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THE RELATIONSHIP BETWEEN THE FINANCIAL DEVELOPMENT AND THE ECONOMIC GROWTH IN TURKEY

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Master Thesis

Tilburg
August 2011

Acknowledgments

I would like to express my gratitude to my thesis advisor Dr. R. B. Uras for his invaluable supervision, academic feedback, support and endless patient during this thesis.

My gratitude also goes to all my family members and beloved wife Fatma who encouraged me patiently.

Finally, I apologize from my little lovely daughter Elifnur for being careless while studying on my thesis.

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SECTION I: INTRODUCTION

Diverse economic growth rates of countries have engaged the attention of economists. Clearly, economic growth is a complex interaction of numerous factors such as factor accumulation, resource endowments, the quality of governance, human capital, institutional development, legal system effectiveness, and ethnic and religious diversity.

Recently, researchers have studied the role of financial development to explain the cross-country differences in growth. In particular, the direction of causality between financial sector development and economic growth has been analyzed in the context of two conflicting hypotheses. According to supply-leading hypothesis financial development leads to economic growth, however demand-following hypothesis claims that the direction of the relationship runs from economic growth to financial development.

As an emerging market, Turkish economy has experienced a wide-ranging structural transformation after it had suffered from a disruptive economic crisis in 2001. Financial sector fragility was one of the main causes of the 2001 crisis. Following the economic crisis, an IMF-supported economic program was put into practice in 2001. The fundamental objective of the program was to correct the instability after the crisis and to form a framework for sustainable growth by decreasing inflation and reforming the banking sector in short-term. In order to restore the banking sector, Banking Sector Restructuring Program (BSRP) was announced on May 15, 2001. The priorities of the BSRP were identified as recovering the deterioration caused by the 2001 crisis in the banking sector and building a strong financial intermediation base that supports the economic activity.

After the 2001 crisis Turkish economy experienced an average of 6.8 percent economic growth in the period of 2002-2007. Though it suffered from global economic crises in the years of 2008 and 2009, it made a strong response in 2010 and grew at a rate of 8.9 percent.

On the other hand, there has been a rapid increase in banking sector total assets and the ratio of banking sector total credits to total assets starting from the year of 2002. The private credits to GDP ratio climbed from 13.6 percent in 2001 to 40.7 percent in 2010.

In this context, my thesis will examine the causal relationship between financial development and economic growth in Turkey for the period 1988:1-2010:4, using the technique of Granger causality, a kind of time series econometric analysis. Since, recent empirical researches have shown strong evidence that financial development and economic growth relationship is country-specific (Ghali, 1999), I prefer to use time series econometric analysis for the Turkish economy in my thesis.

SECTION II: LITERATURE REVIEW

2.1. General Literature

Though the correlation between financial development and economic growth has been more or less recognized, the direction of causality between them is a controversial issue. Does financial development cause economic growth or does economic growth cause financial development? Patrick (1966) entitled the possible directions of causality as the supply-leading and the demand-following hypothesis.

Supply-leading financial development hypothesis has been supported by many works like McKinnon (1973), Shaw (1973), and King and Levine (1993). This hypothesis asserts that financial development leads economic growth exogenously. It implies a pro-active creation of financial institutions and markets will advance real growth by increasing the supply of financial services. As a result of this, financial development affects the economic growth positively. In a cross section study, King and Levine (1993) show that the countries that have less developed financial systems grow slower than the countries that have more developed financial systems. In a very noteworthy paper, Rajan and Zingales (1998) conclude that industries which are more dependent on financial sector grow at higher rates in countries with well-developed financial systems. This result indicates the fact that causality goes from financial development to economic growth.

On the other hand, the demand-following hypothesis assumes a causal relationship from economic growth to financial development. It implies an increase in economic growth enhances the demand for financial services. As a consequence of this, financial development leads the economic growth. Robinson (1952) and Goldsmith (1969) are the papers that support the demand-following hypothesis.

Beside these two competing hypotheses, bi-causality between economic growth and financial development has been argued in the literature as well. Greenwood and Jovanovic (1990) develop a macro model in which both financial development and economic growth are treated as endogenous. Their empirical results indicate that there exists a positive two-way causal relationship between economic growth and financial development. Economic growth stimulates the creation and expansion of financial institutions and the financial development allow investment projects to be chosen more efficiently by collecting and analyzing information from potential investors. Several empirical studies find this bi-causality, mainly using Granger causality methodology. For instance, Apergis et al. (2007) use dynamic panel data integration and cointegration analysis for 15 OECD countries over the period 1975 to 2000. The main finding of the paper is a long-run two way causal relationship between financial development and economic growth.

The early studies in the literature are generally cross-country studies that have some drawbacks. The primary drawback is that cross-country studies assume the relationship between the economic growth and financial development is homogenous for all countries. However, grouping all countries in the same sample may lead to the wrong conclusions. For example, De Gregorio and Guidotti (1995) employ a sample of 98 countries from 1960 to 1985. They merged their sample into three groups regarding their initial income level and found that the correlations are more significant for the poor countries.

Gupta (1984) is the first time series investigation that studies the financial development and economic growth relationship for 14 developing countries. After then time series studies became widespread in the literature. The results of the Gupta paper indicate that causality runs from financial development to economic growth which underlines the role of the financial development in the process of economic growth. Demetriades and Hussein (1996) and Arestis and Demetriades (1997) evaluate the financial development and economic growth relationship in developing and developed economies, respectively. Their results reveal considerable variation across the countries in the sample even when the same variables and estimation methods are employed. As a result they put emphasis on the limitations of cross-country studies for treating different economies as a homogeneous entity. Arestis and Demetriades (1996) argue several reasons for the direction of causality findings from country to country. The first reason is that different financial systems may have different institutional structures and certain institutional structures may contribute more to economic growth. The second reason is that financial sector policies play a crucial role in determining whether financial development supports economic growth. The third reason is that two countries with identical financial systems and financial sector policies may still differ due to the effectiveness of those institutions that design and implement the policies.

2.2. Literature on Turkish Data

Kar and Pentecost (2000) study the causal relationship between financial development and economic growth in Turkey. The annual data is employed for the Turkish economy for the period 1963-1995. Five alternative proxies for financial development are developed and Granger causality tests applied using the cointegration and vector error correction methodology (VECM). The empirical results of the study show that the direction of causality between financial development and economic growth in Turkey is sensitive to the choice of proxy used for financial development. For example, when financial development is measured by the money to income ratio the direction of causality runs from financial development to economic growth, but when the bank deposits, private credit and domestic credit ratios are alternatively used to proxy financial development, growth is found to lead financial development. On balance, however, for Turkey, growth seems to lead financial sector development, supporting the demand-following hypothesis.

Aslan and Kücükaksoy (2006) examine the financial development and economic growth relationship for Turkey over the period of 1970-2004 by using annual data. Granger causality test results of the study show that financial development leads to economic growth and support the supply-leading hypothesis for Turkey.

Unalmis (2002) used annual time series starting from 1970 to 2001 and private credit to GDP ratio as a proxy for the financial development. Granger non-causality test is applied using the cointegration and the vector error correction methodology (VECM). The empirical results of the study show that financial development significantly causes economic growth in the short-run, and in the long-run, there is a bidirectional relationship between financial development and economic growth. In other words, the Turkish case supports the supply-leading phenomena in the short-run and both the supply-leading and the demand-following cases in the long-run.

Halicioglu (2007) investigates the validity of the supply-leading and the demand-following hypotheses using annual data from 1968 to 2005. The bounds testing approach to cointegration is conducted to establish the existence of a long-run relationship between financial development and economic growth. An augmented form of Granger causality analysis is implemented to identify the direction of causality among the variables both in the short-run and the long-run. The empirical findings suggest unidirectional causation from financial development to economic growth, which supports the supply-leading hypothesis.

Belke (2007) studies the role of financial development in economic growth for the period of 1970–2006, by using Granger causality technique in Turkey. The results of cointegration test show that there is no long-run relation between financial development and economic growth. However, conclusion of Granger causality test is obtained as supportive evidence to hypothesis of both short-run supply-leading and demand-following in financial development and economic growth relationship. The results of causality test exhibit clearly that causal relation between financial development and economic growth may change according to financial development indicator.

Ari and Ozcan (2011) study the relationship between financial development and economic growth for Turkey by estimating a VAR Model over the 1998-2009 periods. According to Granger causality test, there is a uni-directional relationship between financial development and economic growth in Turkey. The direction of this relationship is from economic growth to financial development that supports the demand-following hypothesis.

Our thesis mainly differs from these studies in terms of the data and methodology. All these studies employ bi-variate Granger causality tests, whereas we perform a tri-variate Granger causality test. Since our aim is to see and decouple the effect of banking sector development and stock market development on economic growth together in one model, we prefer to perform a tri-variate Granger causality test based on Vector Autoregression (VAR) and Vector Error Correction (VEC) models. On the other hand, apart from the Ari and Ozcan (2011) other studies use annual time series data, whereas we prefer to use quarterly time series data. Our principal concern for using quarterly data is to extend the sample so as to reach sufficient data points for running Granger causality tests.

SECTION III: DATA AND METHODOLOGY

3. 1. Data

In order to analyze the relationship between financial development and economic growth in Turkey the following function is used:

$$EG = f(SMD, BSD)$$

$$EG = Economic\ Growth$$

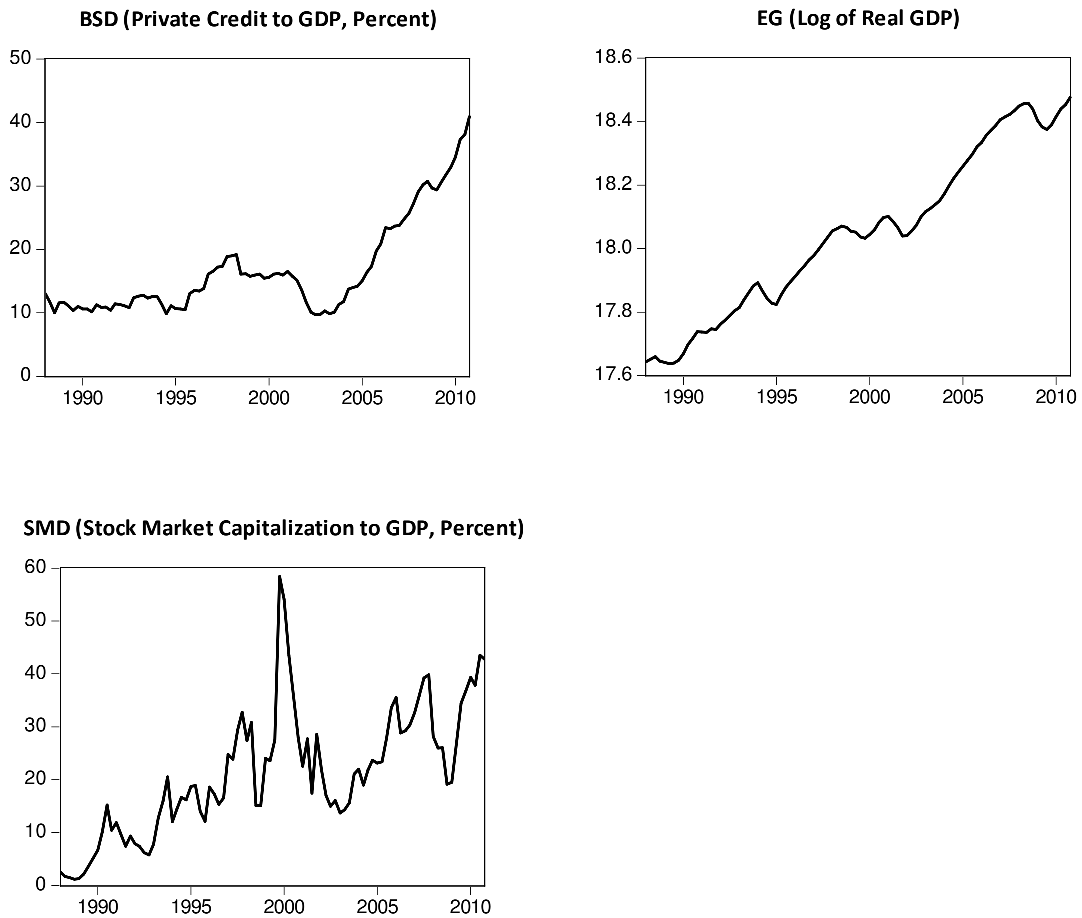
$$SMD = Stock\ Market\ Development$$

$$BSD = Banking\ Sector\ Development$$

The quarterly data of the Turkish economy for the period 1988-2010 is used for the empirical analysis. Economic growth (EG) is measured with natural logarithm of quarterly real gross domestic product (GDP at 1998 constant prices), which is also used in many empirical studies. Banking sector domestic private credit extended by the private banks to the GDP ratio and stock market capitalization to the GDP ratio will be used as the main proxies for the banking sector development (BSD) and stock market development respectively (SMD). The corresponding data is collected from the Central Bank of Turkey Electronic Data Delivery System and Istanbul Stock Exchange Stock Market Data. Afterwards, compiled dataset is employed to develop a relevant tri-variate Vector Auto Regressive model in E-views econometric program.

Before starting to explain the methodology, we analyzed the behavior and the descriptive statistics of the time series data. Figure 1 indicates the graphs of the 3 variables. In the graph of economic growth (EG), as though there is an increasing trend in the whole period, there are some economic contraction years such as 1995, 2001 and 2009 years. Ratio of private sector credit to GDP (BSD) remained relatively stable between 1988 and 1995. After declining due to the 2001 crisis, it has entered in a sharp increasing trend. Ratio of stock market capitalization to GDP (SMD) has displayed a fluctuating pattern for the whole period.

Figure 1: Economic Growth and Financial Development Proxies



Descriptive statistics of the economic growth and financial development indicators are shown in Table 1. As seen from the Table 1, all series are skewed and don't have normal distribution. Moreover, stock market development proxy has a higher volatility than banking sector development proxy.

Table 1: Descriptive Statistics of the Proxies

	Economic Growth	Stock Market Development	Banking Sector Development
	EG	SMD	BSD
Mean	18.04556	21.17525	16.73845
Median	18.05309	19.32235	13.88955
Maximum	18.47593	58.45073	40.87956
Minimum	17.63676	1.178469	9.713143
Std. Dev.	0.257036	12.04675	7.552935
Skewness	0.099741	0.528886	1.418828
Kurtosis	1.877886	3.158774	4.12387
Jarque-Bera	4.97924	4.385682	35.70895
Probability	0.082941	0.111599	0
Sum	1660.192	1948.123	1539.937
Sum Sq. Dev.	6.01216	13206.31	5191.262
Observations	92	92	92

Table 2 displays that the correlation between the economic growth proxy and the banking sector development proxy is positive and the correlation coefficient is equal to 0.81. Similarly, the correlation between the economic growth proxy and the stock market development proxy is positive and the correlation coefficient is equal to 0.74. Moreover, the correlation coefficient between the banking sector proxy and the stock market development proxy is 0.65 that reveals positive relationship as well. It can be concluded that all the proxies are positively related to each other.

Table 2. Correlation Matrix of the Proxies

	EG	BSD	SMD
EG	1	0.805501	0.741045
BSD	0.805501	1	0.651684
SMD	0.741045	0.651684	1

3. 2. Methodology

In order to analyze the relationship between economic growth, banking sector development and stock market development, tri-variate Granger causality test is employed under the models of Vector Autoregression (VAR) and Vector Error Correction (VEC). In an effort to estimate a simple trivariate Vector Auto Regressive (VAR) model, two proxies for financial development and one proxy for the economic growth is applied.

The VAR model to be used in our analysis in matrix form is,

$$\begin{bmatrix} EG_t \\ SMD_t \\ BSD_t \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ c_3 \end{bmatrix} + \begin{bmatrix} a_{11}^1 a_{12}^1 a_{13}^1 \\ a_{21}^1 a_{22}^1 a_{23}^1 \\ a_{31}^1 a_{32}^1 a_{33}^1 \end{bmatrix} \begin{bmatrix} EG_{t-1} \\ SMD_{t-1} \\ BSD_{t-1} \end{bmatrix} + \ldots\ldots + \begin{bmatrix} a_{11}^p a_{12}^p a_{13}^p \\ a_{21}^p a_{22}^p a_{23}^p \\ a_{31}^p a_{32}^p a_{33}^p \end{bmatrix} \begin{bmatrix} EG_{t-p} \\ SMD_{t-p} \\ BSD_{t-p} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix}$$

where p is the order of the VAR and c is the constant term. EG denotes economic growth, SMD denotes stock market development and BSD denotes banking sector development.

Since non-stationarity invalidates many standard empirical results, the first step to develop an appropriate VAR model is to determine the stationary properties of the relevant series. Unit root tests are the main instruments for studying the stationarity properties of the series. In my thesis, Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979) unit root tests and Philips-Perron (PP) (Philips and Perron, 1988) unit root tests are applied for this purpose.

In order to apply the ADF test we need to estimate the following regression.

$$\Delta Z_t = \alpha_0 + \theta Z_{t-1} + \gamma t + \alpha_1 Z_{t-1} + \alpha_2 Z_{t-2} + \cdots + \alpha_p Z_{t-p} + \varepsilon_t$$

Δ: First difference operator

Z_t: Relevant series (EG, SMD, BSD)

t: Index of time $(t = 1, \ldots, T)$

p: number of lags, determined based on information criteria

The null and the alternative hypothesis for the existence of unit root in variable Zt is:

$H_0: \theta = 0 \quad H_1: \theta < 0$

Dickey-Fuller t-statistic is associated with the ordinary least squares estimate of θ.

The Phillips-Perron (PP) unit root tests differ from the ADF tests mainly in how they deal with serial correlation and heteroskedasticity in the errors. In particular, where the ADF tests use a parametric autoregression to approximate the Auto Regressive-MovingAverage (ARMA) structure of the errors in the test regression, the PP tests ignore any serial correlation in the test regression. The PP tests correct for any serial correlation and heteroskedasticity in the errors out of the test regression by directly modifying the test statistics.

After examining the stationary properties of variables, if all variables are found out to be non-stationary, i.e. integrated of order 1, a possible cointegrating relationship between these variables should be searched. The cointegration test has a crucial role in deciding the model used in detecting the relationship between financial development and economic growth. We employ the Johansen multivariate cointegration technique, proposed by Johansen (1988) and Johansen and Juselius (1990), in order to apply the cointegration test. This technique provides two different likelihood ratio tests based upon trace statistics and maximum eigenvalue statistics.

After obtaining cointegration test results, we apply a Granger causality test. Granger (1988) implies that if two time-series variables are cointegrated, then at least one-directional Granger-causation exists. Therefore, the existence of a stable long-run relationship (cointegrating relationship) between financial development and economic growth implies that the three variables are causally related at least in one direction.

A vector error correction (VEC) model is a restricted VAR designed for use with nonstationary series that are known to be cointegrated. The VEC has cointegration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

If there is no cointegrating relationship, we make the variables stationary by first differencing and test for causality in a VAR context. Finally, for non-stationary variables and a cointegrated relationship, we estimate a vector error correction model and again test for Granger causality in this context.

SECTION IV: EMPIRICAL ANALYSIS

4.1. Stationary Properties of the Variables

As it is emphasized before, integration order of each proxy should be determined in order to apply VAR and VECM methodologies. Both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are used in the stationarity analysis. Lag lengths are decided by evaluating Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). The Econometrics program (E-Views 6.0) gives appropriate lag length automatically, according to the criteria set by the user.

Table 3. Unit Root Based on Augmented Dickey Fuller (ADF) Test

	ADF Test Statistics			
	None (T_n)	Intercept (T_i)	Intercept and Trend (T_t)	Lag Length
EG	2.5587	-0.5311	-3.1854	5
SMD	0.3665	-1.5766	-2.8681	8
BSD	2.8825	2.2891	0.5814	1
ΔEG	-1.8394	-3.1778	-3.1575	4
ΔSMD	-3.7138	-3.8982	-3.7944	9
ΔBSD	-3.8573	-4.3400	-4.8098	1

Notes: T_n is the t-statistic for testing the significance of θ when a constant and time trend is not included to the ADF test equation. T_i is t-statistic for testing the significance of θ when a constant is included to the ADF test equation. T_t is the t-statistic for testing the significance of θ when a constant and time trend is included to the ADF test equation.
The critical values at 1, 5, and 10% are -2.59, -1.94 and -1.61 for T_n, -3.50, -2.89 and -2.58 for T_i and -4.06, -3.46 and -3.16 for T_t respectively.
The proper lag order of ADF test is chosen automatically by E-Views program based upon Akaike and Schwarz Information Criteria.

Table 3 and table 4 indicate ADF and PP results of each proxy at levels and at first differences. From these results we can conclude that each series has unit root at levels and it is stationary when first difference is taken. It can be said that all variables are integrated of order 1, I(1).

Table 4. Unit Root Based on Philips-Perron (PP) Test

	PP Test Statistics			
	None (T_n)	Intercept (T_i)	Intercept and Trend (T_t)	Bandwidth
EG	3.8853	-0.2001	-2.5199	4
SMD	-0.3864	-2.2791	-3.6424	3
BSD	2.9666	2.5526	0.3768	3
ΔEG	-3.0406	-3.7585	-3.7445	0
ΔSMD	-9.4420	-9.4495	-9.3957	1
ΔBSD	-5.9831	-6.4754	-7.2473	1

Notes: T_n is the adjusted t-statistic for testing the significance of θ when a constant and time trend is not included to the PP test equation. T_i is adjusted t-statistic for testing the significance of θ when a constant is included to the PP test equation. T_t is the adjusted t-statistic for testing the significance of θ when a constant and time trend is included to the PP test equation.
The critical values at 1, 5, and 10% are -2.59, -1.94 and -1.61 for T_n, -3.50, -2.89 and -2.58 for T_i and -4.06, -3.46 and -3.16 for T_t respectively.
The proper bandwidth of PP test is chosen automatically by E-Views program using Newey-West method and Bartlett kernel method is used for spectral estimation.

4.2. Pairwise Granger Causality

Before searching for the cointegration relationship between the variables, all proxy variables are treated as if they are not cointegrated and Granger causality tests are applied in order to get an idea about the relationship between financial development and economic growth. Pairwise Granger causality test is applied to the first differenced variables since all the variables are found to be I(1).

Table 5. Pairwise Granger Causality Tests

Lag	Null Hypothesis:	Obs	F-Stat.	Prob.
	DBSD does not Granger Cause DEG**	85	1.88919	0.0943
4	DEG does not Granger Cause DBSD		0.76587	0.5992
	DSMD does not Granger Cause DEG*	85	5.39673	0.0001
4	DEG does not Granger Cause DSMD		0.10359	0.9958
	DSMD does not Granger Cause DBSD	85	1.09196	0.3755
4	DBSD does not Granger Cause DSMD**		1.99719	0.0772

(*) denotes the rejection of the hypothesis at 5% significance level
(**) denotes the rejection of the hypothesis at 10% significance level
Rejection means there is causality between the variables

Table 5 indicates the results of the pairwise Granger causality test. It is seen from the table that banking sector development and stock market development proxies reveal relationship with the economic growth proxy. Both relations have the same direction, from financial development to economic growth.

4.3. VAR Model and Cointegration Test

Pairwise Granger causality test is applied with ignoring the possible cointegrating relationship between the 3 variables. Therefore, for the purpose of searching for the cointegrating relationship between the 3 variables, an unrestricted tri-variate VAR model[1] is estimated. In order to apply cointegration test, lag length in the VAR model needs to be determined. Lag length selection is carried out by using AIC.

Table 6. Cointegration Tests

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None * (H_0: r=0, H_1: r=1)	0.251248	43.09548	35.19275	0.0058
At most 1 (H_0: r=1, H_1: r=2)	0.14789	18.50093	20.26184	0.0858
At most 2 (H_0: r=2, H_1: r=3)	0.05599	4.897566	9.164546	0.2948
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None * (H_0: r=0, H_1: r=1)	0.251248	24.59455	22.29962	0.0235
At most 1 (H_0: r=1, H_1: r=2)	0.14789	13.60336	15.8921	0.1107
At most 2 (H_0: r=2, H_1: r=3)	0.05599	4.897566	9.164546	0.2948

Trace test indicates 1 cointegrating equation at 5% significance level
Max-eigenvalue test indicates 1 cointegrating equation at 5% significance level
* denotes rejection of the hypothesis at 5% significance level
**MacKinnon-Haug-Michelis (1999) p-values

Table 6 reports the trace and max-eigenvalue statistics for determining the number of cointegrating vectors (r) using Johansen's maximum likelihood approach. In trace and max-

[1] VAR estimation results can be seen in the appendix.

eigenvalue statistics, the null hypotheses are tested. According to test results, since trace and max-eigenvalue statistics are above the 95 percent critical value of 35.19 and 22.30 respectively, the null hypothesis of r=0 is rejected, which means that there is one cointegrating relationship among the variables.

4.4. VEC Model and Granger Causality

After observing that there is one cointegating equation among the three variables, we estimated a VEC model[2] assuming that there is no trend in data. As it stated previously, in a VEC model, there are two possible sources of causality: error correction term, which shows long-run causality, and lagged explanatory variables, revealing short-run causality.

Error correction term which is the normalized cointegrating equation obtained from the VEC model is as follows:

$$\Delta \mathrm{EG} = 15.827 + 0.083\Delta \mathrm{BSD} + 0.018\Delta \mathrm{SMD}$$

As seen in the VEC estimation results all coefficients are statistically significant. According to normalized equation, stock market and banking sector development contributes to economic growth in the long-run. Moreover, the positive effect of banking sector has been larger than that of the stock market.

In an effort to determine the short run causality among the three variables Granger causality/Block Exogeneity Wald tests based upon VEC model is performed. According to the test results in Table 7, short run causality is from the financial development to economic growth.

[2] VEC estimation results can be seen in the appendix.

Table 7. VEC Granger Causality/Block Exogeneity Wald Tests

Dependent variable: D(EG)=f(DBSD, DSMD)			
Excluded	Chi-sq	df	Prob.
D(BSD)	13.31611	6	0.0383
D(SMD)	31.70284	6	0.0000
All	54.57061	12	0.0000
Dependent variable: D(BSD)=f(DEG, DSMD)			
Excluded	Chi-sq	df	Prob.
D(EG)	4.017543	6	0.6743
D(SMD)	5.257745	6	0.5112
All	10.89396	12	0.538
Dependent variable: D(SMD)=f(DEG, DBSD)			
Excluded	Chi-sq	df	Prob.
D(EG)	2.008183	6	0.9189
D(BSD)	13.52576	6	0.0354
All	14.67076	12	0.2599

In order to determine the robustness of the model, diagnostic tests are implemented in Table 8. We examine whether there is autocorrelation and heteroscedasticity in the model. Moreover, normality of the model is tested. We can conclude from the test results that VEC model residual passes all diagnostic tests.

Table 8. Diagnostic Tests of the VEC Model Residual

	Df.	Test Statistic	P-value
Serial Correlation LM Test	9	15.35935	0.0815
White Heteroskedaticity Test	228	252.7537	0.1249
Normality Test	6	8.544598	0.2009

In conclusion, we found that there is a long-run relationship between the financial development and economic growth. The direction is from financial development to economic growth. Financial development contributes to economic growth in the long run. Similar results obtained for the short run relationship between the financial development and economic growth. Our analysis supports the supply-leading hypothesis which claims that financial development leads to economic growth.

SECTION V: CONCLUSION

This thesis examines the causal link between financial deepening and economic growth in Turkey with quarterly time series data for the 1988-2010 periods. In this study, cointegration relationship between two financial development proxies and an economic growth proxy is investigated by Engle-Granger technique. We found that our financial development and economic growth proxies have a cointegration relationship. Our model reveals that the relationship between financial development and economic growth is from financial development to economic growth both in the short run and in the long run.

In the economic literature there exist two conflicting hypotheses that argue the relationship between the financial development and economic growth. The first one, supply-leading hypothesis, assumes a causal relationship from financial development to economic growth. It implies a pro-active creation of financial institutions and markets will advance real growth by increasing the supply of financial services. As a result of this, financial development affects the economic growth positively. On the other hand, the demand-following hypothesis assumes a causal relationship from economic growth to financial development. It implies an increase in economic growth enhances the demand for financial services. As a consequence of this, financial development leads the economic growth.

Our findings support the view that supply leading hypothesis is valid for the Turkey for the concerned period. We think that rapid private credit growth lies behind our empirical findings. After hit by a disruptive economic crisis in 2001 Turkey strengthened its banking system and built a strong financial intermediation base that supports the economic activity. Since that time Turkish banking sector balance sheet underwent a principal transformation. In pre-crisis period, the sector moved away from real intermediation activities and just financed the public sector. Following the banking reform, banking sector concentrated mainly on intermediation activities by providing loans to the private sector. In the years following the 2001 crisis, banking sector started to finance the private sector and supported the economic growth in a strong manner.

Nowadays it has been argued that Turkish economy is overheated because of the rapid credit growth. Central Bank of Turkey (CBRT) and Banking Regulation and Supervision Agency (BRSA) authority took some measures to slow down the pace of private credit growth starting from 2010. However, it should be kept in mind that private credit to GDP ratio is still low in Turkey compared to developed countries. Because of the overheating arguments and current account deficit concerns it can be accepted to take some measures to slow down the pace of credit growth in the very short run. However, we consider that Turkey needs to finance its private sector progressively in order to grow consistently in the long run.

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APPENDIX:

Table A1. Vector Autoregression Estimates
Standard errors in ( ) & t-statistics in [ ]

	EG	BSD	SMD
EG(-1)	1.745970	11.60563	-26.34106
	(0.12356)	(14.6669)	(91.1745)
	[14.1309]	[0.79128]	[-0.28891]
EG(-2)	-0.757502	-9.091384	8.506653
	(0.22794)	(27.0583)	(168.203)
	[-3.32319]	[-0.33599]	[0.05057]
EG(-3)	-0.144606	7.162894	45.66260
	(0.23304)	(27.6637)	(171.967)
	[-0.62051]	[0.25893]	[0.26553]
EG(-4)	-0.241016	-21.75463	-0.241116
	(0.22390)	(26.5779)	(165.217)
	[-1.07646]	[-0.81852]	[-0.00146]
EG(-5)	0.631737	17.31788	12.10257
	(0.20605)	(24.4592)	(152.046)
	[3.06596]	[0.70803]	[0.07960]
EG(-6)	-0.224512	-3.049121	-35.11728
	(0.10887)	(12.9240)	(80.3399)
	[-2.06212]	[-0.23593]	[-0.43711]
BSD(-1)	-1.31E-08	1.161887	1.814920
	(0.00105)	(0.12431)	(0.77274)
	[-1.3e-05]	[9.34688]	[2.34869]
BSD(-2)	0.002189	-0.084072	-2.443123
	(0.00154)	(0.18336)	(1.13984)
	[1.41693]	[-0.45851]	[-2.14340]
BSD(-3)	-0.002618	-0.288720	0.309093
	(0.00145)	(0.17166)	(1.06709)
	[-1.81048]	[-1.68194]	[0.28966]
BSD(-4)	-7.84E-05	0.547750	0.867673
	(0.00138)	(0.16349)	(1.01628)
	[-0.05690]	[3.35043]	[0.85377]
BSD(-5)	0.001222	-0.479212	-1.925311
	(0.00148)	(0.17554)	(1.09122)
	[0.82630]	[-2.72992]	[-1.76437]
BSD(-6)	-0.001387	0.156082	1.623609
	(0.00107)	(0.12747)	(0.79239)
	[-1.29190]	[1.22447]	[2.04900]

SMD(-1)	0.000560	0.013843	0.815751
	(0.00016)	(0.01900)	(0.11810)
	[3.49790]	[0.72860]	[6.90701]
SMD(-2)	-0.000561	0.000731	-0.048802
	(0.00022)	(0.02595)	(0.16129)
	[-2.56577]	[0.02818]	[-0.30257]
SMD(-3)	0.000127	-0.024798	0.060261
	(0.00023)	(0.02708)	(0.16831)
	[0.55889]	[-0.91588]	[0.35803]
SMD(-4)	2.44E-05	-0.019004	-0.135134
	(0.00023)	(0.02727)	(0.16954)
	[0.10619]	[-0.69679]	[-0.79704]
SMD(-5)	-0.000250	0.027727	-0.134434
	(0.00023)	(0.02707)	(0.16831)
	[-1.09826]	[1.02409]	[-0.79875]
SMD(-6)	-6.51E-06	-0.036794	0.157275
	(0.00018)	(0.02155)	(0.13395)
	[-0.03585]	[-1.70746]	[1.17409]
C	-0.164303	-38.80628	-80.00694
	(0.14223)	(16.8841)	(104.957)
	[-1.15515]	[-2.29840]	[-0.76228]
R-squared	0.999262	0.989644	0.814043
Adj. R-squared	0.999064	0.986862	0.764085
Sum sq. resids	0.003682	51.88735	2005.068
S.E. equation	0.007413	0.880022	5.470501
F-statistic	5038.753	355.6976	16.29438
Log likelihood	310.4897	-100.3020	-257.4394
Akaike AIC	-6.778831	2.774465	6.428823
Schwarz SC	-6.236592	3.316705	6.971063
Mean dependent	18.07342	17.10385	22.53061
S.D. dependent	0.242253	7.677523	11.26287
Determinant resid covariance (dof adj.)		0.001128	
Determinant resid covariance		0.000533	
Log likelihood		-42.02317	
Akaike information criterion		2.302864	
Schwarz criterion		3.929583	

Table A2. Vector Error Correction Estimates
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
EG(-1)	1.000000
PPC(-1)	-0.082546
	(0.02358)
	[-3.50071]
PSMD(-1)	-0.017639
	(0.01014)
	[-1.73999]
C	-15.82741
	(0.37700)
	[-41.9829]

Error Correction:	D(EG)	D(PPC)	D(PSMD)
CointEq1	0.009726	-0.088061	2.409032
	(0.00253)	(0.33311)	(1.97494)
	[3.84893]	[-0.26436]	[1.21980]
D(EG(-1))	0.852408	12.00697	-67.74628
	(0.13176)	(17.3679)	(102.971)
	[6.46956]	[0.69133]	[-0.65792]
D(EG(-2))	-0.202763	4.404661	-24.31204
	(0.15203)	(20.0401)	(118.813)
	[-1.33371]	[0.21979]	[-0.20462]
D(EG(-3))	-0.209333	7.800970	7.502807
	(0.13104)	(17.2731)	(102.408)
	[-1.59751]	[0.45163]	[0.07326]
D(EG(-4))	-0.377643	-18.09332	-9.752530
	(0.12785)	(16.8532)	(99.9191)
	[-2.95375]	[-1.07358]	[-0.09760]
D(EG(-5))	0.376486	3.427611	26.06314
	(0.13500)	(17.7949)	(105.502)
	[2.78887]	[0.19262]	[0.24704]
D(EG(-6))	-0.244812	5.240116	-75.22863
	(0.11021)	(14.5279)	(86.1329)
	[-2.22128]	[0.36069]	[-0.87340]
D(PPC(-1))	0.000727	0.272807	2.528083
	(0.00103)	(0.13639)	(0.80862)
	[0.70255]	[2.00020]	[3.12640]
D(PPC(-2))	0.003031	0.163164	-0.956165
	(0.00111)	(0.14620)	(0.86676)
	[2.73257]	[1.11607]	[-1.10315]

D(PPC(-3))	0.000717	-0.178997	0.533051
	(0.00109)	(0.14424)	(0.85516)
	[0.65515]	[-1.24097]	[0.62333]
D(PPC(-4))	0.000751	0.420634	1.036613
	(0.00100)	(0.13184)	(0.78164)
	[0.75083]	[3.19054]	[1.32621]
D(PPC(-5))	0.002055	-0.103660	-1.461801
	(0.00105)	(0.13813)	(0.81894)
	[1.96142]	[-0.75045]	[-1.78498]
D(PPC(-6))	0.000701	-0.015554	1.800433
	(0.00104)	(0.13687)	(0.81149)
	[0.67506]	[-0.11364]	[2.21868]
D(PSMD(-1))	0.000793	0.019742	-0.015801
	(0.00015)	(0.02040)	(0.12097)
	[5.12557]	[0.96757]	[-0.13063]
D(PSMD(-2))	9.51E-05	0.025054	-0.098295
	(0.00016)	(0.02142)	(0.12698)
	[0.58557]	[1.16982]	[-0.77412]
D(PSMD(-3))	0.000296	-0.002212	-0.019649
	(0.00016)	(0.02149)	(0.12741)
	[1.81718]	[-0.10292]	[-0.15422]
D(PSMD(-4))	0.000331	-0.021597	-0.128612
	(0.00016)	(0.02150)	(0.12748)
	[2.02866]	[-1.00445]	[-1.00890]
D(PSMD(-5))	2.13E-05	0.016354	-0.274275
	(0.00016)	(0.02159)	(0.12797)
	[0.12995]	[0.75767]	[-2.14320]
D(PSMD(-6))	0.000130	-0.015422	-0.082447
	(0.00017)	(0.02235)	(0.13252)
	[0.76484]	[-0.68995]	[-0.62216]
R-squared	0.807154	0.370541	0.286482
Adj. R-squared	0.754560	0.198871	0.091887
Sum sq. resids	0.003385	58.81908	2067.514
S.E. equation	0.007162	0.944033	5.596961
F-statistic	15.34682	2.158444	1.472193
Log likelihood	309.9590	-104.9619	-256.2464
Akaike AIC	-6.846094	2.916751	6.476387
Schwarz SC	-6.300090	3.462755	7.022391
Mean dependent	0.009850	0.358983	0.460424
S.D. dependent	0.014456	1.054717	5.873302

Determinant resid covariance (dof adj.)	0.001194
Determinant resid covariance	0.000559
Log likelihood	-43.54388
Akaike information criterion	2.459856
Schwarz criterion	4.212818