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Financial Development and Economic Growth in Turkey: Further Evidence on the Causality Issue

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ABSTRACT

This paper examines the causal relationship between financial development and economic growth in Turkey. 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 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.

Key Words: Financial development, economic growth, causality, cointegration, Turkey.

JEL Classification: O11, O57

1. Introduction

This paper explores the relationship between financial development and economic growth in Turkey. Since the seminal work of Patrick (1966), which first postulated a bi-directional relationship between financial development and economic growth a large empirical literature has emerged testing this hypothesis (see Levine, 1997 for survey). Two trends in this literature can, however, be identified. The first, testing the relationship between economic growth and financial development, frequently adopts a single measure of financial development and tests the hypothesis on a number of countries using either cross section or panel data techniques. (See, for example, Jung (1986), Rubini and Sala-i-Martin (1992), Demetriades and Hussein (1996) and Luintel and Khan (1999)). The second trend in the empirical literature is to examine the hypothesis for a particular country using time series techniques, as for example, Murinde and Eng, (1996) for Singapore, Lyons and Murinde (1994) for Ghana, Odedokun (1989) for Nigeria, Agung and Ford (1998) for Indonesia and Wood (1998) for Barbados. This paper contributes to this second strand of the literature, which it extends in two directions.

This paper is the first single-country study of the relationship between financial development and economic growth in Turkey, despite over 20 years of financial liberalisation. The methodology used is that of multivariate cointegration and vector error correction models (VECM) following Johnasen (1988) and Johansen and Juselius (1990). The second contribution is to test for the robustness of the causality results by using five alternative proxies for financial development. Given that financial development is difficult to measure, alternative proxies may give rise to different causal relationships. The use of alternative proxies will therefore enable us to test the robustness of the earlier finding, developed in the multi-country context of Demetriades and Hussein (1996), that economic growth follows financial development in Turkey. Moreover, to the extent that our results show that different measures of financial developoment do give rise to different causal patterns between financial development and economic growth, then the findings of previous studies that use only a single measure of financila development may be subject to measurement bias.

The structure of this paper is as follows. Section 2 reviews the theoretical debate on the nature of the relationship between financial development and economic growth. Section 3

explains the alternative measures of financial development and economic growth in the context of developments in the Turkish economy. Section 4 sets out the econometric methodology and investigates the univariate time series properties of the data. The empirical results are discussed in Section 5 and Section 6 offers a brief conclusion.

2. The causal relationship between financial development and economic growth

Patrick (1966) identified two possible causal relationships between financial development and economic growth. The first - called 'demand following' – views the demand for financial services as dependent upon the growth of real output and upon the commercialization and modernization of agriculture and other subsistence sectors. Thus the creation of modern financial institutions, their financial assets and liabilities and related financial services are a response to the demand for these services by investors and savers in the real economy (Patrick, 1966:174). On this view the more rapid the growth of real national income, the greater will be the demand by enterprises for external funds (the saving of others) and therefore financial intermediation, since in most situations firms will be less able to finance expansion from internally generated depreciation allowance and retained profits. For the same reason, with a given aggregate growth rate, the greater the variance in the growth rates among different sectors or industries, the greater will be the need for financial intermediation to transfer saving to fast-growing industries from slow-growing industries and from individuals. The financial system can thus support and sustain the leading sectors in the process of growth. In this case an expansion of the financial system is induced as a consequence of real economic growth.

The second causal relationship between financial development and economic growth is termed 'supply leading' by Patrick (1966). 'Supply leading' has two functions: to transfer resources from the traditional, low-growth sectors to the modern high-growth sectors and to promote and stimulate an entrepreneurial response in these modern sectors (Patrick, 1966:75). This implies that the creation of financial institutions and their services occurs in advance of demand for them. Thus the availability of financial services stimulates the demand for these services by the entrepreneurs in the modern, growth-inducing sectors.

The emergence of the so-called new theories of endogenous economic growth (see Romer, 1986, 1990) has given a new impetus to the relationship between growth and financial development as these models postulate that savings behaviour directly influences not only equilibrium income levels but also growth rates (See for example, Greenwood and Jovanovic, 1990 and Bencivenga and Smith, 1991). Thus financial markets can have a strong impact on real economic activity. Indeed, Hermes (1994) argues that financial liberalization theory and the new growth theories basically assume that financial development leads to economic growth. On the other hand, Murinde and Eng (1994:393) and Luintel and Khan (1999:383) argue that a number of endogenous growth models show a two-way relationship between financial development and economic growth. It is apparent therefore that the debate on the direction of causality between financial development and economic growth remains, despite the emergence of new growth theories. It is the bi-directional relationship between economic growth and financial development that motivates this study.

3. Alternative indicators of financial development

One of the most important issues in assessing the relationship between financial development and economic growth is how to obtain a satisfactory empirical measure of financial development. The five most commonly used proxies for financial development are: the ratio of money to income, the ratio of banking deposit liabilities to income, the ratio of private sector credit to income, the share of private sector credit in domestic credit and the ratio of domestic credit to income. These proxies are considered in turn.

Monetary aggregates provide a set of variables which may be used to measure the extent of financial development (see for example, De Gregorio and Guidotti, 1995 and Lynch, 1996). In the literature, the most commonly used measure of financial development is a ratio of some broad measure of the money stock, usually M2, to the level of nominal income (King and Levine, 1993a, 1993b; Wood, 1993; Murinde and Eng, 1994; Lyons and Murinde, 1994; Berthelemy and Varoudakis, 1995; Arestis and Demetriades, 1997; and Agung and Ford, 1998). This simple indicator measures the degree of monetization in the economy. The monetisation variable is designed to show the real size of the financial sector of a growing economy in which money provides valuable payment and saving services. The

'narrow money' stock best reflects the former - payment services - and 'broad money' the latter, savings function. Narrow money balances should rise in line with economic transactions, but broad money should rise at a faster pace if financial deepening is occuring (Lynch, 1996).

In some cases, however, monetary aggregates – especially narrow money aggregates - may be very poor indicators of the extent of financial development. For example, De Gregorio and Guidotti (1995) criticise the use of narrow money to income ratio as a proxy for financial development on the grounds that a high level of monetization (M1/GDP) is most likely the result of financial underdevelopment, while a low level of monetization is the result of a high degree of sophistication in financial markets which allows individuals to economize on their money holdings. De Gregorio and Guidotti (1995) suggest the use of a less liquid monetary aggregate (M3 or M2/GDP) as a proxy for financial development. In this study, the ratio of broad money to income (M2Y) will be used as onemeasure of financial development in Turkey. This ratio has risen steadily since 1963 in Turkey. Between 1963 and 1970 the average broad money to income ratio was 18.5 per cent, rising between 1970 and 1980 to about 23 per cent. After the financial reforms of 1980 it increased to around 31.5 per cent.

An alternative to a broad money ratio is ratio of bank deposit liabilities to income as a quality proxy for financial development (Demetriades and Hussein, 1996; Luintel and Khan, 1999). In developing countries, a large component of the broad money stock is currency held outside the banking system. In principle a rising ratio of broad money to income may reflect the more extensive use of currency rather than an increase in the volume of bank deposits. Therefore in order to obtain a more representative measure of financial development, currency in circulation should be excluded from the broad money stock. One such proxy is the ratio of bank deposit liabilities to income (BDY). This measure of financial development grows over the whole period from about 8 per cent to around 20 per cent, but this growth is uneven. From 1964 until 1978 there is a sharp rise in the ratio followed by a fall from almost 30 per cent in 1976, to 14 per cent in 1980. After the financial reforms there is again a sharp rise in the ratio of bank deposits to income, peaking at 31 per cent in 1989, followed by a further decline in the early 1990, leaving the ratio at just under 20 per cent at the end of the sample period.

The ratio of domestic credit to income (DCY) can be used as another proxy for financial development (Odedokun, 1989). This represents the domestic assets of the financial sector. This is the major item on the asset side of the consolidated balance sheet of the financial sector. It is expected to increase in response to improved price signalling, represented primarily by the establishment of positive real interest rates. In Turkey this ratio has increased from 26 per cent in the 1960s to 31 per cent in the 1970s and to just over 36 per cent after the liberalisation of the 1980.

In order to obtain a more direct measure of financial intermediation, the private sector credit ratio (CPY) is also employed as a fourth measure of financial development. It is assumed that credit provided to the private sector generates increases in investment and productivity to a much larger extent than do credits to the public sector. It is also argued that loans to the private sector are given more stringently and that the improved quality of investment emanating from financial intermediaries' evaluation of project viability is more significant for private sector credits. This series has also shown an upward trend over the sample, but most particularly after 1980, but it is also quite volatile. It rises, for example, from 13 per cent in 1980 to 32 oer cent in 1987, before falling back to around 20 per cent at the end of the sample.

Another proxy for financial development is the share of the private sector credit in the domestic credit. This indicator may capture the aspect of domestic asset distribution of an economy. A financial system that simply funnels credit to the government or state-owned enterprises may not be evaluating managers, selecting investment projects, pooling risk and providing financial services to the same degree as a financial system that allocates credit to the private sector. Lynch (1996) argues that government credit from banks in countries with a highly regulated financial system is frequently captive and that banks have no control over its use. Consequently, the important credit allocation role of banks is best represented by their lending to the private sector. The share of the credit given to the private sector in the domestic credit may reflect another aspect of the financial sector and can be used as a proxy for financial development. This ratio has fluctuated over the sample period rising from 0.50 in 1964 to 0,86 in 1972, hem slowly declining to about 0.4 in 1980. After the liberalisation of 1980 this ratio doubles to reach 0.84 by 1990, after which it falls back to about 0.63 at the end of the sample. This is a rise of some 26 oer cent over the whole sample.

4. Methodology, Data Set and Unit Root Tests

In order to empirically test the causality issue it is common to apply the Granger causality test (Granger, 1969, Sims, 1972). Moreover, the cointegration technique pioneered by Engle and Granger (1987) and Granger (1986) makes a significant contribution towards testing causality. According to this technique, Engle and Granger (1987) demonstrate that once a number of variables (say *Y* and *FD* representing income and financial development) are found to be cointegrated, there always exists a corresponding error-correction representation which implies that changes in the dependent variable are a function of the level of dis-equilibrium in the cointegration relationship (captured by the error-correction term) as well as changes in other explanatory variable(s). A consequence of cointegration is that either $?Y_t$ or $?FD_t$ or both must be caused by the lagged error-correction term which is itself a function of Y_{t-1}, FD_{t-1}. Formally the relationship between *Y* and *FD* can be written in vector-error correction model (VECM) form as:

$$?Y_t = ?_1 + \sum_{i=1}^{m} ?_{1i} ?FD_{t-i} + \sum_{i=1}^{n} ?_{1i} ?Y_{t-i} + \sum_{i=1}^{r} ?_{1i} ECM_{r,t-1} + u_t \quad (1)$$

$$?FD_t = ?_2 + \sum_{i=1}^{m} ?_{2i} ?FD_{t-i} + \sum_{i=1}^{n} ?_{2i} ?Y_{t-i} + \sum_{i=1}^{r} ?_{2i} ECM_{r,t-1} + u_t \quad (2)$$

where $?$ denotes the first-difference of a non-stationary variable. In this VECM, the sources of causation can be exposed through the statistical significance of three different tests. First, a joint test applied to the sum of the lags of each explanatory variable in turn using a Wald $?^2$ test; second, by a t-test test on the lagged ECM term which is in fact, the weak exogeneity test; and thirdly, by a joint test applied to the sum of each explanatory variable and the lagged ECM terms using a Wald $?^2$ test, which is a strong exogeneity test (Charemza and Deadman, 1997). For instance, the null hypothesis that financial development (*FD*) does not Granger cause economic growth is rejected if the $?_{1i}$'s are jointly significantly different from zero. Again the same null is rejected if $?_{1i}$ is significant or if $?_{1i}$s and $?_{1i}$ are jointly significant from zero.

If there is no long run relationship between financial development and economic growth, the traditional causality test is applied. However, the studies applying the standard

causality tests suffer from the following two methodological deficiencies. First, these standard tests did not examine the basic time series properties of the variables. If the variables are cointegrated, then these tests incorporating differenced variables will be mis-specified unless the lagged error-correction term is included (Granger, 1988). Second, these tests turn the series stationary mechanically by differencing the variables and consequently eliminates the long-run information embodied in the original level form of the variables. The error-correction model derived from the cointegrating equations, by including the lagged error-correction term reintroduces, in a statistically acceptable way, the long-run information lost through differencing. This term also opens up an additional channel of Granger causality so far ignored by the standard causality tests.

The annual data is employed for the Turkish economy for the period 1963-1995. The gross national product (GNP) at 1968 constant prices is available from *Statistical Indicators 1923-1995*, published by the Turkish State Institute of Statistics (SIS). Broad money (line 35), domestic credit (line 32), banking deposit liabilities (line 24 + line 25) and private sector credits (claims on the private sector, line 32d) are taken from various issues of the *International Financial Statistics* (IFS). The share of private sector credit in total domestic credit is calculated from these series by taking the ratio of line 32d to line 32. The definition of variables is given in Table 1.

If a time series has a unit root, a widespread and convenient way to remove non-stationarity is by taking first differences of the relevant variable. A non-stationary series which by differencing *d* times transfers to a stationary one, is called integrated of order d and denoted as I(d) (Charemza and Deadman, 1997). In fact, when a series y_t is integrated of order 1 it means that it is not itself stationary, but that its first differences are stationary. In order to investigate the time series properties of the variables the sequential testing procedure suggested by Holden and Thompson (1992). The main advantage of this procedure is that it takes into account the full data generating process with drift and trend terms and tests the null hypothesis of unit root sequentially.

All variables are in logarithmic form and are represented as lower cases letters. The results of the Dickey-Fuller (DF) and Augmented Dickey – Fuller (ADF) unit root tests for the variables are presented in Table 1. The critical values are produced by the PcGive

econometrics program (Doornik and Hendry, 1994) which is based on the response surfaces in MacKinnon (1991). The results of DF and ADF unit root tests show that the annual levels of the variables are not stationary, but that their first difference stationary, with or without the inclusion of a deterministic trend.

5. Empirical Results

In order to examine the direction of causality a long-run relationship between each of proxies for financial development (*FD*) and income is established by using the Johansen cointegration procedure (Johansen, 1988; Johansen and Juselius, 1990). The proxies for financial development are the ratio of broad money to gross national product (*m2y*), the ratio of bank deposit liabilities to GNP (*bdy*), the ratio of claims on the private sector to GNP (*cpy*), the share of private sector credits in the domestic credit (*cpd*), and the ratio of domestic credit to GNP (*dcy*). Economic growth is proxied by the change in per capita GNP (*yp*). All the variables are in logarithmic form and enter the cointegration analysis in levels.

In a bivariate system consisting in this case of *yp* and *FD*, the maximum number of cointegrating vectors is one so that the null hypothesis is that there is no cointegrating vector and the alternative is that there is one cointegrating vector (Doornik and Hendry, 1994). The Johansen cointegration procedure gives the results as reported in Table 2. The maximum eigenvalue and trace statistics show that there is one cointegrating vector between four of the five proxies for financial development variables per capita income at the 5 per cent level. In the case of *cpd* and *yp*, the maximum eigenvalue and trace statistics, suggest that there is one cointegrating vector, but this is only significant at the 10 per cent level, indicative of a much weaker association. Furthermore if the 10 per cent level of significance is chosen then there are two cointegrating vectors private sector credit to income ratio and real GNP, which is inconsistent with the unit root test results which shows the levels of the variables to be non-stationary and their differences to be stationary.

Although Table 2 does not report the cointegrating vectors since we are simply interested in the direction of causality, it should be noted that the correlation between

financial development and economic growth is found to be positive in all cointegrated relationships in the bivariate context.

The next step is to empirically test the causal relationship between financial development and economic growth by forming the VECM, including explicitly the cointegrating vector obtained in the first stage. After estimating the VECM and applying the relevant statistical test to identify the sources of causation, the results are presented in Table 3.

As can be seen from Table 3, the principal source of causation is through the error-correction mechanism in three out of the five cases (between ?*yp* and ?*m2y*, between ?*yp* and ?*bdy*, and between ?*yp* and ?*cpy*). In the other two cases (between ?*cpd* and ?*yp*, and between ?*dcy* and ?*yp*), the error-correction terms are statistically significant at the 10 percent level. In two cases (between ?*yp* and ?*bdy* and between ?*yp* and ?*dcy*), there is further support for the source of causation through the statistical significance of the explanatory variables. As far as the joint test applied to the sum of coefficients of each explanatory variable and the corresponding error-correction term is concerned, there is support for the causality between financial development and economic growth in four cases. It seems that the causality between the share of private credit in domestic credit measure (?*cpd*) and economic growth (?*yp)* is not very strong, it is only through the ECM and is significant at the 8 percent level. This is, of course, consistent with the finding that there was little cointegration between *cpd* and *yp*.

The economic interpretation of these statistical tests reveals that all causal relationships between finance and growth are not in the nature of supply-leading or demand-following, rather it depends upon the measures of financial development. The direction of causality between variables is summarised in Table 4. As can be seen from Table 4, it is not possible to draw a firm conclusion as to whether the demand-following or supply-leading hypotheses is predominant in the Turkish case, although on balance the demand-leading hypothesis is the stronger, with the proxies for bank deposits, private sector credit and domestic credit all indicating that economic growth causes financial development.

Furthermore, as there is no causal relationship between the ratio of private sector credit to total domestic credit, the relationship between financial development and economic growth is only in the nature of ‘supply-leading’ if the traditional broad money ratio is taken as the measure of financial development. To the extent that this measure of financial development is dominated by cash or demand deposits, that is the components which are included in the narrow (M1) definition of the money supply, then, as noted earlier, this variable is a measure of financial underdevelopment, rather than development. In Turkey, at least in the early years of this sample, it is likely that M1 dominated what is now the M2 measure of the money supply. This is reason therefore for not over-emphasising this specific finding and for simultaneously adding weight to the demand-lead causality hypothesis.

6. **Conclusions**

In this paper, the direction of causality between financial development and economic growth in Turkey is investigated for the period 1963-1995. In order to see the impact of different aspects of financial development, five alternative financial development indicators are proposed. Granger causality tests have been carried out in the context of cointegration and vector error-correction mechanisms. The empirical results show that the direction of causality between financial development and economic growth is sensitive to the choice of measurement for financial development in Turkey. There can therefore be no 'wholesale' acceptance of the view that 'finance leads growth' just as there can be no 'wholesale' acceptance of the view that 'finance follows growth’ in Turkey. The results do however, imply that the strength of the causality between financial development and economic growth is much weaker than that between economic growth and financial development. Indeed it would not be inconsistent with the results obtained to argue that for all intents and purposes in Turkey economic growth leads financial development.

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Table 1 The DF And ADF Tests For Unit Root

Explanatory Variable	code	t-value of ?	code	t-value of ?
Per capita GNP	*yp*	-2.04 (1)	? *yp*	-6.62*
Domestic credit to GNP ratio	*dcy*	-1.58	? *dcy*	-4.08*
M2 to GNP ratio	*m2y*	-1.09 (1)	? *m2y*	-3.80 (2)*
Bank deposit liabilities to income ratio	*bdy*	-2.46 (2)	? *bdy*	-3.66 (1)*
Private sector credit to domestic credit ratio	*cpd*	-2.50	? *cpd*	-6.76*
Private sector credit to income ratio	*cpy*	-2.70	? *cpy*	-6.49*

Critical value at 5 per cent of ADF test –2.95. An asterisk denotes a rejection of the null hypopthesis of non-stationarity. Number in parentheses beside t-value are the number of lags required to make the residuals whire noise. t-values for ? based on model:

$$?x_t \; ? \; ? \; ?x_{t?1} \; ? \; ? \; ?_j ?x_{t?j?1} \; ? \; u_t$$

for column 3 and the first difference of the model for column 5. The results are almost identical when a deterministic time trend is introduced.

Table 2 Johansen Cointegration Results

Variables	Lags	Cointegration tests				Result
		Max.	95%	Trace	95%	
m2y and *yp*	2	24.35**	15.7	30.38**	20.0	Cointegrated
bdy and *yp*	3	20.69**	15.7	24.46**	20.0	Cointegrated
cpy and *yp*	2	17.65* 11.26*	15.7 9.2	28.91** 11.26*	20.0 9.2	Cointegrated
cpd and *yp*	1	18.78*	15.7	23.93*	20.0	Cointegrated
dcy and *yp*	1	20.46**	15.7	37.29**	20.0	Cointegrated

Table 3 The Source of Causation

ıdent Variable	Wald Test		t-test	Wald test
	? ? *yp*	? ? *m2y*	ECM_{-1}	
	-	$?^2(4)=1.82$ (0.76)	-2.62 (0.015)**	(? ? m2y,ECM_{-1})
	$?^2(4)=4.12$ (0.38)		-0.84 (0.40)	(? ? yp, ECM_{-1})
	? ? yp	? ? bdy		
		$?^2(4)=3.44$ (0.48)	0.44 (0.66)	(? ? bdy,ECM_{-1})
	$?^2(4)=11.66$ (0.02)**		-3.90 (0.0008)***	(? ? yp,ECM_{-1})
	? ? yp	? ? cpy		
		$?^2(4)=2.30$ (0.67)	-0.51 (0.61)	(? ? cpy,ECM_{-1})
	$?^2(4)=7.004$ (0.13)		-3.18 (0.004)***	(? ? yp,ECM_{-1})
	? ? yp	? ? cpd		
		$?^2(2)=0.54$ (0.76)	-1.78 (0.08)*	(? ? cpd,ECM_{-1})
	$?^2(2)=2.34$ (0.30)		0.56 (0.57)	(? ? yp,ECM_{-1})
	? ? yp	? ? dcy		
		$?^2(4)=3.52$ (0.47)	-1.20 (0.24)	(? ? dcy,ECM_{-1})
	$?^2(4)=10.40$ (0.03)**		-1.94 (0.06)*	(? ? yp,ECM_{-1})
;	1.? denotes the sum of the coefficients of the *lagged* relevant variables. 2.*, ** and *** indicate the significance of the test at the 10, 5 and 1 percent levels. 3.The p-values are in parentheses			

Table 4 Summary of the causality issue

? *m2y* and ? *yp*	Finance causes Growth	
? *bdy* and ? *yp*		Growth causes finance
? *cpy* and ? *yp*		Growth causes finance
? *cpd* and ? *yp*	Finance causes growth	
? *dcy* and ? *yp*		Growth causes finance