external capital to finance investment. Thus, they suggest that the underdeveloped legal and financial systems constrain firms to exploit potentially profitable growth options. A legal system protecting the rights of investors is important because corporate insiders may engage in opportunistic behavior that will result in low returns on their investment. However, firms in countries that have legal traditions protecting investor rights and developed financial markets can obtain external financing and grow faster. Furthermore, LA PORTA et. al. (1997) show that countries with good legal environments-measured by legal rules protecting investor rights- have broader capital markets. An efficient legal system contributes to the expansion of a capital market because better legal protections increase the willingness of investors to supply external finance for firms by protecting the investors against opportunistic behavior of corporate insiders.

Thus, the findings of LA PORTA et. al. (1997) indicate that the legal tradition of a country is one of the determinants of financial development. On the other hand, some recent papers such as KING/LEVINE (1993) claim that developed financial markets facilitate economic growth. Taken together, this evidence gives support to the view that the legal system causes economic growth.

It should be stated, however, that the law and finance approach has certain potential deficiencies. For example, shortcomings in legal rules need not severely constrain firms to obtain external finance because there are alternative solutions to agency problems between entrepreneurs and investors. Contract enforcement may be a determinant of external finance, as suggested by

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1 German legal tradition had influenced legal theory in Japan and Korea as well as in some European countries such as Austria, Switzerland and Italy (see La Porta, et. al. (1998), p. 1118).

MODIGLIANI/PEROTTI (1996). The lack of legal rules can be compansated by the contractual rights of creditors and shareholders. Another potential deficiency of this approach is that it does not account for the role of financial recources obtained from abroad. Firms may meet financing needs from foreign recources.

3. A Brief Literature Survey

3.1. Neoclassical Theory

Early contributions by SCHUMPETER (1911) and HICKS (1969) emphasized that financial system played an important role in accelerating industrialization and economic development. SCHUMPETER (1911) believed that financial intermediaries allow an economy to move funds from savers to those entrepreneurs with the best chances of successfully implementing innovative products, and that financial system can promote technological innovation and economic performance.

New classical theory argues that the underdeveloped financial markets in developing economies have resulted from the historical repression of the interest rates by the governments In developing countries, savers prefer to consume and buy short-term assets due to the lack of incentive for savings. In addition, government cannot have access to bonds markets because of financial repression. Since the government has no option other than inflationary financing, higher inflation reduces even further the real interest rate (MCKINNON,1973; SHAW, 1973). Neoclassical theory suggests that the measures implemented in developing countries such as high rates of reserve requirements and excessive regulations will lead to higher financial intermediation costs and and therefore inefficient intermediation activities. Thus, to the extent that financial liberalization lead to a reduction in the cost and inefficiencies associated with the financial intermediation, the rate of economic growth will tend to rise.

A set of recent models of growth employs either capital externalities or capital goods produced using constant returns to scale in order to generate steady-state output growth. ROMER (1986) and LUCAS (1988) constructed models in which the functions performed by the financial system influence steady-state growth by affecting the rate of capital formation. In these models, the financial system affects capital accumulation either by altering the savings rate or by reallocating savings among different capital producing technologies. Another class of models concentrate mainly on the the invention of new production processes and goods. ROMER (1990) and GROSSMAN/HELPMAN (1991) formulated models in which financial system affects steady-state growth by changing the rate of technological innovation.

The theoretical models of KING/LEVINE (1993), GREENWOOD / JOVANOVIC (1990) and, BENCIVENGA/ SMITH (1991) highlight the role of financial intermadiation in resource allocation. KING/LEVINE (1993) form an endogenous growth model to show that financial intermadiaries reduce inefficiencies by obtaining information about the quality of individual projects that is unavailable to private investors and public markets. This informational advantage encourages the funding of less-established firms that are likely to develop innovative products. Consequently, a reduction in the cost of productivity enhancements will then promote long-run economic growth.

On the other hand, GREENWOOD/JOVANOVIC (1990) utilizes a dynamic general equilibrium model to demonstrate that increases in efficiency of financial sector create output growth, which in turn generates additional demand for deposits and financial services. These models stress that the financial sector can increase its size by becoming more efficient and offering a broader range of services. It is believed that financial institutions are more likely to innovate when new technologies can generate shifts in the portfolio choices of savers. In a paper by BENCIVENGA/SMITH (1991), it is shown that financial intermediaries increase the productivity of investment both by directing funds to illiquid, high-yield technology and by lowering the investment waste stemming from premature liquidation. The resulting increase in the productivity accelerates the rate of economic growth.

3.2. Post Keynesian Theory

The new Keynesian view of the role of the financial sector in economic growth is essentially based on a critique of financial liberalization hypothesis. In neoclassical theory, the fully competitive financial structure is considered to be the most efficient financial structure. From this perspective, financial liberalization is the logical outcome of such a view. Thus, neoclassical economics has left the question of institutional development to a secondary plan (STUDART, 1996).

Post Keynesian thought claims that information asymmetries and market imperfections necessiate a more active government intervention. Thus, a long-term government strategy and planning to develop financial markets and institutions will be more successful than market-friendly approach of liberal economics. From a Keynesian perspective, economic development creates demands for particular types of financial arrangements, and the financial sector responds to these demands (ROBINSON, 1952). However, some post-Keynesian economists such as CHICK/DOW (1988) and MOORE (1988) claim that in a minimally developed financial system credit creation causes economic growth. Credit creation is not, however, constrained by the supply of deposits because of

the existence of idle balances in the banking system and because of the possibility of borrowing from central bank or the money market.

According to new Keynesian view, fine monitoring and regulatory rules are necessary until a robust financial market is developed. In developing countries, financial markets are thin and generally speculative. They tend to be manipulated by a few big insiders. The financial markets in developing countries are dominated by speculative booms, highly volatile asset prices, and crashes, which create a widespread mistrust among small savers. Thus, stability of financial markets should have priority for developing countries and financial deepening should be realized under the guidance of government. KEYNES (1939) declares that "when the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done".

It is also important to note that in countries where financial system is not sufficiently developed to support economic growth, different arrangements may serve to finance industrialization and economic development. Developing countries may create development banks and/or use selective credit mechanisms to finance their efforts of economic development.

3.3. Neostructuralist Theory

The best known proponents of "new structuralist" view such as VAN WIJNBERGEN (1983) and TAYLOR (1983) are deeply skeptical of the benefits from financial liberalization. They suggest that financial liberalization (and financial deepening) can actually inhibit economic development. In the neostructuralist view, only a series of government actions can establish the necessary conditions for free financial markets. Financial markets cannot overcome bottlenecks and supply-side shortages by themselves. The neostructuralist view emphasizes some deficiencies of financial liberalization hypothesis (GRABEL, 1994).

First, neostructuralists argue that an increase in the loan rate will lead to a inflationary supply shock . On the other hand, aggregate demand will fall as a result of lower wages and higher borrowing costs, inducing firms to decrease production. The supply-side inflationary affects of higher borrowing costs will dominate the deflationary effects of the demand side generating a stagflationary dynamic in developing countries. Secondly, the neostructuralist view counters the neoclassical argument that higher interest rates will induce investors to sustitute hedge assets for bank deposits. If the neoclassical argument fails, then financial liberalization will not generate an increase in savings and economic growth. Thirdly, neostructuralists stress that a portfolio shift by financial investors from curb to formal deposit accounts will take place following an increase in the formal sector deposit rates. Since neostructuralists assume that

curb-lenders have the greater loan-creation efficiency, the degree of financial intermediation will decline. Hence, the declining deposit base leads to increases in the curb market lending rate. Consequently, an increase in the curb market rate and a decline in the total real supply of credit and investment combine to create a stagflationary environment.

In the neostructuralist theory, financial development results essentially at the expense of direct lending in the curb market. Therefore, financial development is likely to reduce the total real supply of credit available, total investment, and the rate of economic growth.

3.4. Previous Empirical Studies

At the empirical level, the relationship between financial development and economic growth has been analyzed by a large number of studies. Historical studies by CAMERON (1967) and McKINNON (1973) concluded that the growth performance of financially developed countries are better than those of financially underdeveloped countries. In his seminal paper GOLDSMITH (1969) utilizes the indicator of the value of financial intermediary assets divided by GNP and data on 35 countries over the period 1860-1963. He found a positive linkage between financial and economic development. However, his methodology has several weaknesses. In addition to the weaknesses summarized below, Goldsmith's study has two more methodological deficiencies: (i) the paper utilizes limited observations on only 35 countries and (ii) it does not identify the direction of causality .

Employing two measures of financial development (growth of per capita real money balances and ratio of M2 to the GDP) in his cross-country study, JAO (1976) found that financial development has a positive impact on economic growth for 67 countries examined. LANYI/SARAÇOĞLU (1983) found a positive and significant relationship between growth of real money stock (M2) and the growth rate of real GDP in their cross-country study covering 21 countries over the 1971-80 period. By pooling cross-country data for 34 LDCs over two periods (1965-73 and 1974-85), GELB (1989) found a significant positive association between financial development (measured by change in broad money supply as a ratio of gross domestic savings) and economic growth.

Most of the recent empirical studies have reached the conclusion that financial development promotes economic growth in industrialized countries (see, for example, WORLD BANK, 1989; ROUBINI/ SALA-I-MARTIN, 1992; KING/ LEVINE, 1993). KING/ LEVINE (1993) examined 80 countries over the period 1960-1989. They control for other factors influencing economic growth and construct additional measures of the level of financial development and analyze the relationships of causality. By employing annual data for 71 countries

over varying periods in 1960s and 1980s, ODEDOKUN (1996) analyzes the effects of financial development on economic growth in LDCs. Relying on a new model framework, he finds that financial intermediation promotes economic growth in about 85ı of the countries. Moreover, the growth-promoting effects of financial intermediation are more predominant in low-income than high-income LDCs.

DEMETRIADES/HUSSEIN (1996) carried out cointegration tests to investigate financial development-economic growth nexus by using time series data from 16 countries over the period 1960-1987. They found little evidence in favor of the view that finance is a leading sector in the process of economic development. However, they obtained considerable evidence of bi-directionality and some evidence of reverse causation. Analyzing links between the financial and real sectors within the framework of Vector error correction models (VECMs), ROUSSEAU/WACHTEL (1998) suggest a leading role for financial development in economic growth for five industrialized countries (United States, United Kingdom, Canada, Norway and Sweden) over the 1870-1929 period. Another important paper by RAJAN/ZINGALES (1998) examines the link between financial intermediation and economic growth under the assumption that financial deepening leads to lower external financing costs for enterprises. Utilizing a large sample of developed as well as developing countries, they find a positive correlation between financial deepening and the success of externally financed industries which confirms the validity of their hypothesis.

The aforementioned time series and cross-section studies are, nonetheless, subject to certain potential deficiencies. First, most of the studies employ only the financial deepening variable as the determinant of economic growth in the regression equations. Therefore, their estimates of the impacts of financial deepening variable could be biased because of the omitted variables. Second, estimates derived from cross-sectional data can only be valid if the institutional and other features that affect economic growth are very similiar across countries. Finally, most of these studies generally assume that finance is always exogeneous to economic growth. However, economic growth and technological progress may affect financial development as well.

4. Specification of the Model Framework

In this section, we will present the empirical model to be tested. We can utilize a model based on the conventional neoclassical one-sector aggregate production function in which financial development is an input such as in equation (1) below.

$$Y_t = f(K_t, L_t, F_t, O_t) \tag{1}$$

where Y_t : real GNP; K_t : capital stock; L_t : labor force; F_t : an indicator (proxy) of the level of financial development; and O_t : vector of other factors that can be regarded as inputs in the neoclassical aggregate production function (t denotes the time period). As explained in the following chapter, two different proxies for F are used in this paper.

In the present study, the only element of the vector O_t is trade to GNP ratio (or openness to trade). Economists have proposed a number of factors in favor of outward orientation such as gains from improved resource allocation, economies of scale, increased efficiencies and technical change. Several empirical studies found that export growth has a positive and significant impact on economic growth (see, for example, KAVOUSSI (1984) and MOSCHOS (1989)). Thus, if trade to GNP ratio is denoted by TRAD and Y are taken as real GNP per capita (denoted by PY), after adding the error and intercept terms, we can write the growth equation below.

$$PY_t = + \beta_1 INV_t + \beta_2 F_t + \beta_3 TRAD_t + \varepsilon_t \quad (2)$$

where : the intercept (or constant term); β : coefficients; PY_t : real per capita GNP; INV_t : real total investment and ε_t is the error term that is expected to to satisfy the usual assumptions of classical regression. Equation (2) describes a standard model of economic growth and is also quite similiar to that specified by ODEDOKUN (1996).

Considering the series are I(1) and after adding some lagged terms to (2), we hypothesize the following model:

$$DPY_t = \alpha_1 + \sum_{i=1}^{p} a_i \, DPY_{t-i} + \sum_{j=0}^{q} b_j DF_{t-j} + \sum_{k=0}^{r} c_k DINV_{t-k} + \sum_{l=0}^{s} d_l DTRAD_{t-l} + \varepsilon_{1t} \quad (3)$$

where "D" represents first differences of the series. It is evident that (3) is a single-equation model, and can be estimated by the ordinary least squares (OLS) method. However, the exogeneity status of DFt is always questionable. A feedback from economic growth to the proxies for financial development is possible. The potential endogeneity of DFt variable is discussed by LEVINE (1997) and other scholars. This paper examines the possibility that financial development is not only a result but also an important deteminant of economic development. This view implies that financial sector responds to the demands of a growing economy but at the same time, independent changes in the financial development variable may contribute to economic development. In an effort to explore the exogeneity status of DFIN, the methodology of ENGLE *et. al.* (1983)

are employed. On the other hand, the variables used in growth equation are also included in financial development equation expressed in (3). *The inclusion of the same variables ensures the consistency and validity of our exogeneity tests* (see ENGLE/HENDRY, 1989 and 1993).

$$DF_t = \alpha_2 + \sum_{i=1}^{u} e_i DF_{t-i} + \sum_{j=0}^{v} f_j DPY_{t-j} + \sum_{k=0}^{y} g_k DINV_{t-k} + \sum_{l=0}^{z} h_l DTRAD_{t-l} + \varepsilon_{2t} \quad (4)$$

The econometric modelling strategy adopted in this paper can be summarized as follows: (i) a provisional model is formulated on the basis of economic theory, (ii) diagnostic checks are performed, (iii) if diagnostic checking indicates inadequacies, the specification of the model is revised, (iv) the statistical significance of each regressor and overall performance of the model have also been considered in formulating the econometric model.

5. Data and Empirical Methodology

Data used in this study are obtained from various sources. Regarding the data set related to total financial assets, it is obtained from various issues of "Main Economic Indicators" published by State Planning Organization and "Quarterly Bulletin" published by the Central Bank of Turkey. The data set regarding the other macroeconomic variables are sourced from "Statistical Indicators (1923-1995)" published by State Institute of Statistics (DYE).

The data cover the period 1968 to 1995 for total financial instruments. On the other hand, the period 1970 to 1995 was covered by the data for the credit allocated to private enterprises. We prefer to use two indicators for the level of financial development. The first indicator, FIN, measures the size of financial intermediaries and equals total financial instruments divided by GNP. The second indicator of financial development, CR, equals the ratio of credit allocated to private enterprises to total domestic credit (excluding credit to banks). The importance of the second measure has been stressed by LEVINE (1997). The fundamental purpose of including this measure is to address concerns about the allocation of credit. Developed financial systems allocate more credit to private sector. Furthermore, economies with a developed financial system allocate more recources for researching firms, exerting corporate control, providing risk management services, mobilizing savings and facilitating transactions. However, less-developed financial systems generally funnel credit to the government or state-owned enterprises.

The variables in this paper are the following (All the variables are in the logarithmic form and D represents first differences of the series)

DPY: D (real GNP per capita)

DFIN: D (the ratio of total financial instruments to GNP)

DINV: D (real total investment)

DTRAD: D (the ratio of foreign trade to GNP)

DCR: D (the ratio of credit allocated to private enterprises to total domestic credit, excluding to banks)

DUM1: 1 from 1974 to 1975; 0 otherwise

DUM2: 1 from 1980 to 1995; 0 otherwise

DUM3: 1 for 1994; 0 otherwise

All the nominal variables were deflated by wholesale price index (1963=100) in order to construct real variables. DUM1 is used to incorporate the possible influence of the first oil shock. DUM2 is added to capture the effect of policy change on the economy caused by structural adjustment policies after 1980. In an attempt to incorporate the impact of financial crisis in 1994, DUM3 is used in some equations.

This paper employs time series data for Turkey to analyze the relationship between financial development and economic growth within exogeneity framework by ENGLE, *et. al.* (1983). Within this framework, the concept of weak exogeneity implies that the use of single-equation regression is valid for assesing the effect of financial development on economic growth. The concept of strong exogeneity implies that the use of financial development to predict economic growth is appropriate. On the other hand, the concept of super exogeneity indicates that the relationship between financial deepening and economic growth are invariant to policy interventions (see Appendix for a technical presentation of exogeneity concepts and testing procedures).

Previous studies generally assume that the financial deepening is exogenous. However, economic development and technological innovations can influence financial sector as well. Furthermore, standard regression analyses are sensitive to structural shifts and regime changes. Thus, the concept of super exogeneity provides a formal testing of invariance of the relationship to policy interventions (i.e., a test of Lucas critique).

6. Empirical Results

As a prelude to exogeneity analysis, we first checked for the degree of integration of all the variables by using the test developed by PHILLIPS/PERRON (1988). The results of Phillips-Perron tests imply that the

null hypothesis of I(1) process cannot be rejected in all cases (results available upon request).

We next tested for three types of exogeneity: weak, strong, and super. The main empirical results related to the two indicators of financial development (DFIN and DCR) are presented below. First, the exogeneity analysis will be conducted for the measure of ratio of financial assets to GNP. Out of several indicators of financial development, this measure has been used widely as a prime indicator of financial development. Table 1A reports the results for economic growth equation. For diagnostic checking, we employed BREUSCH/GODFREY (1978) Lagrange multiplier test for the first-order serial correlation, the WHITE (1980) test for heteroscedasticity, the JARQUE/BERA (1980) test for normality, and the RAMSEY (1969) reset test for specification error. The results of the diagnostic tests indicate that there is no serious evidence for misspecification. On the other hand, the estimated regression model for financial development (measured by DFIN) is reported in Table 1B.

Table 1A. Economic Growth Equation [†] *(1)*

$$DPY_t = -0.00047 - 0.12704\ DFIN_t + 0.34390^f\ DINV_t + 0.11318^f\ DTRAD_{t-t}$$

$$(-0.0403) \quad (-1.3944) \quad\quad (5.1454) \quad\quad (2.4067)$$

$$+ 0.02240\ DUM2_t - 0.06070t\ DUM3_t$$

$$(1.4301) \quad\quad (-2.0500)$$

$R^2 = 0.7276$; adj.$R^2 = 0.6595$; F (5, 19) = 10.685;

B-G (1978) LM test: F(1,18)=1.0837; WHITE (1980) X^2 (8)=9.8908; J-B (1980) X^2 (2)= 1.2104;

Ramsey's (1969) RESET: F (1, 18) = 0.1810

NOTES: [†] The indicator of financial development is DFIN. t-statistics are given in parantheses. f:significant at the 5% level, t : significant at the 10% level.

Table 1B. Financial Development (DFIN) Equation   (2)

$$DFIN_t = 0.00255 + 0.72335^f DPY_t - 0.03334 DINV_t + 0.30044^f DTRAD_{t-1}$$

$$(0.1393) \quad (2.8548) \quad\quad (-0.2578) \quad\quad (3.2941)$$

$$- 0.09463^t DUM1_t$$

$$(-1.7589)$$

$R^2 = 0.4505$; adj.$R^2 = 0.3459$; F (4, 20) = 4.3058;

B-G (1978) LM test: F(1,19)=0.5618; WHITE (1980) X^2 (7)=4.2100; J-B (1980) X^2 (2)=1.0791;

Ramsey's (1969) RESET: F (1, 19) = 0.5499

NOTES: t-statistics are given in parantheses.

Table 1C. Exogeneity Tests   (1)

Panel 1. Weak Exogeneity Test Regression:

$$DPY_t = 0.000773 - 0.03364 DFIN_t + 0.34309^f DINV_t + 0.15294^f DTRAD_{t-1}$$

$$(0.0676) \quad (-0.3157) \quad\quad (5.3124) \quad\quad (2.9338)$$

$$+ 0.02778^t DUM2_t - 0.06760^f DUM3_t - 0.28375$$

$$(1.7894) \quad\quad (-2.3350) \quad\quad (-1.5562)\ \hat{\mu}_t{}^2$$

$R^2 = 0.7584$; adj.$R^2 = 0.6821$; S.E. of Regression: 0.0346

Weak Exogeneity Test: F (1, 18) = 2.4219

Panel 2. Super Exogeneity Test Regression:

$$DPY_t = 0.00452 - 0.02461 \, DFIN^2 + 0.32434^f \, DINV_t + 0.16345^f \, DTRAD_{t-1}$$
$$\quad\;\; (0.3255) \quad (-0.2233) \qquad\quad (4.2719) \qquad\quad (2.8554)$$

$$\qquad\quad + 0.02769^t \, DUM2_t - 0.06788^f \, DUM3_t - 0.23758 \; \hat{\mu}_t - 1.10174 \hat{\mu}_t^2$$
$$\qquad\qquad (1.7476) \qquad\quad (-2.2973) \qquad\quad (-1.1425) \quad\;\; (-0.4971)$$

$R^2 = 0.7616$; adj.$R^2 = 0.6690$; S.E. of Regression: 0.0353

Super Exogeneity Test: F (2, 17) = 1.2865

Panel 3. Strong Exogeneity Test

H_0: DFIN does not Granger-cause DPY

F-statistic: 0.3199   Optimal lag length: (1, 1)

H_0: DPY does not Granger-cause DFIN

F-statistic: 2.9171   Optimal lag length: (1, 1)

NOTES: H_0 denotes the null hypothesis of Granger non-causality.

According to our regression estimates in Table 1A, the coefficient associated with financial development variable (DFIN) is negative and statistically insignificant at the conventional levels. Table 1C gives the results of the weak and super exogeneity. Weak exogeneity test regression demonstrates that the coefficient of μ_t is statistically insignificant. Therefore, we are not able to reject the null hypothesis of weak exogeneity at conventional levels.

On the other hand, super exogeneity test regression suggests that both $\hat{\mu}_t$ and $\hat{\mu}_t^2$ are statistically insignificant at the 10% level. Consequently, super exogeneity assumption cannot be rejected and the coefficient of DFIN is structurally invariant to policy interventions. By employing GRANGER (1969) noncausality test[2], we tested for strong exogeneity of DFIN. The results of

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2 The results of JOHANSEN/JESULIUS (1990) cointeegration technique demonstrate no cointegration between the indicators of financial development and economic growth at 5% level. Consequently, the standard Granger-noncausality model does not include an error-correction term (results available upon request).

Granger noncausality test indicate no causality from DFIN to DPY (see Table 1C, panel 3). Therefore, our evidence does not support the hypothesis of strong exogeneity.

Secondly, we tested exogeneity assumptions for DCR (the ratio of credit allocated to private enterprises to total domestic credit, excluding to banks). Table 2A presents the results of regression equation for economic growth. As is seen from Table 2A, the estimated coefficient associated with DCR is positive but statistically insignificant at the 10% level. Table 2A reports the regression results for DCR.

Table 2A. Economic Growth Equation[†] *(2)*

$$DPY_t = 0.00652 + 0.04340\,DCR_t + 0.36702^f\,DINV_t + 0.05879\,DTRAD_{t-1}$$
$$(0.4826) \quad (0.2405) \quad\quad\quad (5.1187) \quad\quad\quad (1.0838)$$

$$- 0.19001\,DPY_{t-1} + 0.01695\,DUM2_t - 0.06511^t\,DUM3_t$$
$$(-1.2372) \quad\quad\quad (0.8740) \quad\quad\quad (-2.0829)$$

$R^2 = 0.7366$; adj.$R^2 = 0.6488$; F (6, 17) = 8.3925;

B-G (1978) LM test: F(1,16)=0.0547; WHITE (1980) X^2 (10)=9.6985; J-B (1980) X^2 (2)=0.3038;

Ramsey's (1969) RESET: F (1, 16) = 0.06071

NOTES: [†] The indicator of financial development is DCR.

Table 2B. Financial Development (DCR) Equation *(2)*

$$DCR_t = -0.02695 + 0.91166^f\,DPY_t - 0.51282^f\,DINV_t + 0.12569\,DTRAD_t$$
$$(-1.3240) \quad (3.1971) \quad\quad\quad (-3.5403) \quad\quad\quad (1.7475)$$

$$+ 0.19489\,DCR_{t-3} - 0.04218^f\,DUM2_t$$
$$(0.9614) \quad\quad\quad (1.6059)$$

$R^2 = 0.5950$; adj.$R^2 = 0.4685$; F (4, 13) = 4.7021;

B-G (1978) LM test: F (1,12)=0.0044; WHITE (1980) X^2 (9)=7.1351; J-B (1980) X^2 (2)=0.3327;

Ramsey's (1969) RESET: F (1, 12) = 0.6430

Table 2C. Exogeneity Tests   (2)

* Weak Exogeneity Test Regression:

$$DPY_t = 0.03137^f - 0.00950\ DCR_t + 0.51205^f\ DINV_t - 0.00788\ DTRAD_t - 0.02281\ DPY_{t-1}$$

(2.5327)   (-0.0574)   (8.7092)   (0.1910)   (-0.1956)

$$- 0.05091^2\ DUM2_t - 0.01322\ DUM3_t + 0.84961^f\ \hat{\mu}_t$$

(-2.3982)   (-0.5361)   (3.7050)

$R^2 = 0.8993$; adj.$R^2 = 0.8489$; S.E. of Regression: 0.0258

Weak Exogeneity Test: $F(1, 13) = 13.727$

Table 2D. Granger Causality Tests

H_0: DCR does not Granger-cause DPY

F-statistic: 1.2859   Optimal lag length: (1, 1)

H_0: DPY does not Granger-cause DCR

F-statistic: 10.009   Optimal lag length: (1, 1)

The results of the weak exogeneity test regression are documented in Table 2C. The assumption of weak exogeneity is rejected at the 10% level. Therefore, empirical evidence in this paper does not justify the use of a single equation regression in estimating the impact of DCR on economic growth. On the other hand, we also checked for a possible casual relationship between DCR and economic growth. The test results of Granger-noncausality in Table 2D demonstrate that economic growth Granger-cause DCR. As for the causality from DCR to economic growth, the author finds no evidence of causality from DCR to economic growth.

7. Summary and Conclusion

Neoclassical theory argues that financial development is an important determinant of economic growth. Alternatively, neostructuralist and

post-Keynesian views criticize the neoclassical prescription of financial deepening as the engine for economic growth. While the neostructuralist view argues that financial development is likely to reduce economic growth by lowering the total real supply of loanable funds available in an economy, post-Keynesian economics generally holds the view that economic growth leads to more highly developed financial systems. On the other hand, the law and finance approach argues that legal traditions of countries affect financial development and thereby economic growth.

The present paper investigates the relationship between financial development and economic growth for the case of Turkey by using exogeneity analysis developed by ENGLE et. al. (1983). In this paper, we attempted to rectify some deficiencies of previous empirical studies. We employed exogeneity analysis and included some other important macroeconomic variables influencing economic growth in our models. For our first proxy of financial development (the ratio of total financial instruments to GNP), the hypotheses of weak and super exogeneity cannot be rejected. The result of super exogeneity testing indicates that our model is immune to Lucas critique. However, the rejection of strong exogeneity implies that financial development does not cause economic growth. In addition, the estimated coefficient associated with the first proxy of financial development is negative and insignificant.

On the other hand, the assumption of weak exogeneity are rejected for the second indicator of financial development (the ratio of credit allocated to private enterprises to total domestic credit). This result indicates that the use of single-equation regression is not valid for assesing the effect of financial development on economic growth. Thus, it can be stated that the second indicator of financial deepening is endogenous. Moreover, Granger-noncausality test results demonstrate that the second indicator of financial deepening does not cause economic growth.

The empirical evidence presented in this paper does *not* support the neoclassical view that finance is a leading sector in the process of economic development. It seems that the evidence gives some support to the critiques of neoclassical theory. However, it should be noted that we find no evidence of causality from economic growth to our first proxy of financial development (the ratio of total financial instruments to GNP). This result is not consistent with Robinsons view that "where enterprise leads finance follows".

In summary, the data for Turkey suggests that financial development has not contributed to Turkish economic growth in the recent decades.

Appendix:

An Overview of Exogeneity Concepts

A variable is exogenous if that variable can be taken as "given" without losing information for the purpose of model. ENGLE, *et. al.* (1983) define three types of exogeneity: weak, strong, and super.

(i) Weak exogeneity: This concept is necessary for efficient inference in a conditional model. We first consider two variables, r and f and the following simple regression model:

$$r_t = b_0 + b_1 f_1 + e_t \tag{5}$$

where r_t and f_t have a bivariate normal distribution. Means are given by E (r_t) = μ_r and E (f_t) = μ_f. In addition, the variance-covariance matrix is given by the following matrix.

$$\Omega = \begin{bmatrix} \sigma 11 & \sigma 12 \\ \sigma 21 & \sigma 22 \end{bmatrix} \tag{6}$$

The conditional density of rt given ft is as follows:

$$r_t \mid f_t \sim IN\ (\beta_0 + \beta_1\ f_t, \sigma^2) \tag{7}$$

where $\beta_1 = \sigma_{12} / \sigma_{22}$, $\beta_0 = \mu_r - \beta\mu_f$, and $\sigma^2 = \sigma_{11} - \sigma^2_{12} / \sigma_{22}$.

Sembolically, the joint density of r_t and f_t is:

$$F(r_t, f_t) = G\ (r_t \mid f_t ; \gamma_t) . H\ (f_t ; \gamma_2) \tag{8}$$

where $G(r_t \mid f_t ; \gamma_1)$ is the conditional density of r_t given f_t, and H $(f_t ; \gamma_2)$ is the marginal density of f_t, and γ_1 and γ_2 are the parameters of the conditional and marginal models.

Weak exogeneity requires that efficient estimation and testing can be carried out by examining only the conditional model (7). According to ENGLE *et.al.* (1983), a variable is said to be weakly exogenous if the parameter of interest be a function of the conditional models parameters 1 only. A second condition for weak exogeneity is that the parameters of the conditional and marginal models (1 and 2) should be variation free.

(ii) Strong exogeneity: If a variable satisfies the conditions of weak exogeneity and Granger noncausality, it is said to be strongly exogeneous. Strong exogeneity is required for valid conditional forecasting.

(iii) Super exogeneity: Super exogeneity of a variable requires both weak exogeneity and invariance to policy interventions. More specifically, the structural invariance of the relationship to policy interventions is required for super exogeneity. Under the empirical presence of super exogeneity, LUCAS (1976) critique is not valid for the conditional model (ENGLE/HENDRY, 1993).

For testing exogeneity, we employ the ENGLE/HENDRY (1989, 1993) procedures. If equation (5) is rewritten as

$$r_t = b \, f_t + j_t \, \kappa + \varepsilon_t \tag{9}$$

We assume that there exists a set of instruments J_t, including j_t, and that j_t contains lagged r_t, lagged f_t and other variables. We can estimate the mean of f_t as $\hat{\mu}_t = J_t \, \hat{\Pi}_t$ from the least squares regression $f_t = J_t \, \hat{\Pi}_r + \hat{v}_t$. Under the null hypothesis of exogeneity (if ε and v are jointly homoscedastic), we can conduct a test for the weak exogeneity of f_t for b by adding $\hat{\mu}_t$ to (11) as an additional regressor and by testing for its significance. On the other hand, both $\hat{\mu}_t$ and $\hat{\mu}_t^2$ are augmented to (9) and their joint significance is tested for testing super exogeneity. We conclude to reject the exogeneity assumption if the test statistic is significant. The GRANGER (1969) noncausality test is employed to test for strong exogeneity. If the variables are cointegrated, the standard Granger model also includes an error correction term.

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