

# Financial Deepening and Economic Growth in Turkey

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## Abstract

*This study is an attempt to contribute to knowledge concerning to relationship between financial development and economic growth in literature. Based on the theory of financial deepening from the perspectives of monetization ratio we analyzed the relationship between financial development and economic growth in Turkey. In this context, using VAR model approach we investigated the relation between broad money supply to GNP ratio and per capita GDP annual data from 1980 to 2010. Empirical findings indicate that there are a bidirectional relationship between financial deepening and economic growth in Turkish Economy*

**Keywords:** Financial depth, Economic growth, VAR model, Granger Causality

JEL Classification: E01, O11, O16

## Introduction

The relationship between economic growth and financial development has generated a great attention among economists and policy analysts over time. From this point of view, this paper sheds light on the finance-growth nexus focusing on Turkey from 1980 to 2010. Such a country focus is much more relevant for evaluating the Turkish financial liberalization process after 1980. This year is important for the political economy of Turkey since country launched financial liberalization program under the name of "24 January Decisions". Before 1980, the system was under the "financial repression" with negative real interest rate, high tax burden on financial earnings and high liquidity and reserve requirement ratios. After 1980, financial markets started to be the active part of the economy. The lifting of repressive controls on financial markets was realized gradually over 1980s as part of this policy change. Thus, the beginning of 1980s constituted a turning point in the economic life in Turkey. Consequently Turkey has a possibility to increase her financial depth in order to promote economic growth. In this study we will try to evaluate the financial liberalization process of Turkey analysing the relation between financial depth and economic growth.

In today's globalized world, financial systems and their level of development and efficiency are key factors that contribute to the economic development of countries. The proper working of the financial system is critical to the success of an economy. There are a number of well-understood theoretical mechanisms by which financial development promotes growth. The literature identifies certain channels through which financial markets exert influence on growth. In particular, financial markets reduce transaction and information costs and so facilitate management risks. The financial systems effect capital

accumulation by mobilizing saving and allocating them among different capital investment. Financial markets also promote real economy by easing the exchange of goods and services (Levine,1997: 691).

In this regard, to determine the realtion between financial development and economic growth, empirical application requires a measure for definition of the development of the financial sector. There is lots of measure to evaluate the development of financial system while researching its effect on economic growth. In this study we will focus on financial deepening, that is currency's role of gathering financial resources rather than other functions of financial system such as reducing transaction costs, managing risk and improving corporate governance structure through allocating resources effectively. In other words we will take the financial depth as the key indicator that shows the development stage of financial sector.

Financial deepening theory defines the positive role of the financial system on economic growth by the size of the sector's activity. That is an economy with more intermediary activity was assumed to be doing more generate efficient allocations. The size of the financial sector is usually measured by two basic quantitave indicators: "monetisation ratio" and "intermediation ratio". The monetisation ratio includes money-based indicators or liquid liabilities like broad money supply to GDP ratio. Intermediation ratio consists of indicators concerning to bank-based measures like bank credit to the private sector and capital market-based measures such as capitalization ratio of stock market. In our study, the level of intermediation to GDP, that is broad money supply to GDP ratio, was taken as a broad measure of the size of the financial sector.

The rest of the paper is organized as follows: Section 2 reviews the literature, Section 3 presents data, methodology and emprical results, Section 4 comprises the conclusion.

## Literature

The link between finance and growth has also been controversially debated in economic literature. Despite the great deal of effort devoted empirically in disentangling the impact of financial development on growth as accurately as possible, there is still no consensus as to the existence, the level, or the direction of such relationship. Many researchers argue that a well developed financial sector facilities high and sustainable economic growth. Some of the researchers assert that there still exists great dichotomy regarding the role of financial intermediaries in facilitating sustainable economic growth especially in the long run. However later studies mostly find that the depth of financial sector and economic growth exhibit a close direct relationship with each other. Nonetheless the way of relation becomes controversial issue at this time.

Broadly speaking there are three basic views expressed for the finance-growth nexus. The first one is the "**supply leading hypothesis**", which supports a positive impact of financial development on economic growth. Secondly, "**demand following hypothesis**", which states that finance actually responses to changes that happen in the real sector or "where enterprise leads, finance flows". Finally, another approach somewhere between these two views is the one that claims mutual impact of finance and growth, which can be called "**bi-directional causality hypothesis**".

The "supply-leading" hypothesis posits a unidirectional causation that runs from financial deepening to economic growth implying that financial markets and institutions will increase the supply of financial services. This approach argues that the level of financial development is a good indicator of future economic growth. If an economy has not sufficient and sustained finance supply, it can not form a new economic growth point and promote sustained and stable economic development. This view has been widely supported and explained theoretically by McKinnon (1973) and Shaw (1973).

**King and Levine (1993)** empirically demonstrated that financial indicators strongly positively correlated with an economy's level of real production. They also argue that policies that alter the efficiency of financial intermediation exert a first-order influence on growth. **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. They interpreted these results as supportive of the supply-leading hypothesis. **Kwan et. al. (1998)** analyzed the relationship between financial deepening and economic growth for Hong Kong, South Korea and Taiwan. The findings suggested that financial deepening had a positive influence on output growth. From this point of view, they argue that a sound financial system is essential in the course of economic development. **Wadud (2005)** researched the causality between the level of financial development and economic growth for India, Pakistan and Bangladesh. Paper employed a cointegrated vector autoregressive model to assess the long-run relationship between the variables relating to "bank-based", "capital market based" and economic growth. The findings indicate the causality between financial and economic growth nexus running from financial development to economic growth. **Ndebbio (2004)** examined the effect of financial deepening on growth in Sub-Saharan African countries. Financial deepening variable was measured by M2 as ratio to GDP and the growth rate of per capita real money balances. The study showed that financial sector development has spurred economic growth.

Besides the studies advocating of supply-leading hypothesis, there are also empirical researchers indicating the results concerning to demand-following" hypothesis. Studies consistent with the demand-following response posit a unidirectional causation from economic growth to financial development. This implies financial system passive response to economic growth meaning that the increasing demand for financial services might lead to the aggressive expansion of the financial system as the real sector of the economy grows. **Arestis and Demetriades (1997)** used time series analysis and Johansen cointegration analysis for the United States and Germany. For United States there was insufficient evidence to claim a growth effect of financial development and the data also point to the direction that real GDP contributes to both banking system and stock market development. **Odiambho (2004)** investigated the finance-growth nexus in South Africa. The study used monetization ratio namely the ratio of M2 to GDP and intermediation ratio, the ratio of bank claims on the private sector to GDP against economic growth proxied by real GDP per capita. Using Johansen-Juselius cointegration approach and vector error correction model, he empirically revealed demand-following response between financial development and economic growth. Thus the study totally rejected the supply-leading hypothesis. **Guryay et. al (2007)** examined the relationship between financial development and

economic growth for Northern Cyprus for the period of 1986-2004. The result showed that there was a negligible positive effect of financial development on economic growth of Northern Cyprus. On the other hand, there was evidence of causality from economic growth to the development of financial intermediaries.

Hypothesis of bi-directional causality argues that a sound financial system can promote economic growth and the economic growth promotes the financial development in return. Empirical studies postulate a feed back relationship between economic growth and financial development. Theoretically, **Greenwood and Smith (1997)** explained comprehensively the mutual relation between financial market and real economy. They argued that financial markets has promoted growth, and growth in turn has encouraged the formation of financial markets. Also empirically **Demetriades and Hussein (1996)** found bidirectional causal relationship between financial development and economic growth for some Asian Countries like India, South Korea and Thailand.

Concerning to empirical researches on finance-growth nexus for Turkey, there are a lot of studies advocating both supply-leading and demand-following hypothesis. Thus it can be argued that there is still no consensus as to the direction of finance-growth nexus in Turkey. **Yılmaz et. al. (2007)** found that there has been a demand following relationship between financial development and economic growth for the period from 1988 to 2004 in Turkey. The ratio of Stock Exchange trading volume to national income, the ratio of capitalization value to national income and Stock Exchange turnover ratio concerning to capital market used for financial development indicators while the ratio of private sector bank credits to national income for monetary market. Johansen Cointegration, error correction and causality methods were employed and revealed that financial market has not appeared to support economic growth while economic growth has seemed to impact on financial growth.

**Keskin and Karşıyakalı (2010)** investigated finance- growth nexus in Turkey for the data of period 1987 - 2007 by applying Engle-Granger cointegration procedure and error correction model. Data set relating to financial development consist of ratio of Stock Exchange trading volume to national income, the ratio of private sector bank credits to national income, the ratio of demand deposit to national income and the ratio of broad money to national income. As a result of the analysis, they found that demand following hypothesis is valid since the direction of the causality is from economic growth to financial development in the long run and the short run. No evidence supporting supply leading hypothesis can also be found neither in the long nor in the short run. **Ozcan and Arı (2011)** analyzed the relation between financial development and economic growth in Turkey by estimating a VAR Model over the 1998-2009 periods. Using real GDP and banking credit to private sector as proxies of economic growth and financial development respectively, uni-directional relationship from growth to financial development has been indicated. Consequently, "demand-following hypothesis" has been corroborated.

Concerning the studies consistent with the supply-leading response, **Acaravci et. al (2007)** found one-way causal relationship running from the financial development to the economic growth in Turkey. The empirical investigation was carried out in a vector autoregression (VAR) framework to analyze the short run effect of the financial intermediary development represented by the domestic credit provided

by banking sector on economic growth. In other words, Granger causality test results showed that financial development has led to economic growth and support supply-leading hypothesis for Turkey. **Doğan (2002)** applied co-integration analysis and the Granger Causality technique to data concerning to financial deepening and economic growth in Turkey. Cointegration analysis could not find evidence of a stable relation between financial deepening and the GDP in the long run. However, the results of the Granger Causality Test indicated that financial deepening has had a positive effect on the economic growth-rate in Turkey in the short run. **Aslan and Küçükaksoy (2006)** advocated the supply-leading hypothesis for Turkey over the period of 1970-2004. Using per capita GNP and banking credit to private sector as measures of financial development and economic growth, Granger causality test results showed that supply-leading hypothesis has been valid in Turkey.

Finally bi-directional causality hypothesis has been advocated by **Altay and Atgür (2010)**. In this study, financial deepening and economic growth relationship using VAR model approach were investigated in Turkey over the period 1970-2006. In this context, an indicator of financial deepening, the broad money supply to GNP ratio and economic growth constant prices, representing per capita GDP data has been used. Empirical findings indicated that there was a bidirectional Granger Causality relationship between financial deepening and economic growth in Turkey.

#### **Data, Methodology and Empirical Results**

To measure the impact of financial deepening on economic growth, this paper has designed two indicators to study the relationship of financial deepening and economic growth. The first proxy (GDP) is the ratio of broad money stock to GDP, which is a standard measure of financial development. Thus, an increase in the ratio indicates a situation of a more financial deepening. The second proxy (MGDP) is the real income per capita which is the most plausible variable for economic growth. In other words, economic growth is proxied by per capita GDP, while the proxy for financial development is the ratio of broad money supply to GDP ratio. Annual data from 1980 to 2010 sourced from World Bank Database were employed.

#### **Unit Roots Test**

We found that the variables contain the unit root or I (1). Table 1 presents the unit root test results in terms of ADF and PP Test. According to the ADF and PP test results the variables are all stationary when they are expressed in first differences at the %99 and %95 level confidence. Accordingly, Figure 1 presents time path of new stationary series for per capita GDP (DGDP) and the ratio of broad money stock to GDP (DMGDP).

**Table 1: ADF and PP Test Results**

Variables	ADF (Augmented Dickey Fuller)		PP (Philips Peron)	
	Level	First Differences	Level	First Differences
GDP (constant)	0,275725	-2,947113**	1,89928	-2,947113**

GDP (constant+trend)	-1,712798	-3,329252**	-1,024712	-3,346873**
MGDP (constant)	0,699195	-5,418954*	1,660509	-5,432344*
MGDP (constant+trend)	-0,851054	-5,790997*	-0,608590	-7,145290**

\*,\*\* indicate significance at %1 and %5 levels, respectively

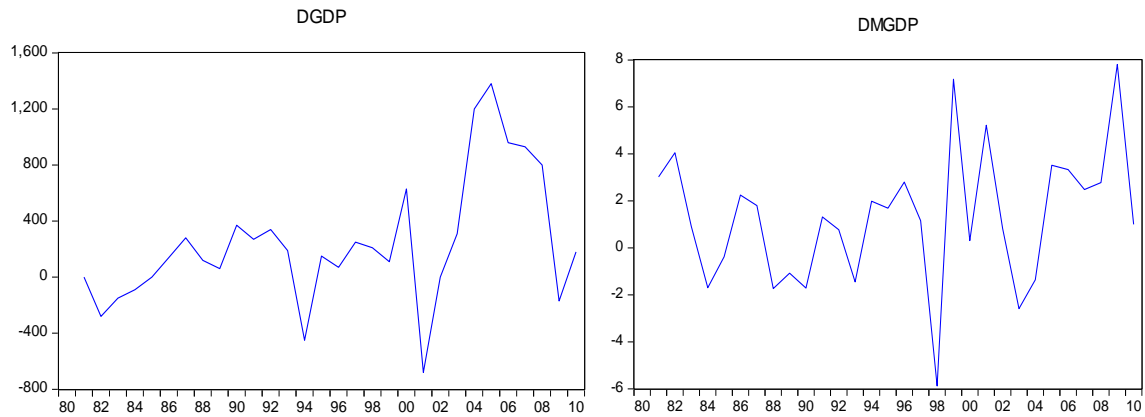


Figure-1: Time Paths for DGDP and DMGDP

### VAR Analysis

The VAR model is a multi-equation system where all the variables are treated as endogenous. There is thus one equation for each variable as dependent variable. Each equation has lagged values of all the included variables as dependent variables, including the dependent variable itself. Since there are no contemporaneous variables included as explanatory, right-hand side variables, the model is a reduced form.

Thus all the equations have the same form since they share the same right-hand side variables. Say, we have two variables: DGDP,  $y$ , and the DMGDP,  $m$ , the VAR model will be (Thomas 1997):

$$y_t = a_1 y_{t-1} + \dots + a_k y_{t-k} + a_{k+1} m_{t-1} + \dots + a_{k+1+n} m_{t-n} + e_t^y$$

$$m_t = b_1 y_{t-1} + \dots + b_k y_{t-k} + b_{k+1} m_{t-1} + \dots + b_{k+1+n} m_{t-n} + e_t^m$$

The two endogenous variables  $y$  and  $m$  are also the explanatory variables in lagged form. How many lags to put in is an empirical matter, which is decided at the estimation stage.

Assumptions about the error terms:

1. The expected residuals are zero;  
 $E(e_{i,t}) = 0$  with  $i = 1, 2$
2. The error terms are not autocorrelated;  
 $E(e_{i,t} \cdot e_{j,l}) = 0$  with  $t \neq l$

Like indicated above, our estimation for results fro VAR Model is presented Table-2. According to this estimation relation between two variable (DGDP and DMGDP) can be written like:

$$\text{DMGDP} = 0,463127 + 0,000989 \text{ DGDP}(-1) + 0,002472 \text{ DGDP}(-2) - 0,181184 \text{ DMGDP}(-1) + 0,001927 \text{ DMGDP}(-2)$$

$$\text{DGDP} = 200,4084 + 0,539939 \text{ DGDP}(-1) - 0,041551 \text{ DGDP}(-2) + 14,81482 \text{ DMGDP}(-1) - 73,34997 \text{ DMGDP}(-2)$$

Results of LM Test for autocorrelation relating to our VAR estimation can be shown from Table 3. According to this LM Test results, there is no autocorrelation at the %95 level confidence. Also no heteroskedasticity in terms of results of White Test indicated in Table 4.

The Impulse Response Functions, shown in Figure-2, has been used to produce the time path of the variables (DGDP and MDGDP) in the VAR Model, and the shocks from all the explanatory variables. If the system of equations is stable any shock should decline to zero, an unstable system would produce an explosive time path. According to the trends in Figure 2, both DGDP and DMGDP reach stable line in nearly six term after taking shocks from each other, which shows the relationship between them.

**Table-2: VAR Model Estimation Results**

	DGDP	DMGDP
DGDP (-1)	0.539939	0.000989
	(0.19229)	(0.00144)
	[ 2.80790]	[ 0.68896]
DGDP (-2)	-0.041551	0.002472
	(0.20742)	(0.00155)
	[-0.20032]	[ 1.59637]
DMGDP (-1)	14.81482	-0.181184
	(28.0008)	(0.20905)
	[ 0.52909]	[-0.86670]
DMGDP (-2)	-73.34997	0.001927
	(26.4616)	(0.19756)
	[-2.77194]	[ 0.00976]
C	200.4084	0.463127
Adj. R <sup>2</sup>	0.359073	0.104932
F-statistic	4.781624	1.791323

**Table-3: LM Test Results**

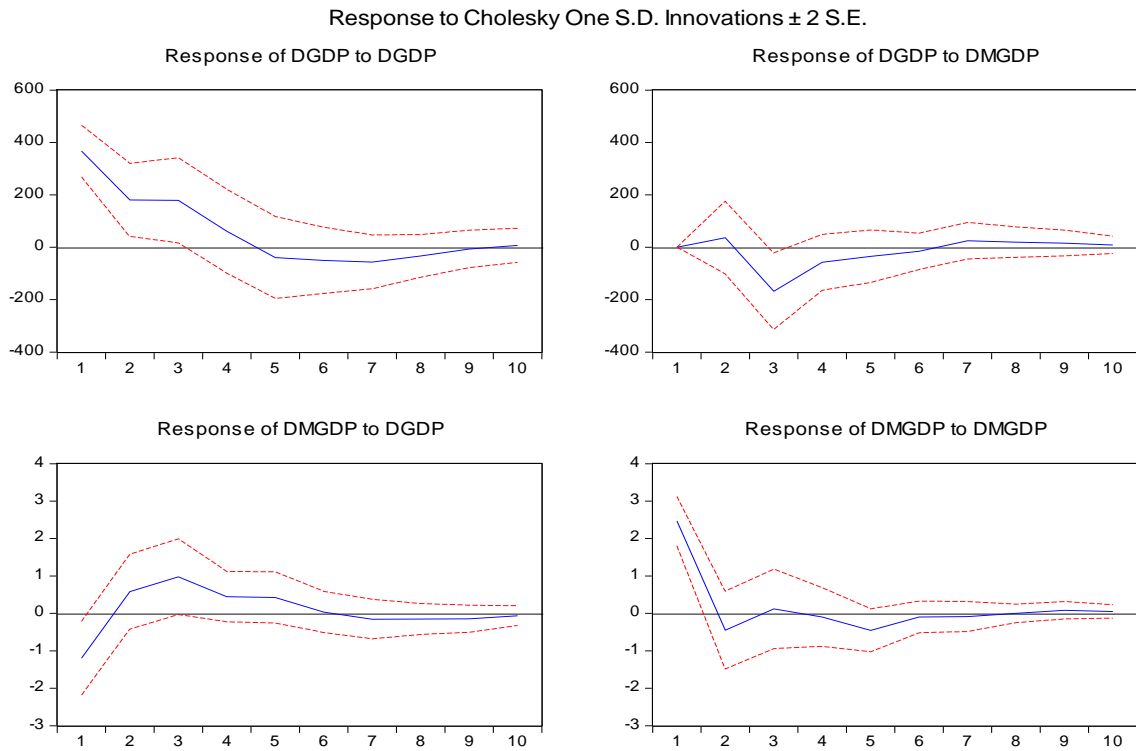
Lags	LM-Stat	Prob
1	5.172234	0.2701
2	3.008101	0.5565
3	8.218490	0.0839
4	3.872792	0.4235
5	0.908743	0.9233
6	1.103645	0.8937
7	3.438157	0.4873
8	8.416111	0.0775
9	1.670573	0.7961
10	7.391797	0.1166
11	11.22288	0.0242
12	2.583561	0.6297

**Table-4: White Test Results**

Chi-sq	df	Prob.
20.95077	24	0.6416

Variance Decomposition is an alternative method to the Impulse Response Functions for examining the relation between variables (DGDP and MDGDP). This technique determines how much of the forecast error variance for any variable in a system, is explained by innovations to each explanatory variable, over a series of time horizons. Usually own series shocks explain most of the error variance, although the shock will also affect other variables in the system. Table-5 presents the results of Variance Decompositions of DGDP and DMGDP. According to results, it can be argued that nearly 14 % of DGDP can be explained by the effects of DMGDP while nearly 32 % of DMGDP can be determined by DGDP. This results, like in impulse- response function, shows that there is a relationship between variables mutually.





**Figure-2: Impulse - Response Function**

**Granger Causality Test**

VAR Model itselfs do not allow us to make statements about causal relationship. For determining the causal relation between dependent variables Granger causality test should be applied. Granger casality test may be illustrated by considering the following equation. Say, we have two variables: DGDP,  $X$ , and the DMGDP,  $Y$ , the VAR model will be:

$$X_t = \sum_{j=1}^m a_j X_{t-j} + \sum_{j=1}^m b_j Y_{t-j} + \varepsilon_t$$

$$Y_t = \sum_{j=1}^m c_j X_{t-j} + \sum_{j=1}^m d_j Y_{t-j} + \eta_t$$

**Table-5: Variance Decomposition**

Periods	Variance Decomposition of DGDP		Variance Decomposition of DMGDP	
	DGDP	DMGDP	DMGDP	DGDP
1	100.0000	0.000000	80.88836	19.11164
2	99.20934	0.790662	77.97871	22.02129
3	87.11986	12.88014	69.73638	30.26362
4	86.10049	13.89951	68.26081	31.73919
5	85.76330	14.23670	67.66964	32.33036
6	85.82578	14.17422	67.69063	32.30937
7	85.79224	14.20776	67.54898	32.45102
8	85.72007	14.27993	67.38705	32.61295
9	85.63554	14.36446	67.26472	32.73528
10	85.61109	14.38891	67.24611	32.75389

X is said to be a Granger cause of Y if present Y can be predicted with greater accuracy by using past values of X rather than not using such past values, all other information being identical (Thomas 1997: 461).

As can be seen from Table-5 our Granger Causality test results show that there is a bi-directional relation between DMGDP and DGDP. In other words "bi-directional causality hypothesis" is valid at the %95 level confidence in the relation between financial development and economic growth.

**Table-5: Granger Causality Test Results**

Null Hypothesis	F Value	Probability Value (p)	Decision
DMGDP does not Granger cause of DGDP	3.96321	0.00332*	Reject
DGDP does not Granger cause of MGDP	3,52622	0.0462**	Reject

*\*,\*\* indicate significance at %1 and %5 levels, respectively*

## Conclusion

This study employed the VAR estimation and Granger causality test approach to ascertain the availability and direction of relationship between "monetary-based" financial deepening and economic growth in Turkey between 1980 and 2010. The results of VAR analysis suggest that there is a relationship between financial sector development and economic growth mutually. The results of Granger Causality Test also assert that financial deepening and economic growth effects each other supporting to "bi-directional causality hypothesis". In other words, analysis shows that financial system can promote economic growth and the economic growth promotes the financial development in return. The study consistent with the bi-directional causality response between finance-growth nexus in Turkey.

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