

Does Financial Development Affect Growth?

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Does Financial Development Affect Growth?

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3 **Does Financial Development affect Growth?**
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13
14 **Abstract**

15 This paper contributes to the literature on the relationship between financial development and
16 economic growth in three ways: it utilises recently developed techniques for generalised
17 methods of moments (GMM) one-step estimation with dynamic panel models, it focuses
18 exclusively on a sample of developing countries and it uses as proxies for financial
19 development variables which capture both banking sector and stock market effects. The
20 results provide evidence, based on a panel of annual data for thirty developing countries, that
21 while the stock market variables are positively and significantly related to growth, their
22 presence results in the standard banking sector variables, credit to the private sector and
23 liquid liabilities, having negative effects on growth.
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33 **1. Introduction**

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35 Since the pioneering work of McKinnon (1973) and Shaw (1973) suggesting a link between
36 growth and financial development many attempts (e.g. King & Levine 1993a, Levine &
37 Zervos, 1996, Beck *et al.*, 2000, Levine *et al.*, 2000, Tang, 2006, Zang & Kim, 2007) have
38 been made at providing evidence for this link. However, Driffill (2003, p. 363) after reviewing
39 the empirical evidence argues that the question of “whether finance plays a causal role or
40 merely follows economic development remains an open one”. Indeed, recent contributions to
41 the literature show that results either in support or rejecting the role of finance are highly
42 dependent on the model specification, the level of development (financial and/or economic) of
43 a country, the choice of financial variables and the econometric technique used.
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2 Favara (2003) concludes that the importance of private credit and liquid liabilities upon
3 economic growth is highly dependent on the choice of estimation method. While
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5 Bhattacharya and Sivasubramaniam (2003) provide evidence of unidirectional effect of
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7 financial development upon economic growth in India, Dawson (2003) shows that financial
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9 development, approximated by the variable liquid liabilities, does not affect economic growth
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11 in a sample of transition economies in Central and Easter Europe.

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14 Rioja & Valev (2004), for a sample of 74 countries at different stages of development , use
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16 generalised method of moments (GMM) estimation to conclude that evidence of an influence
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18 of financial development upon economic growth is highly dependent on the level of
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20 development of the financial sector of a particular country or group of countries: at low levels
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22 of financial development, the effect on growth is mixed, whereas at an intermediate level of
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24 financial development the effect is positive and strong . This positive effect weakens for
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26 countries at a very high level of financial development, although it does remain positive.
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28 Shan (2005) for a sample of 10 OECD countries and China finds, at best, weak support for
29
30 the hypothesis that financial development (proxied by total credit) influences economic
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32 growth. Finally, Chang & Caudill (2005) provide mixed support to the hypothesis that financial
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34 development leads economic growth for Taiwan.

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36 In this paper, we use annual panel data for 30 developing countries and utilise recently
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38 developed methods-of-moments techniques for dynamic models, which attempt to deal with
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40 the problems of biased and inconsistent estimates resulting from endogeneity and
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42 autocorrelation. To measure financial development we use two variables relating to the stock
43
44 market - the traded value and market turnover - and three variables relating to the
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46 development of the banking system - domestic credit to the private sector as a percentage of
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48 GDP, the ratio of liquid liabilities to GDP (or M3/GDP), and the ratio of commercial bank
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50 assets to all (commercial plus central) bank assets. Following Rousseau & Wachtel (2000),
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52 the usual control variables are not included in the equations. However, they are used as
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54 instruments to correct problems of simultaneity and endogeneity of the explanatory variables.

Comment [KS1]:

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2 The measurement of financial development is discussed in section 2, where the focus is on
3 the roles of financial intermediaries and of the stock market. In section 3 the estimation
4 method is set out. The empirical evidence is reported in section 4 and the conclusions are
5 presented in section 5.
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10 **2. Measuring Financial Development**

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13 To align this paper with the extant literature and allow comparability with results from previous
14 empirical work, we have selected the following variables, widely used in the literature, to
15 capture the level of financial development: domestic credit to the private sector as a % of
16 GDP, the ratio of liquid liabilities to GDP (or M3/GDP), the ratio of commercial bank assets to
17 all (commercial plus central) bank assets for the banking sector and the turnover ratio and the
18 ratio of value of shares traded to GDP for financial markets .
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26 **(a) Measures of Financial Intermediaries Development**

27 The level of financial services is commonly measured by **domestic credit to the private**
28 **sector as a % of GDP (CPS)** (e.g. King & Levine 1993a, Levine & Zervos, 1996, Beck *et al.*,
29 2000 and Levine *et al.*, 2000). This distinguishes between the credit issued to the private
30 sector and that to government and public enterprises. This variable should capture the ability
31 of intermediaries (both privately owned and state-owned) to evaluate information and identify
32 profitable investment projects. Higher levels of this ratio could be therefore interpreted as
33 indicating lower transaction costs and higher levels of financial services and therefore greater
34 financial intermediary development. However, it could be argued that given some of the
35 characteristics of the financial systems in developing countries such as repeated and
36 substantial interventions by the government leading to moral hazard problems, lack of a
37 strong regulatory system, lax supervision, lack of skills in the banking personnel (De Gregorio
38 & Guidotti, 1995 and Brownbridge & Kirkpatrick, 2000), a high value of credit to the private
39 sector, in cases of over-lending or careless lending, could actually lead to a reduction in
40 economic growth, due to its association with high, but less efficient, investment (De Gregorio
41 & Guidotti, 1995).
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6 To measure the overall size of the financial intermediary sector, the ratio of **liquid liabilities**
7 **to GDP (LL)** (or M3/GDP) is used (e.g. Goldsmith 1969, King & Levine 1993a, Rousseau &
8 Wachtel 2000, Rioja & Valev 2004, and Levine *et al.*, 2000). LL is the ratio of broad money to
9 GDP. Broad money consists of currency held outside the bank system plus interest-bearing
10 total deposit liabilities of banks and other financial institutions. However, the interpretation of
11 this variable could be difficult because a low ratio could be the result either of under-
12 development of the banking sector or equally, the result of a highly sophisticated financial
13 sector that allows economic agents to reduce money balances held with the banking system
14 and invest them in other products. Therefore care should be taken when interpreting this
15 variable (see King & Levine, 1993b, Morisson, 2000, and De Gregorio & Guidotti, 1995).
16 Also, this variable does not necessarily reflect the allocation of savings and so may not be an
17 accurate indicator of the activities of financial intermediaries.
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27 Finally, the ratio of **commercial bank assets to all (commercial plus central) bank assets**
28 **(BA)** is used to measure the degree to which commercial banks versus the central bank
29 allocate society's savings (e.g. Demirguc-Kunt & Levine 1996, Andres *et al.*, 1999, Levine *et*
30 *al.*, 2000 and Rioja & Valev 2004). The intuition underlying this is that commercial banks are
31 more likely to identify profitable investments, monitor managers' decisions, facilitate risk
32 management and mobilise savings than central banks. Commercial banks are thought to be
33 more effective than central banks in allocating savings to productive investment projects.
34 Hence, an increase in this ratio indicates an expansion of the financial sector (Levine *et al.*,
35 2000).
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46 **(b) Measuring Stock Market Development**

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49 The most commonly used complementary measures of stock market size are the market
50 turnover ratio (e.g. Demirguc-Kunt & Levine 1996, Levine & Zervos 1996, Rousseau &
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2 Wachtel 2000, and Beck & Levine 2002) and total value traded (e.g. Atje & Jovanovic 1993,
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4 Levine & Zervos, 1996, and Rousseau & Wachtel, 2000). The **turnover ratio (TR)** is the
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6 trading volume of the stock market relative to the average market capitalisation and it
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8 measures stock market liquidity, showing the importance and the credibility of available
9
10 information. In emerging markets, an increase in liquidity is a good indication of financial
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12 development. Also, it indicates low transactions costs, which facilitate fund transfers and
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14 increase the number of firms and traded shares. Hence, it promotes growth (Rousseau &
15
16 Wachtel, 2000).

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18 The ratio of **value of shares traded to GDP (TV)** is used to measure stock market activity. It
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20 measures trading volume relative to the size of the economy. Being the product of market
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22 price and the number of shares traded, it includes elements of both liquidity and size (Beck &
23
24 Levine, 2002).

25 26 27 **3. Estimation methodology**

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29 In the literature many studies of the growth - financial development relationship (see, for
30
31 example, Beck & Levine, 2002 and Levine et al. 2000) use averaged data, usually for non-
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33 overlapping five-year periods, in an effort to reduce the impact of the business cycle.
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35 However, Madsen (2002) demonstrates that averaging over 3, 5 or 8 years can produce
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37 contradictory results in Granger-Sims non-causality tests, so that any interpretation of
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39 causality for averaged data is likely to be flawed (see also Huh, 2005 for a discussion of these
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41 tests). Furthermore, there is a belief in the business cycle literature that the function of the
42
43 business cycle is central to growth, so its impact should not be minimised. Instead of using
44
45 averaged data we use annual data for a panel of developing countries. This increases the
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47 sample size and allows dynamic effects to be included.

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49 Also, previous research has not adequately dealt with the problems of simultaneity and
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51 endogeneity of the explanatory variables. Here, to deal with these problems, the method of
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53 estimation uses instrumental variables and, as well as the lagged values of the explanatory
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2 variables, the instruments include the standard conditioning variables (see, King & Levine
3 (1993a and 1993b, Zang & Kim, 2007). These are the size of government consumption, the
4 initial real GDP per capita, the inflation rate, the level of secondary school enrolment and the
5 degree of openness of the economy.
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10 Following Levine *et al.* (2000), Beck & Levine (2002), Rousseau & Wachtel (2000) and Yao
11 (2006) recently developed dynamic panel generalized-method-of-moments (GMM) techniques
12 are used to assess the relationship between stock market development, intermediaries
13 development and economic growth. Since these GMM techniques are well-known we only
14 provide a summary of them. These techniques control for unobserved country-specific effects,
15 first-difference non-stationary variables, overcome the endogeneity of the explanatory
16 variables by using instruments and test for the presence of autocorrelation. The traditional
17 cross-country growth regression can be written as:
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$$24 \quad y_{i,t} - y_{i,t-1} = \alpha + \beta y_{i,t-1} + \gamma' X_{i,t} + \eta_i + \varepsilon_{i,t} \quad (1)$$

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29 where y is the logarithm of real per capita GDP, X represents the set of explanatory variables,
30 other than lagged per capita GDP and including our indicators of stock market and bank
31 development, η is an unobserved country-specific effect, ε is the error term, and the
32 subscripts i and t represent country and time period, respectively. The dependent variable in
33 equation (1) is the period's growth rate. The OLS estimator of (1) is biased and inconsistent
34 since $y_{i,t-1}$ is correlated with $\varepsilon_{i,t}$. Subtracting the mean from each variable and estimating this
35 equation by OLS gives the within-groups (WG) estimator. However, the WG estimator is
36 consistent only if all the explanatory variables are strictly exogenous (Arellano & Bond, 1998).
37 First-differencing the equation and using the GMM estimator with instrumental variables deals
38 with this endogeneity problem. The validity of the instruments can be checked using Sargan's
39 test. A consequence of the first-differencing is to introduce first-order autocorrelation, so this
40 is expected on estimation. However, it is well-known that this first-differenced GMM method
41 performs poorly in small samples (Levine *et al.*, 2000). Instead, Arellano & Bover (1995) and
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2 Blundell & Bond (1998) propose a system (SYS-GMM) method which uses more instruments
3 and links the regressions in differences with regressions in levels.
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7 To detect whether there are serious finite sample biases in the SYS-GMM estimations,
8 Doornik *et al.*, (2002) and Bond *et al.*, (2001) suggest comparing them to the within-groups
9 estimator. Unlike Levine *et al.*, (2000), Rousseau & Wachtel (2000) and Beck and Levine
10 (2002), who used the GMM estimation only, here the within-groups estimation is also
11 performed for comparative purposes. The main difference is in the coefficient on the lagged
12 dependent variable. A finding that the within-group estimate of the coefficient lies above the
13 corresponding GMM system parameter estimate suggests that the GMM system estimates
14 are seriously biased (Bond *et al.*, 2001).
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22 In summary, our approach is to use both the within-groups and SYS-GMM estimation and to
23 use the Sargan test and serial correlation tests to check the validity of the assumptions.
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27 **4. The Empirical Results**

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29 The data are primarily from the World Bank's Global Development and Finance & World
30 Development Indicators and the Standard & Poor's (S&P) Emerging Stock Markets
31 Factbooks. The countries and time periods are based on the availability of data on stock
32 market development in the annual issues of the S&P's Emerging Stock Markets Factbooks,
33 1998, 2001, 2002, which track market capitalization, the number of listed companies and total
34 value traded (among other variables) for up to fifty three countries. Selecting those countries
35 with at least ten years data gives our sample of thirty countries: Argentina, Bangladesh,
36 Brazil, Chile, Colombia, Cote d'Ivoire, Egypt, India, Indonesia, Jamaica, Jordan, Israel,
37 Kenya, Korean Republic, Malaysia, Mauritius, Mexico, Morocco, Nigeria, Pakistan, Peru,
38 Philippines, South Africa, Sri Lanka, Thailand, Trinidad and Tobago, Tunisia, Turkey,
39 Venezuela and Zimbabwe for 14 years (1988 - 2001). The commercial-central bank assets
40 ratio (BA) is from the database of Levine *et al.* (1999). Prior to 1997, the levels of secondary
41 school enrolment (SE) are from the UNICEF statistics database.
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TABLE 1 NEAR HERE

The list of variables is summarised in table 1 and the simple correlations of the financial development variables are presented in table 2. For 420 observations all the correlations are greater than 0.08 and so are significantly positive, with the highest being 0.737 for CPS with LL. This suggests that multicollinearity may be a problem if all the financial development variables are included in an equation.

TABLE 2 NEAR HERE

In tables 3, 4 and 5 the results for the systems (SYS-GMM) and within-groups (WG) estimations are presented, as estimated using PcGive 10. In all the estimated equations dummy variables for the year are included but are not reported. As stated in section 3, should the estimated coefficient on $GY(-1)$ from WG estimation be greater than that from the SYS-GMM estimation, it would suggest that the SYS-GMM estimates are seriously biased. When the estimated equations included $GY(-1)$, there was no evidence of this bias. However, since its coefficient was never significant, the reported results omit this variable. The diagnostic tests check for the overall fit of the regressions (the Wald test), the validity of the instrumental variables (the Sargan test), and the presence of first-order and second-order serial correlation. Since first-order serial correlation is introduced automatically when the basic equation is differenced, any evidence of this can be ignored, and instead the results of the tests for second-order serial correlation are considered. For all the reported results the diagnostic tests are satisfactory.

TABLE 3 NEAR HERE

In table 3, taking the SYS-GMM results, while credit to the private sector (CPS) has a significantly negative coefficient in column (1), when the stock market variable is the ratio of the value of shares traded to GDP, TV, which has a significantly positive coefficient, the effect of CPS becomes insignificant when the turnover ratio, TR, replaces TV. However, in each case the effect of the stock market variable on growth is positive and significant. This finding is consistent with the results reported by Beck & Levine (2002) and Rousseau & Wachtel (2000). However, unlike Levine *et al.*, (2000) and Beck & Levine (2002) findings, our result is that credit allocation (CPS) negatively and significantly affects growth when stock market activity (TV) is taken into account. It is worth noting that the samples of Levine *et al.*, (2000)

1
2 and Beck & Levine (2002) include both developed and developing countries with 5-year
3 averaged data over 1960-1995, and 1976-1998 respectively, whereas our sample includes
4 developing countries only with annual data over 1988-2001. In fact, when Beck & Levine
5 (2002, page 18) use annual data, instead of average data, only the stock market variable is
6 significantly positive, while the relationship between bank credit and economic growth
7 becomes insignificant. Also, our analysis uses the one-step system GMM whereas Levine et
8 al., (2000) relies on the two-step system GMM which is known to be inconsistent and
9 unreliable (see section 3). The results in table 3, however, confirm the findings of Ben Naceur
10 & Ghazouani (2003) that credit allocation negatively affects growth in developing countries
11 over 1979-1999.
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21 TABLE 4 NEAR HERE

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23 The results for the effects of the stock market and the size of financial intermediaries on
24 economic growth are given in table 4. The SYS-GMM results reported in column (1) show a
25 significant negative link between the liquid liabilities of the financial system (LL) and economic
26 growth at the 5 per cent level when using value of shares traded over GDP (TV) for stock
27 market activity. As in table 3, TV remains significant, now at the 1 per cent level, and
28 positively related to growth. When focusing on the stock market liquidity by including the
29 turnover ratio (TR) in table 4 column (2), the liquid liabilities ratio (LL) remains negatively but
30 insignificantly related to growth while TR has a positive and a significant impact on growth at
31 the 1 per cent level of significance. As with the credit to the private sector regressions in table
32 3, in all the specifications the size of the intermediaries (LL) negatively affects growth (at
33 varying levels of significance) but the stock market variables always have significantly positive
34 coefficients.
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45 Overall, the results in table 4 confirm the earlier findings that stock market development has a
46 significant positive impact on growth. However, unlike most other empirical studies findings
47 (e.g. Levine et al., 2000, Beck & Levine 2002, and Rousseau & Wachtel, 2000), the liquid
48 liabilities of the financial sector (LL), measuring financial intermediary size, negatively and
49 significantly relates to economic growth. Our findings agree with the results of Hsu & Liu
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1
2 (2002) that the size of financial intermediaries negatively affects growth in three developing
3 countries over 1981 to 2001.

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6 TABLE 5 NEAR HERE

7 The results for the size of commercial bank assets (BA) are reported in table 5, where this
8 variable has a positive effect on growth, but with varying levels of significance. The
9 significance level is higher when stock market liquidity, TR, is included, than when turnover
10 value, TV, is included.
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16 The results in tables 3, 4 and 5 demonstrate the importance of stock market development for
17 growth. This suggests that a trade-off between bank development and stock market
18 development may not exist and that they are both important for economic growth (Beck &
19 Levine, 2002).
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26 6. Conclusions

27 In this paper the joint contribution of stock markets and banks development to economic
28 growth has been examined by using annual panel data for 1988 - 2001 for thirty developing
29 countries, and utilising general method-of-moments estimation (GMM). The main conclusion
30 is that while the alternative measures of stock market development are positively and
31 significantly linked to economic growth, their presence results in the standard measures of
32 development of the banking sector, credit to the private sector and liquid liabilities, having a
33 negative impact on growth. This result confirms earlier findings by De Gregorio & Guidotti
34 (1995), and Beck and Levine (2002) when they used the same technique and frequency of
35 data for a different sample of countries.
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Comment [KS2]:

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Table 1 List of Variables

All variables are measured as logarithms of the corresponding numbers or, for growth and inflation, as logarithmic rates of change.

	Financial Development Variables
BA	Commercial bank assets / (commercial + central bank assets)
CPS	Domestic credit to the private sector / GDP
LL	Liquid liabilities (M3) / GDP
TR	Total value of shares traded / average market capitalisation
TV	Value of shares traded / GDP
	Conditioning Variables
GC	Government consumption / GDP
IIP	Initial real GDP per capita
INF	Inflation rate
OPEN	(Exports + imports) / GDP
SE	Secondary school enrolment
	Economic Growth Variable
GY	Growth of real GDP per capita

Table 2 Correlations of the variables 1988 - 2001 (panel of 420 observations)

	CPS	LL	BA	TR	TV
LL	0.737*	1.000			
BA	0.436*	0.327*	1.000		
TR	0.171*	0.171*	0.149*	1.000	
TV	0.474*	0.395*	0.248*	0.583*	1.000
GY	0.092*	0.039	0.131*	0.134*	0.195*

* Significantly positive at the 5% level ($r_c = 0.0802$)

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Table 3: Growth, Stock Market Development and Credit Allocation

Regressors	SYS-GMM (1)	WG (1)	SYS-GMM (2)	WG (2)		
Constant	8.092 (0.000)	-	2.581 (0.219)	-		
CPS	-1.736 (0.006)	-1.800 (0.116)	-0.771 (0.246)	-1.256 (0.213)		
TV	0.917 (0.001)	0.983 (0.006)	-	-		
TR	-	-	0.921 (0.004)	0.760 (0.040)		
No. observations	299	299	299	299		
Wald test for joint significance ¹	15.01 (0.001)	7.851 (0.020)	8.54 (0.014)	4.772 (0.092)		
Sargan test ²	432.5 (0.993)	-	439.5 (0.987)	-		
First order serial correlation test ³	-2.219 (0.026)	-0.068 (0.946)	-2.205 (0.027)	0.082 (0.934)		
Second order serial correlation test ⁴	0.477 (0.633)	0.732 (0.464)	0.3479 (0.7281)	0.434 (0.664)		
R ²	-	0.147	-	0.127		

The regressions also include dummy variables for the different time periods (not reported).

Instruments include lags of GY, the control variables, and the considered measure of bank and stock market development. P-values are reported in parentheses. SYS-GMM is one-step GMM estimates and WG is within group estimates.

1 The null hypothesis is that none of the variables are worth including and the alternative is that some variables are needed.

2 The null hypothesis is that the instruments used are valid and not correlated with the residuals.

3 The null hypothesis is that the errors in the first-difference regression exhibit no first-order serial correlation

4 The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation (listed as m2 in Arellano & Bond, 1991).

Table 4: Growth, Stock Market Development and the Size of the Financial Intermediaries

Regressors	SYS-GMM (1)	WG (1)	SYS-GMM (2)	WG (2)		
Constant	10.235 (0.002)	-	3.835 (0.201)	-		
LL	-2.211 (0.012)	-5.020 (0.012)	-1.071 (0.205)	-4.440 (0.023)		
TV	0.929 (0.000)	0.960 (0.002)	-	-		
TR	-	-	0.933 (0.003)	0.693 (0.039)		
No. observations	299	299	299	299		
Wald test for joint significance ¹	18.63 (0.000)	15.35 (0.000)	9.23 (0.010)	6.779 (0.034)		
Sargan test ²	452.2 (0.964)	-	477.9 (0.827)	-		
First order serial correlation test ³	-2.204 (0.028)	-0.173 (0.862)	-2.197 (0.028)	0.046 (0.963)		
Second order serial correlation test ⁴	0.448 (0.654)	-0.165 (0.869)	0.339 (0.734)	0.031 (0.975)		
R ²	-	0.180	-	0.156		

See notes to table 3.

Table 5: Growth, Stock Market Development and the Size of Bank Assets

Regressors	SYS-GMM (1)	WG (1)	SYS-GMM (2)	WG (2)		
Constant	-10.209 (0.255)	-	-17.099 (0.055)	-		
BA	2.878 (0.178)	6.071 (0.042)	4.133 (0.055)	6.776 (0.017)		
TV	0.533 (0.019)	0.792 (0.030)	-	-		
TR	-	-	0.661 (0.050)	0.730 (0.081)		
No. observations	299	299	299	299		
Wald test for joint significance ¹	13.59 (0.001)	14.34 (0.001)	12.95 (0.002)	13.34 (0.001)		
Sargan test ²	504.5 (0.536)	-	486.1 (0.751)	-		
First order serial correlation test ³	-2.246 (0.025)	-0.086 (0.931)	-2.231 (0.026)	-0.014 (0.989)		
Second order serial correlation test ⁴	0.4238 (0.672)	-0.692 (0.489)	0.368 (0.713)	0.441 (0.659)		
R ²	-	0.159	-	0.153		

See notes to table 3.