Lancaster University Management School
Working Paper
2005/026

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PN Snowden

The Department of Economics
Lancaster University Management School
Lancaster LA1 4YX
UK

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CAPITAL STRUCTURE AND A DIFFERENCE OF OPINION: STOCK MARKETS, MINORITY EQUITY AND ECONOMIC DEVELOPMENT

P.N. Snowden[•]

Introduction

The renewal of interest in the relationship between financial and economic development that occurred in the 1990s was stimulated by the 'endogenous' growth literature that became prominent towards the end of the previous decade. An association between measures of financial development and per capita GDP at the international level was already clear in Goldsmith's (1969) research, and this finding had helped to motivate early theoretical work in the McKinnon-Shaw tradition. While this literature was able to show how development of the financial sector might improve the allocation of investment spending, and therefore the level of income, it lacked a clear mechanism linking the financial sector to the economy's underlying rate of growth. The posited endogenous growth mechanisms were able to provide this link (Pagano, 1993).

These theoretical developments in the 1990s were accompanied by empirical work that attempted both to clarify the direction of causality between financial and economic growth and the changes in financial structure that take place over time (for instance, Levine *et al* (2000) and Levine and Zervos (1998)). Recognising their rapid international integration during the 1990s, the key structural issue considered was the role of stock markets in the development process. Whereas empirical studies

confirmed their relatively late emergence, very strong correlation between stock market activity and real incomes was also evident (Levine and Zervos (1996) and Demirgüç-Kunt and Levine (1996)).

Despite the attention devoted to the topic, it is argued below that the basic developmental role of equity markets remains unsettled in recent literature, and that an approach from the perspective of the owner-entrepreneur seeking finance is able to offer clarification. An initial advantage of this viewpoint is that it is able to address a basic difficulty confronting theorising on the issue - the extent to which a distinctive developmental role for stock market finance might be compatible with the well-known capital structure 'irrelevance' proposition of Modigliani and Miller (MM, 1958). For such a role to be identified one, or more, of the assumptions underlying this proposition must be relaxed, and the first section below considers the choice with reference to financial structures in developing countries.

A simple model of the entrepreneur's decision is developed in the subsequent section and an expression for the optimal capital structure, in terms of the proportion of debt and outside equity used to fund a given project, is derived. The nature of the trade-off involved in this decision is then examined, and its empirical implications outlined, before international panel evidence on primary issues in developing country markets is presented. Although the model only examines formally the entrepreneur's debt -

• The author wishes to acknowledge the generous advice of Yingqi Wei and John Whittaker during the preparation of this paper. His occasional stubbornness is sufficient to absolve them of any responsibility for remaining errors.

(outside) equity financing decision, the concluding section argues that it is able to throw considerable light on the developmental role of stock markets.

The capital structure decision: corporate theory and development practice

An important advantage of stock market finance would arise should an optimal combination of debt and equity claims permit firms to minimise their overall cost of external funds. As this is the central benefit identified in the following analysis, the contrary view, that a firm's market value is independent of its capital structure, must clearly be acknowledged (MM, *op.cit.* Proposition 1). Early attempts to reconcile these two positions noted that firms typically gain tax advantages through the deductibility of interest payments. Since this practical consideration would establish an overwhelming advantage for debt in the capital structure a countervailing benefit of equity finance was required in order to explain the mixed funding typically observed (MM, 1963).

The introduction of bankruptcy costs (initially assumed absent by MM but, if present, more likely to arise with excessive debt) provided a plausible gain from equity issue and a possible 'trade-off' explanation for the debt-equity choice. As these costs would have to be quite substantial to offset the interest tax shield, however, additional costs of debt might need to be identified to explain the high levels of equity finance often observed (Myers, 1984, p. 580). Moral hazard arguments, for instance, draw attention to the incentive confronting shareholders in highly geared firms to engage in very

risky projects that offer high payoffs in good states but bankruptcy in poor ones. Recognition of the risk lowers market valuation as indebtedness rises, thereby limiting recourse to this form of finance (Jensen and Meckling, 1976, pp. 333-7).

Although an optimal capital structure might be rationalised from these trade-off considerations, the extent to which they explain the wide variety of gearing patterns actually observed is contested (Myers, *op.cit.)*. The opposing 'pecking order' view of financial structure relies on an adverse selection problem arising when management acts in the interests of existing (rather than new) shareholders and when information on new projects cannot easily be transmitted to investors. When managers have high confidence in their investment opportunities they will avoid dilution by issuing debt. Since equity will tend to be issued when failure is more probable, new equity issues will be discounted for their information content by the market (Myers and Majluf, 1984).

The abandonment in the pecking order approach of the shared information assumption underlying the MM proposition does not in itself imply the emergence of an optimal capital structure. While its key prediction that debt will normally be favoured over equity issue accords with traditional accounts of management behaviour, the inference has been challenged in more recent empirical studies (Myers, 1984 *op.cit.* and Frank and Goyal, 2003). Developments in the theoretical literature have, moreover, raised doubts about the relevance of the asymmetric information elements involved in existing explanations of capital structure determination. Agency problems, for example, which arise when management has control of assets financed by investors,

might be resolved by appropriate remuneration incentives, rather than by being indirectly contained through the firm's capital structure (Hart, 2001). The apparently limited success of the two popular theories has encouraged attempts to develop approaches to capital structure choice based on the control provisions inherent in debt and equity contracts, rather than upon their traditional cash flow entitlement characteristics (*ibid*).

This radical shift of focus has begun to influence theories of the role and emergence of equity markets in the course of economic development (Capasso, 2004). A notable case arises in the work of Boyd and Smith who specify potential bankruptcy costs in terms of the 'costly state verification' (CSV) faced by investors in the event of firm bankruptcy (1996). The requirement for investors to ascertain the true situation in these circumstances will involve CSV and will favour contracts that minimise the need for it to be incurred. A standard debt contract, where CSV is not required provided that contractual interest payments are made, has been shown to be the most efficient from this perspective (Townsend, 1979).

In constructing their theory of the interaction between equity markets and development, Boyd and Smith recognise that the CSV assumption appears to leave little room for equity issues (with their implied need for the relatively continuous monitoring of variable dividend payments). Their solution is to assume that firms are able to choose between two technologies with returns from one only observable after CSV and the other with returns visible to all at no cost. For both technologies to be used, the former must be inherently more productive and the proportions in which

they are employed will depend on the magnitude of CSV. If the latter is low, the unobservable return technology will be particularly attractive, whereas high CSV endows the less productive (but observable) technology with some attraction to investors.

With CSV assumed to arise from labour-intensive monitoring (on one interpretation), it will become increasingly important as real incomes rise (and as capital costs decline) in the process of development. As easily observable projects gain a financial advantage claims that are contingent on their performance (shares) will become increasingly attractive, providing motivation for the development of a stock market. Although the model developed on this basis is able to formalise a process of mutual reinforcement between financial sector development and economic growth, the implication that stock markets will facilitate the dominance of the less productive technology over time does not accord readily with intuition.

The alternative perspective on the developmental role of stock markets offered below represents a departure from the literature's current preoccupation with agency and associated contractual issues in the determination of financial structure. Instead, it emphasises the traditional view underlying the MM propositions that debt and equity are differentiated essentially by the nature of their associated returns – contractual interest and residual dividends (and/or capital gains). The justification for this retrogression is that it is able to shed light on the capital structure patterns that are typically observed in developing and emerging markets. More specifically it addresses

the case of the closely owned firm, substantially reliant on borrowed funds, that also issues minority equity positions to outside investors.

Underlying much of the theorising on agency aspects of business finance has been the assumed separation between (equity) ownership and (management) control associated originally with the observations of Berle and Means (1932). Their early focus on US data appears today to be seriously misleading as a characterisation of corporate enterprise at the international level. While diffuse equity ownership is relatively typical in the US and UK, a study of the 20 largest companies in the 27 richest economies revealed that only 35 per cent could be described as Berle and Means corporations (La Porta *et.al.*, 1999). Thirty per cent were family owned, with this ratio rising to 45 per cent for medium sized firms in the rich economies. In a broader sample covering 45 countries the fraction of the shares held by the three largest shareholders in the ten largest companies averaged 46 per cent (median, 45 per cent) (La Porta *et.al.* 1998). Much higher levels of ownership concentration are evident in studies devoted to developing regions. In nine East Asian economies control was exercised by a single shareholder in two thirds of a total of 2980 listed companies (Claessens *et.al.* 2000).

With such levels of concentration the agency considerations arising from the separation of ownership from control must, at least, change in focus. As observed in the East Asian case, the controlling shareholders will typically also be (or be related to) the management. While obviating concerns with asymmetric information for these groups, the position of 'outside' shareholders becomes problematic if pyramid

financial relationships permit the core shareholders to divert revenues to other, wholly owned, entities (La Porta *et.al.* 1999). When such arrangements permit core shareholders to exercise control rights significantly in excess of their cash flow rights, the danger of expropriation facing outside investors mounts. The studies by the last named authors appear to demonstrate that variations in the legal protections enjoyed by outside shareholders help to explain the degree of dispersion of ownership observed across countries. Indeed, concentrated ownership may be a response to weak legal protection for outside investors.

Inadequate legal support, while likely to discourage minority share purchases, also raises the question as to why such investments nevertheless take place in countries where legal recourse in the event of expropriation is effectively minimal (Schleifer and Vishny, 1997 pp. 765-6). While these writers cite the importance of reputation effects in sustaining a market for outside equity, an important element of protection arises when the core investors, by holding a high fraction of the outstanding shares, have a large claim on residual cash flows. Recognised early in the literature as alleviating agency costs in general, large cash flow (as opposed to control) rights associated with majority ownership also act to diminish the incentive to divert revenues (Jensen and Meckling, *op.cit.* p313, La Porta, *et.al.* 1999, p. 511). In its focus on the decision confronting an owner-entrepreneur, therefore, the following analysis exploits the implied concentration of cash flow rights to side-step agency considerations and to base the choice of the debt-equity ratio entirely on the traditional cash flow entitlements of the two claims.

The market and the entrepreneur's opinion

The essential aspect of the following analysis is that the return expectations of the owner-entrepreneur (owner) differ from those held in the market from which finance is being sought. By eliminating the distinction between the management and 'existing' shareholders in the original analysis of Myers and Majluf, the predominant equity holding of the owner is here assumed to permit the public issue of shares without generating the signalling difficulties that were central to that study. Another difference is that whereas Myers and Majluf assumed the manager's information advantage to be 'real', the owner needs only to hold a relatively optimistic opinion about the potential returns of the project in the present case.

The owner's capital structure choice

The owner is assumed to maximise the expected net value of the enterprise at a particular horizon (year T) attributable to a given (personal) equity holding. This formulation is equivalent to maximising the present value of the project provided that the personal discount rate applied is unaffected by the chosen capital structure. Although probably unrealistic when the personal holding may represent a large part of the owner's portfolio, the assumption of risk neutrality permits concentration on the purely financial aspects of the debt-equity decision. Moreover, if a risk neutral entrepreneur might choose to issue shares on these grounds, a risk averse one would be more likely to do so, at least under practical financial constraints.

The project has fixed immediate cost (K) and will be financed by the owner's initial equity stake (of monetary value M, also representing M unit shares), the public flotation of S shares (at the unit price b) and an initial loan (L) as in the following balance sheet:

$$K = M + bS + L \tag{1}$$

The initial value of the loan (if insolvency is avoided) will be repaid with interest in a single 'bullet' payment at time T, amounting to $\underline{L} \equiv e^{iT} L$ at the interest rate *i.* The owner's objective function is therefore:

$$Max\ E(V_T) = \frac{M}{(M+S)} \left[\int_{\underline{L}}^{\infty} (G - \underline{L})\, f(G) dG \right] \tag{2}$$

$E(V_T)$ is the (subjectively) expected value of the owner's share of the project at T and the probability distribution of returns (G) also reflects a personal assessment. Should realised returns at T fall short of the lower limit defined by the accumulated debt $\underline{L}$ (implying insolvency) the owner would receive nothing. The balance sheet ($L \equiv K - M - bS$) requires that the owner choose only the number of shares to be issued leaving loans as the residual source of finance. With both equity prices (b) and loan interest rates (*i*) affected by the choice of financing, maximisation of $E(V_T)$ in (2) with respect to S yields:

$$E(V_T) = -M \frac{d\underline{L}}{dS} \Theta \qquad (3)$$

where $\Theta \equiv \int_{\underline{L}}^{\infty} f(G)dG$ and represents the owner's assessment of the probability that the debt will be repaid at T. The derivative $\frac{d\underline{L}}{dS} = \frac{d(e^{iT}L)}{dS}$ is evaluated as follows (defining $\Delta e^{iT} \equiv {}^{d}\!/_{dS}\, e^{iT}$):

$$\frac{d\underline{L}}{dS} = -e^{iT}b(1+\varepsilon_{bS}) + L\Delta e^{iT}$$

The term Δe^{iT} represents the change in the cost at T of repaying a unit of initial loan consequent upon a marginal immediate equity issue, and $\varepsilon_{bS} \equiv \frac{S}{b}\frac{db}{dS}$ is the elasticity of the initial market share price with respect to such an issue. The second order condition for a maximum at (3) confirms that an increase in S must lower both the unit share price and the interest rate charged on loans (implying that $\varepsilon_{bS} < 0$ and $\Delta e^{iT} < 0$). In addition, it is necessary that $|\varepsilon_{bS}| < 1$ to ensure that ${}^{d\underline{L}}\!/_{dS} < 0$. Finally, interpretation of (3) is facilitated if the owner's expected valuation is converted to a per unit share basis as follows:

$$E(V_T) = \{b^* e^{k^*T} M\}$$

The curled bracket term is the product of the owner's personal valuation of a share in the enterprise (b*), the subjective cost of capital applied to the investment (e^{k^*T}) and

the total number of 'inside' shares held (M). Making these substitutions, the first order condition in (3) becomes:

$$b * e^{k*T} = [e^{iT} b(1 + \varepsilon_{bS}) - L\Delta e^{iT}]\Theta \quad (4)$$

Intuitively, therefore, the owner will equate the anticipated marginal 'revenue' from equity issue (the right side of (4)) with the marginal cost (the subjectively anticipated valuation of a share at T) on the left. The square bracket term in (4) separates the gain from debt reduction arising directly from the issue (when used to retire or to avoid equivalent borrowing at the outset) and that arising from the reduced interest payment accumulated on the remaining debt. These potential gains from a marginal issue must finally be adjusted for the owner's probability assessment (represented by Θ) that the debt will in fact be repaid at T (that insolvency will be avoided).

Rearrangement of (4) yields a solution for the optimal capital structure and expresses the public equity issue by *market* value as a fraction of the external capital requirement:

$$\frac{bS}{(K - M)} = 1 + \left[\frac{b * e^{k*T} - b(1 + \varepsilon_{bS}) e^{iT} \Theta}{(K - M)\Theta\Delta e^{iT}} \right] \quad (4a)$$

With the numerator in the square bracket term necessarily positive at the optimum (for the denominator of (4a) to be non-zero, in view of (4)), the assumption that equity issue reduces the interest rate charged on loans ensures a negative value for the ratio. The fraction of the external capital requirement raised through equity issue will

therefore be affected critically by the discrepancy between the owner's and the market's anticipation of returns on the project. The greater the market 'discount' from the owner's perspective (the smaller, *ceteris paribus*, is b relative to b*), the smaller will be the reliance on outside equity finance. The numerator also implies that a low interest rate on loans would lead to a lower equity issue. By contrast, the more confident is the owner in ultimate success (the higher the value of Θ), the more attractive will be equity funding (since the high probability of debt repayment increases the value to the owner of improved borrowing terms). Equally evidently, the more responsive is the loan interest rate to the risk reduction implied by greater reliance on equity, captured by Δe^{iT}, the more the owner will be inclined to offer shares.

The owner's choice and the financial characteristics of debt and equity

The result presented in alternative forms in Equations (4) and (4a) provides a model of the choice of capital structure in which the issue of equity is determined by the reaction to it of both the share price and the interest rate charged on loans. If efficient financial markets are assumed, however, these two responses will be jointly determined and the nature of the trade-off facing the entrepreneur may be clarified by explicit recognition of this connection. In pricing its claims on the enterprise, the equity market may be expected to evaluate an expression of similar form to Equation (2) above. With the key distinction that the market value incorporates a different return distribution from that of the entrepreneur (indicated by H rather than G), the following would therefore determine the anticipated value of (all of) the equity:

$$E(V_{MT}) = \int_{\underline{L}}^{\infty} (H - \underline{L}) f(H) dH \quad (5)$$

An alternative representation of (5) will help later to clarify the calculations confronting the owner. Defining the market's anticipated overall mean (debt-free) valuation of the real assets as $Ke^{\rho T}$ leads to the following implication:

$$Ke^{\rho T} = \int_{MIN}^{\infty} Hf(H) dH \quad (6a)$$

The lower limit in (6a), $MIN < \underline{L}$ is the minimum possible valuation of the assets at T and may be taken as the scrap (or collateral) value at that time. Noting that $\int_{MIN}^{\infty} f(H) dH = 1$, subtraction of the maturity value of the debt from both sides of (6a) yields:

$$Ke^{\rho T} - \underline{L} = \int_{MIN}^{\infty} (H - \underline{L}) f(H) dH \quad (6b)$$

The use of (6b) permits equation (5) above to be written as:

$$E(V_{MT}) = Ke^{\rho T} - \underline{L} + \{\int_{MIN}^{\underline{L}} (\underline{L} - H) f(H) dH\} \quad (5a)$$

This is the familiar interpretation of the expected market value of the shares as a call option. The right side confirms that the call amounts to a 'long' position in the assets of the firm (with the holding financed by debt) and the anticipated value of a put

option (represented by the curled bracket term) should returns be insufficient to repay the loan at T. Differentiation of (5a) with respect to S yields:

$$d/dS\, E(V_{MT}) = \{b(1+\varepsilon_{bS})e^{iT} - L\Delta e^{iT}\} - [b(1+\varepsilon_{bS})e^{iT} - L\Delta e^{iT}] \int_{MIN}^{\bar{L}} f(H)dH \quad (7)$$

Noting that Θ represents unity minus the owner's bankruptcy probability in (4) above, subtraction from that equation of (7) yields the following implication:

$$b * e^{kS*T} - d/dS\, E(V_{MT}) = [b(1+\varepsilon_{bS})e^{iT} - L\Delta e^{iT}]\left\{ \int_{MIN}^{\bar{L}} f(H)dH - \int_{MIN}^{\bar{L}} f(G)dG \right\} \quad (8)$$

The left side of (8) represents the discrepancy between the owner's anticipated value of a unit share at T and the market's marginal equivalent equity valuation at that time. Since, for a marginal issue:

$$d/dS\, E(V_{MT}) \equiv d/dS\, b(M+S)e^{kT} \approx be^{kT}$$

the difference is approximately that between the owner's and the market's expected value of a share at T, given the issue decision. The square bracket term on the right is the familiar effective reduction in due loan repayment at T resulting from a marginal equity issue, while the contents of the curled bracket capture the difference between the implied bankruptcy probability distributions underlying the two perspectives. Equation (8) indicates that the owner's chosen financial structure in (4) will be compatible with efficient market pricing when the market discount on the share price

(as perceived by the owner) is offset by a smaller probability (from the same viewpoint) that bankruptcy will prevent the repayment of debt obligations. In summary, the owner's opinion is that the market undervalues the shares of the enterprise and overly discounts its debt. At the margin, the implied loss on issuing the former must be offset through retirement (or reduction) of the latter.

By permitting the owner's opinion to differ from that implied by the market consensus, this result emphasises that the capital structure decision can be derived from the financial characteristics of debt and equity claims alone. Each instrument has a potential comparative advantage for the owner. Whereas the share price may not reflect fully the (subjectively) expected value of the enterprise, this bias will be of less central importance in affecting the terms of borrowing. By contrast, the relatively 'fat' tail of the H (*vis-à-vis* the G) distribution is a factor offsetting equity under-valuation as the option formulation in (5a) indicates. With this benefit achieved at the potential expense of creditors, however, the terms of borrowing will be directly affected. As in the original pecking order argument, therefore, a more optimistic assessment of the mean return by the owner will bias the choice of finance towards debt. To the extent that the relative optimism also takes the form of a greater degree of certainty about the returns, however, the case for equity funding gains strength.

This distinction was clearly recognised in the conjecture originally offered by Myers and Majluf to explain why, in their debt-oriented analysis, managers may sometimes choose to issue equity (*op.cit,* p.209). Despite its ability to define an optimal capital structure (otherwise absent in the pecking order approach), however, little emphasis

appears to have been given to the case. One reason for believing that this could amount to a significant oversight, at least in the development context, is that a role for entrepreneurial expectations in the financial structure-growth relationship is suggested. This connection, and its relevance for interpreting the role of equity markets in the process of economic development, will be taken up following consideration of empirical evidence bearing on the perspective developed above.

Empirical perspectives on the equity issue decision

The most immediate empirical implications deriving from the equilibrium described in Equation (4) relate to the extent to which debt and equity are substitutes or complements as sources of finance. Empirical attempts to answer this question in the development literature have examined whether the growth of equity markets leads to a relative decline in firm indebtedness and have tended to conclude, to the contrary, that the two sources are complementary (Demirgüç-Kunt and Maksimovic (1995), Demirgüç-Kunt and Levine (1996)). The perspective presented by Equation (4) is that they are more appropriately considered to be both, as (physical) capital and labour may be so regarded in a production function.

The relative attractiveness to the owner of issuing the two claims is seen to depend on the interest rate and the market equity valuation, suggesting a substitute relationship at the margin. With reference to the production function analogy, however, an important qualification to this interpretation is that, on both theoretical and empirical grounds, the costs of equity and debt will not be determined independently. Nevertheless, a rise

in the market's *valuation* of the equity (b, with b* unchanged) will represent a decline in the cost of that source, and an opportunity for substitution, from the owner's viewpoint. Setting such changes in market conditions aside, the chief characteristic of the formulation in Equation (4) is that it identifies an optimal capital structure in which the attraction to the owner of a public share issue lies in a reduction in the cost of debt finance. As the need for outside funds (K-M) grows, therefore, the two sources are complements in the sense that increased use of machines is able to reduce unit labour cost as production expands.

Striking evidence that appears to be consistent with the dual interpretation presented here is contained in a detailed case study of the decision of firms to make initial public share offers (IPOs) in Italy (Pagano, ***et.al.*** 1998). The main determinant of the probability that a firm would engage in an IPO was found to be the market to book ratio for similar firms, confirming the relevance of market prices in the calculation. In the cases where offers were made, the funds raised were typically used to reduce debt accumulated during an earlier phase of expansion. The implication that firms were aiming for a less strained gearing ratio indicates the complementary aspect, and is supported by the finding that the cost of credit tended to decline after the IPO.

A complementary relationship that is surprisingly strong also arises in evidence of the type cited above connected with developing countries: stock market growth promotes the issue of shares but is actually associated with a rise in debt-equity ratios. Evidence on substitution, however, is also available in the widely remarked tendency (in both advanced and developing economies) for firms to issue shares when market prices are

high. Such 'timing' of issues, though obvious intuitively, has always been 'embarrassing' in theory (Myers, 1984, *op.cit.* p. 586). The theoretical unease disappears in the result presented in Equation (4), however, since the owner would certainly be expected to take advantage of an increase in the market's 'appetite for risk', provided that this served to narrow the gap between the two perspectives involved (b relative to b*). The implication that market booms would promote equity issue receives strong empirical support in Singh (1997) for a wide range of developing countries.

With empirical studies appearing collectively to support the view that equity issues can be both substitutes and complements for debt, the examination below of evidence on developing country primary equity issues attempts clarification of the relative strength of the two motivations during the 1990s.

Data on emerging market issues

The data cover twenty countries[1] over the period 1989 to 2000, and were drawn initially from the larger sample developed by Aylward and Glen (1999). These authors used national sources and direct enquiries to construct series for primary equity issues in current $US and as a ratio of GDP over the years 1980-95. This original source is here extended from the World Federation of Exchanges (WFE) web site to cover issues in the years 1995-2000.[2] Data for the ratio of stock market capitalisation and for credit to the non-bank private sector to GDP were drawn from

[1] Argentina, Brazil, Chile, Colombia, Greece, India, Indonesia, Jamaica, Jordan, Kenya, Korea, Malaysia, Mexico, Pakistan, Philippines, Portugal, Taiwan, Thailand, Turkey and Venezuela.

the Beck and Levine financial development database available electronically from the World Bank.[3] The objective of obtaining a balanced panel over the decade 1990-2000 (requiring figures for 1988-9 for differencing purposes) resulted in inclusion of the twenty countries listed in Footnote 1.

The attempt here to extend the primary issues data collected by Aylward and Glen must be qualified by two *caveats.* Individual discrepancies in observations for the available common year (1995), while exhibiting no consistent pattern, were occasionally large and may reflect more general problems of comparability between the two sources. The second concern arises in the substantial revisions sometimes reported in the sequence of current and preceding year data on the WFE site. Although possibly helping to explain the discrepancies in relation to the last year of figures available to Aylward and Glen, the evident uncertainties surrounding the collection of these data suggested that each annual observation from the WFE source should be taken from its (later) reported value in the subsequent year. Figures for 1995, for example, were drawn below from the comparison figures in the reported data for 1996.

Despite the uncertainties arising from the joining of the two data sources, one of the main conclusions on cross-country patterns in the earlier study is supported for the extended period. In addition to variations in accounting standards (an indicator of transparency) Aylward and Glen found that the market capitalisation to GDP ratio

[2] http://www.fibv.com/WFE/home.Asp?nav=ie

(taken as an index of market depth) was the most reliable indicator of issue activity by country. This relationship is depicted in Figure 1 below, which plots (the logarithm of) the mean values of the issue to GDP and capitalisation to GDP ratios over the six years of WFE data, 1995-2000. The observations are for twenty-three countries comprising the twenty identified in Footnote 1 with the addition of Israel, Morocco and South Africa, for which complete figures for the shorter period were available from the sources employed.

FIGURE 1

While acting to reduce the influence of relatively extreme observations the logarithmic transformation also suggests a cross-country 'elasticity' of issues in relation to capitalisation of approximately 0.75 over the second half of the 1990s. With the emphasis placed earlier on the choice of financial structure, however, the relationship between equity issues and credit extended to the private sector is also of interest. Figure 2 plots the equivalent relationship for the same years and countries.

FIGURE 2

At least for the period involved, the strength of the association between these two variables is similar to that reported in Figure 1 and suggests that the issue ratio tends to rise in step with the private credit ratio. Before examining the direction of causality between the variables, the association in Figure 2 is of interest in terms of the possible

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[3] *A New Database on Financial Development and Structure*, Beck, T. and Levine, R. http://econ.worldbank.org/view.php?type=5&id=607

complementary relationship between borrowing and equity issuance. At the level of a growing enterprise, this would imply an association between share issues and the *change* in the firm's indebtedness. In terms of aggregate data, however, credit is constantly turned over between entities so that equity issues would be observed even if credit aggregates were unchanged year on year. This would also be the case if, as in the Italian example, firms issue equity to reduce their gearing ratios and thereby permit credit lines to be reallocated.

Determinants of equity issues: panel analysis

To examine whether any causal inferences may be derived from the associations in Figures 1 and 2, a panel VAR system involving annual observations for the issues, capitalisation and private credit ratios was estimated. Since both the issues and capitalisation ratios are subject to occasional large variations at the country level, and as the issues series also contains some zero observations in individual years, the data were transformed into logarithms of one plus their values. Finally, differencing of the transformed variables addressed effectively the evidence provided by a battery of panel unit root tests that the data in levels were non-stationary. The results from estimation of the VAR system are reported in Table 1, with the two-lag structure chosen on the basis of the Schwartz criterion. Country fixed effects were incorporated in the specification but were omitted from the table to conserve space. The 'euro' dummy identifies observations for 1998-2000 in the cases of Greece and Portugal, as some very large issues ratios were recorded in these years that are likely to have

reflected portfolio adjustments surrounding the two countries' impending participation in the single currency.[4]

TABLE 1

Neglecting their own lagged values, the following features of the reported relationships between the variables are noticeable. The new issue ratio appears not to be influenced (at conventional levels of significance) by changes in market valuation and, if any relationship exists, it does not arise in the first year. By contrast, the one-year lagged credit term provides evidence of a significant direct (positive) connection. The second equation suggests that the credit variable is influenced quite strongly in turn, albeit after a lag of two years, by changes in the market capitalisation to GDP ratio. Finally, the conclusion suggested by the third result is that the capitalisation ratio is only affected by its own previous values. Support for these inferences is supplied by the tests reported in Table 2:

TABLE 2

The evidence is clear in indicating that changes in market capitalisation during the decade of the 1990s were substantially exogenous in relation to the other elements in the VAR system. Valuation changes might also have been exogenous at this time in the broader sense that external influences were becoming more important through the increasing external integration of peripheral equity markets. The effect of such

[4] Although Greece had not met the 'convergence criteria' to allow participation in the single currency from January 1st 1999, the country agreed to participate in the narrow bands (ERM 2) exchange rate arrangement on September 26th 1998. Portugal was a founder member of the euro.

changes was not directly to increase share issues: they appear instead to have influenced the loans market, which subsequently influenced the issue ratio. To summarise these interactions, the impulse response functions graphed in Figure 3 trace the influence on the new issue ratio of a one standard deviation disturbance to the market capitalisation and private credit ratios. The positive response of equity issue to the latter contrasts with the lagged influence of the disturbance to the capitalisation ratio and presumably reflects an indirect mechanism operating through induced changes in the credit variable.

FIGURE 3

To summarise the conclusions relating to the question of equity as a substitute or as a complement for debt, the cross-country evidence appears to favour the view that equity issues in the 1990s complemented borrowing. The evidence that increased market capitalisation boosted issues directly is weaker than that for an indirect channel, by which changes in market capitalisation preceded an increase in credit granted to the private sector. Equity issues followed shortly after the credit expansion had occurred. As world equity markets were tending to strengthen through much of the 1990s the lack of a more direct influence on new issues is noteworthy, especially when set against Singh's findings on developing country share issues in the 1980s.

The substantial volumes of equity capital raised in the earlier decade were attributed to substitution by firms in response to the coincidence of elevated stock market valuations and high international and national (post-liberalisation) real interest rates.

While compatible with this finding the equilibrium described in Equation (4) also suggests that substitution need not arise if the improvement in equity market valuations is associated with an easing of credit conditions. Evidence that capitalisation changes had just this effect is quite strong in the VAR results and possibly reflects the lower real interest rates that characterised the international environment of during the 1990s. In the absence of a relative change in their costs, therefore, the analysis and evidence presented above are consistent with the view that owners would regard equity and debt as complementary sources of finance for business expansion. The implications of this perspective for the relationship between stock markets and economic development will be discussed in conclusion.

Conclusions: stock markets and development

Minority equity issues by closely controlled enterprises are difficult to explain from the perspective of the current literature on corporate finance (Myers, 2000). They are nevertheless characteristic of developing country equity markets and one objective of this analysis has been to provide an explanation for the phenomenon. Since firms will normally be closely controlled in their early years, an understanding of the relevance of stock markets to economic development must encompass the initial motivation to seek equity funding by these enterprises. It was suggested above that the expedient of allowing the owner-entrepreneur's expectations to differ from those of the financial and capital markets would permit an optimal capital structure, involving minority issue, to be defined.

For this result to be realistic, it was necessary to invoke the owner's financial exposure to the project in order to suppress the adverse signalling aspects of new equity issues that have been a preoccupation at least since the analysis of Myers and Majluf (*op.cit.*). The basic assumption that the owner's substantial cash flow rights would provide sufficient confluence of interests between 'inside' and 'outside' investors receives some further support from the nature of the equilibrium depicted in Equation (4). While it is apparent that an owner who is highly optimistic in relation to the expected (mean) return on the project will be disinclined to issue shares, a high degree of certainty in relation to that expectation would tend to prompt some equity issue. Expressed differently, if a minority issue takes place, the owner will be selling shares for less than they are believed to be worth. When proceeds from the issue are employed to reduce gearing, moreover, the signalling involved is essentially positive for outside investors. Although conflicts of interest will certainly arise in practice, the analysis is at least consistent with international evidence that they are not insuperable obstacles to minority investors in practice.

The essential assumption that the owner does not share the market's opinion of the likely returns to the project is more easily sustained in the context of development and change than it would be in essentially static economic circumstances. Entrepreneurial activity has been linked traditionally to the view that the individuals concerned are characterised by comparative optimism, and Schumpeter's emphasis on financial support for entrepreneurial innovation has been invoked more recently in order to rationalise the empirical connection between financial intermediaries and economic

growth (King and Levine, 1993). On the interpretation offered here, the entrepreneur's optimism relates both to the expected (mean) value of returns and to a comparatively high degree of certainty that those returns will be realised. By permitting the owner to obtain the least 'disadvantageous' combination of funding, the basic implication is that an equity market serves to increase the prospective rewards to entrepreneurial activity.

With this mechanism suggesting a general link between stock markets and economic development, two observations were noted earlier in connection with the empirical evidence on the relationship involved. Measures of stock market activity are closely related to levels of per capita income internationally, and markets appear to emerge rather late in the development process. The equilibrium capital structure defined in Equation (4) suggests a starting point for interpretation of these findings. While the attraction of an equity issue will be affected by market valuations, it is also evident that the absolute size of the financing gap confronting the owner (K-M) tends to increase the proportion of external finance that takes the form of equity. An under-capitalised owner seeking to rely on debt finance, for example, will confront a relatively unfavourable interest rate and an inducement to seek external equity for this reason. To explain the relationship between income levels and stock market activity, it might be hypothesised that the cost of the representative investment increases in relation to the resources of the representative entrepreneur as development proceeds.

This hypothesis can be elaborated somewhat by reference to the types activities that, according to Equation (8), would be particularly encouraged by (or encouraging of)

the emergence of an equity market. That relationship makes clear that if equity issues take place, despite their (owner-perceived) under-valuation by the market, the owner must be anticipating a compensating gain in the form of the debt repayments that eventually will be made. The size of outstanding loans determines both the payments due and the probability that revenues will be insufficient to meet them. The right side of Equation (8) incorporates the division of opinion on this probability and, for a given amount of debt (L), will have a smaller value the closer are the minimum returns to the contractual payment due at T. A useful simplification is to allow these lower limits to be the same and to reflect the agreed assessment of the collateral (or scrap) value of the project at that time. If the discrepancy between the owner's and the market's marginal equity valuation (the left of Equation (8)) is taken as given, the implication is that projects with higher (lower) collateral value would tend to be financed predominantly by debt (outside equity).

Equally intuitive would be an extreme version of the case in which low collateral content, and a wide dispersion in the market's view of the potential returns, might indicate a high fraction of outside equity finance. As already indicated, these tendencies would be reinforced should the owner's own funds be rather limited. Such a context would approximate that of Cho (1986) in which high return-high risk projects might not receive loans, even in a reformed banking market. If high borrowing in these conditions would confer on equity valuation a significant 'put option' component (Equation (5a)), the potential cost to lenders might well be unacceptable. Cho's analysis is compatible with this interpretation and is highly

appealing as an explanation of the emergence of 'venture' capital funding. Nevertheless, while using the same risk-return perspective, the analysis presented above appears more generally applicable to the developing country case by permitting firms to be financed by a mixture, depending on their debt capacity, of the two instruments.

Drawing these elements together, the outcome described in Equations (4) and (8) is pertinent to the question of why stock markets appear at a relatively late stage in the process of financial development. Consistently with historical observation, recent theorising on the interaction between financial and real development has emphasised the transition from less to more specialised fixed (illiquid) capital investment in the course of economic growth (Hicks, 1969, pp. 141-5, Obstfeld, 1994). While this would be consistent with the cost of projects tending to rise relative to individual wealth, it is also probable that the increased specialisation of equipment would reduce its collateral value relative to the initial commitment of resources. Equity finance would gain in importance in the later stages of industrial development when equipment specialisation presents owners with the prospect of enhanced returns at the expense of greater potential losses on the downside.

The ability to diversify these risks and to benefit thereby from enhanced overall returns must be the key attraction of a stock market from the viewpoint of portfolio investors. While it has been argued that market liquidity can facilitate growth by reconciling the permanent commitment of capital with a transitory holding by individual investors, it is not clear that this advantage differs fundamentally from the

maturity transformation traditionally conducted through the banking system. The benefit of market liquidity on the present interpretation is that it will facilitate attempts by individual portfolio investors to maintain a desired balance of risk and reward. To explain why stock markets tend to emerge only after a banking system has been long established, however, the claim made here is that the preferences of the entrepreneurs who seek external finance deserve at least as much consideration as those of fund suppliers have received to date.

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FIGURE 1: ISSUES AND CAPITALISATION-GDP RATIOS (LOG OF MEAN 1995-2000)

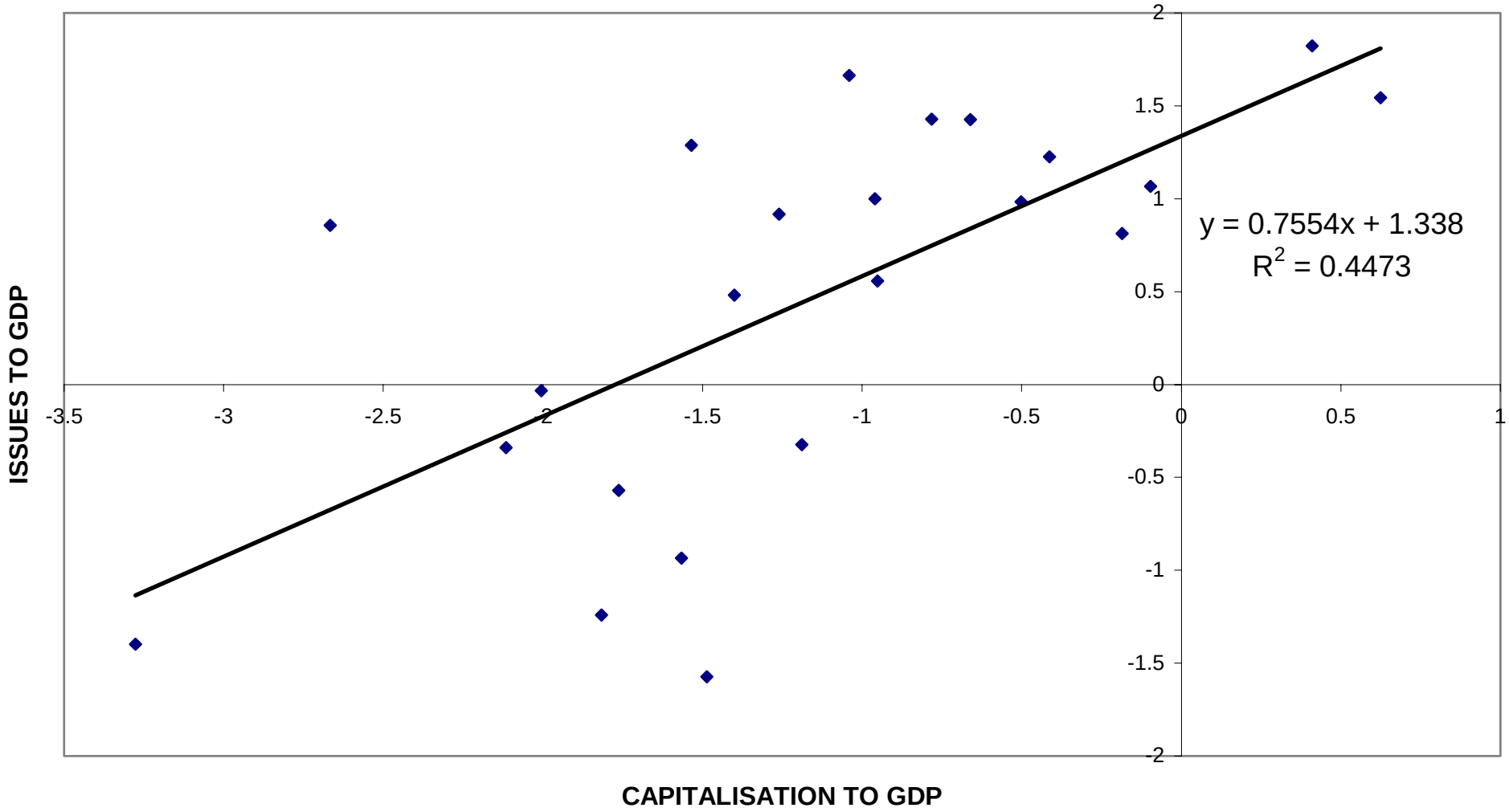


FIGURE 2: ISSUES AND CREDIT-GDP RATIOS (LOG OF MEAN 1995-2000)

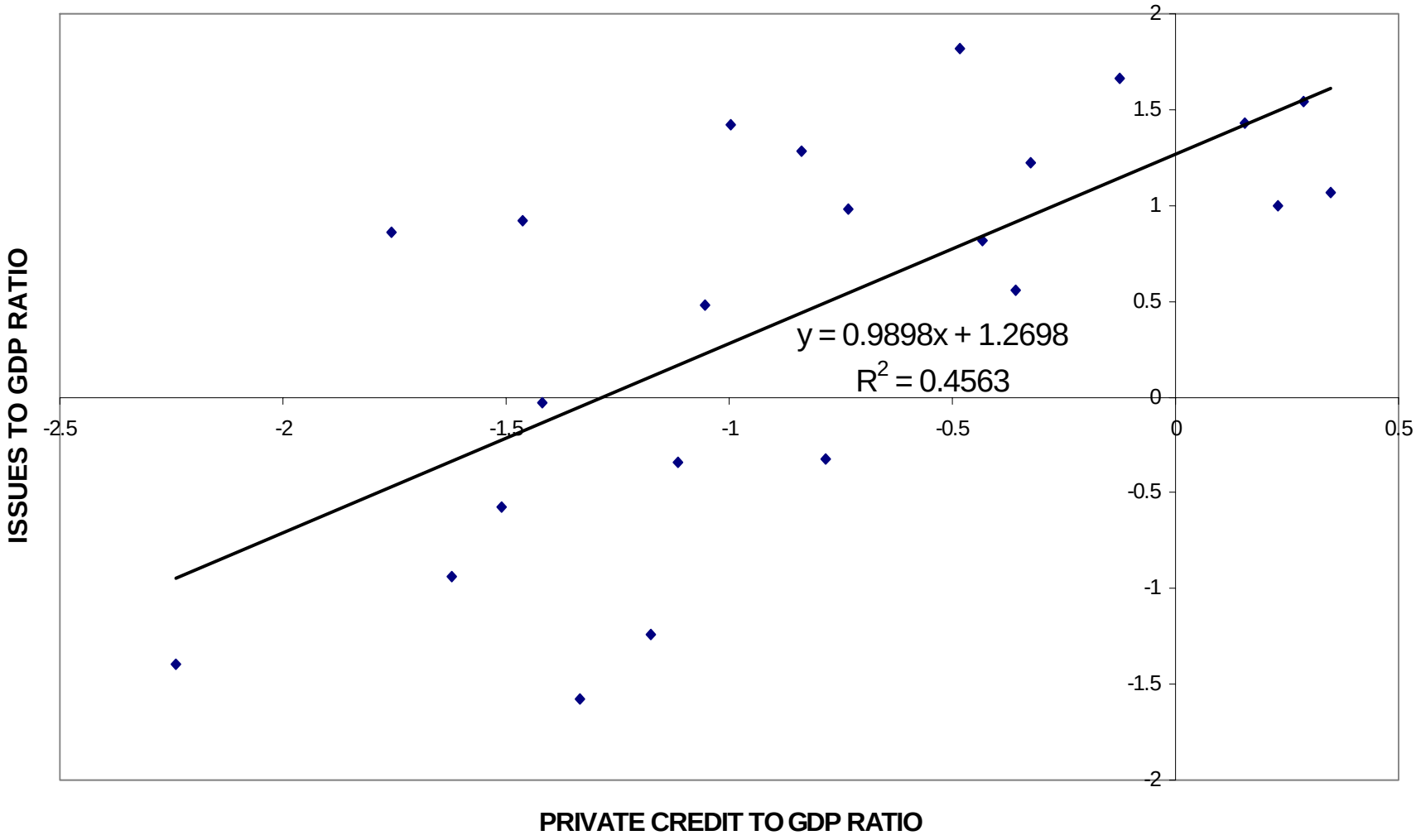


TABLE 1
VECTOR AUTOREGRESSION ESTIMATES

Sample (adjusted): 1991 2000
Included observations: 200 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DLOG(ISSUES)	DLOG (CREDIT)	DLOG(CAPN)
DLOG(ISSUES(-1))	-0.525661	-0.002582	0.005036
	(0.07208)	(0.00445)	(0.01114)
	[-7.29246]	[-0.57994]	[0.45215]
DLOG(ISSUES(-2))	-0.340284	-0.005406	-0.011331
	(0.07706)	(0.00476)	(0.01191)
	[-4.41592]	[-1.13578]	[-0.95159]
DLOG(CREDIT(-1))	2.333214	0.386926	0.047593
	(1.16397)	(0.07190)	(0.17986)
	[2.00453]	[5.38155]	[0.26461]
DLOG(CREDIT(-2))	-1.251743	-0.165664	-0.095963
	(1.14861)	(0.07095)	(0.17749)
	[-1.08979]	[-2.33494]	[-0.54068]
DLOG(CAPN(-1))	-0.080563	-0.015269	0.432387
	(0.47434)	(0.02930)	(0.07330)
	[-0.16984]	[-0.52113]	[5.89919]
DLOG(CAPN(-2))	0.777084	0.112330	-0.311165
	(0.48062)	(0.02969)	(0.07427)
	[1.61682]	[3.78367]	[-4.18981]
C	0.063869	0.011638	0.002323
	(0.15145)	(0.00935)	(0.02340)
	[0.42173]	[1.24402]	[0.09925]
EURO	1.064268	0.034290	0.078686
	(0.24524)	(0.01515)	(0.03789)
	[4.33978]	[2.26363]	[2.07646]

R-squared	0.307779	0.394297	0.269521
Adj. R-squared	0.203746	0.303266	0.159737
Sum sq. resids	37.02551	0.141272	0.884065
S.E. equation	0.462623	0.028576	0.071486
F-statistic	2.958467	4.331473	2.455029
Log likelihood	-115.1167	441.7510	258.3664
Akaike AIC	1.421167	-4.147510	-2.313664
Schwarz SC	1.866440	-3.702237	-1.868392
Mean dependent	0.026818	0.009408	0.011275
S.D. dependent	0.518444	0.034235	0.077985

Determinant resid covariance (dof adj.)	8.73E-07
Determinant resid covariance	5.65E-07
Log likelihood	587.2966
Akaike information criterion	-5.062966
Schwarz criterion	-3.727147

TABLE 2
VAR GRANGER CAUSALITY/BLOCK EXOGENEITY WALD TESTS

Sample: 1988 2000
Included observations: 200

Dependent variable: DLOG(ISSUES)

Excluded	Chi-sq	df	Prob.
DLOG(CREDIT)	4.894658	2	0.0865
DLOG(CAPN)	2.771973	2	0.2501
All	8.460536	4	0.0761

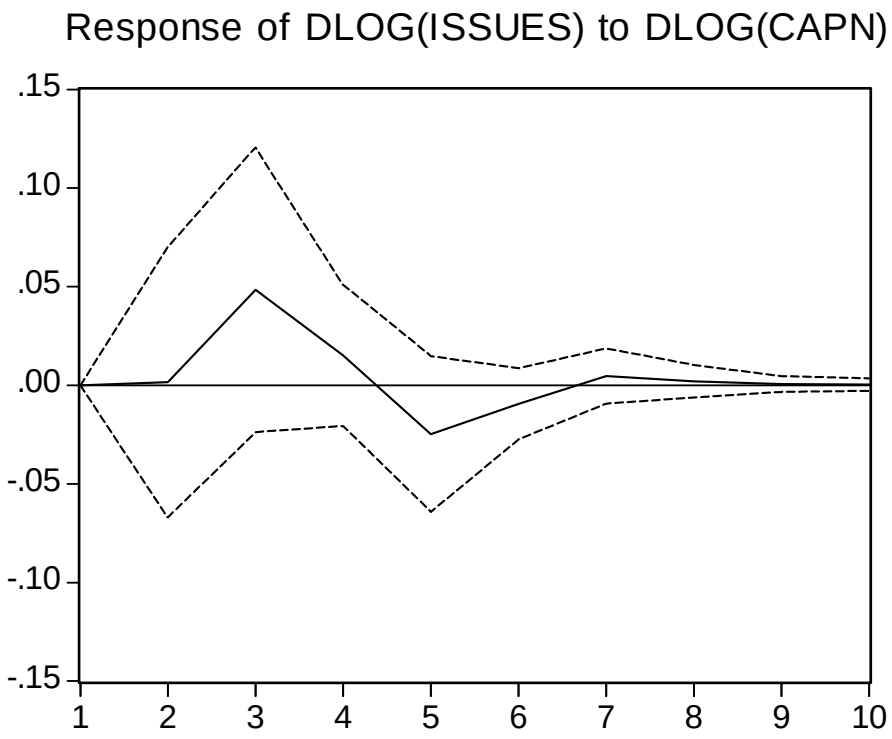
Dependent variable: DLOG(CREDIT)

Excluded	Chi-sq	df	Prob.
DLOG(ISSUES)	1.322662	2	0.5162
DLOG(CAPN)	14.95371	2	0.0006
All	15.55182	4	0.0037

Dependent variable: DLOG(CAPN)

Excluded	Chi-sq	df	Prob.
DLOG(ISSUES)	1.636546	2	0.4412
DLOG(CREDIT)	0.342107	2	0.8428
All	1.956455	4	0.7438

Response to Cholesky One S.D. Innovations ± 2 S.E.



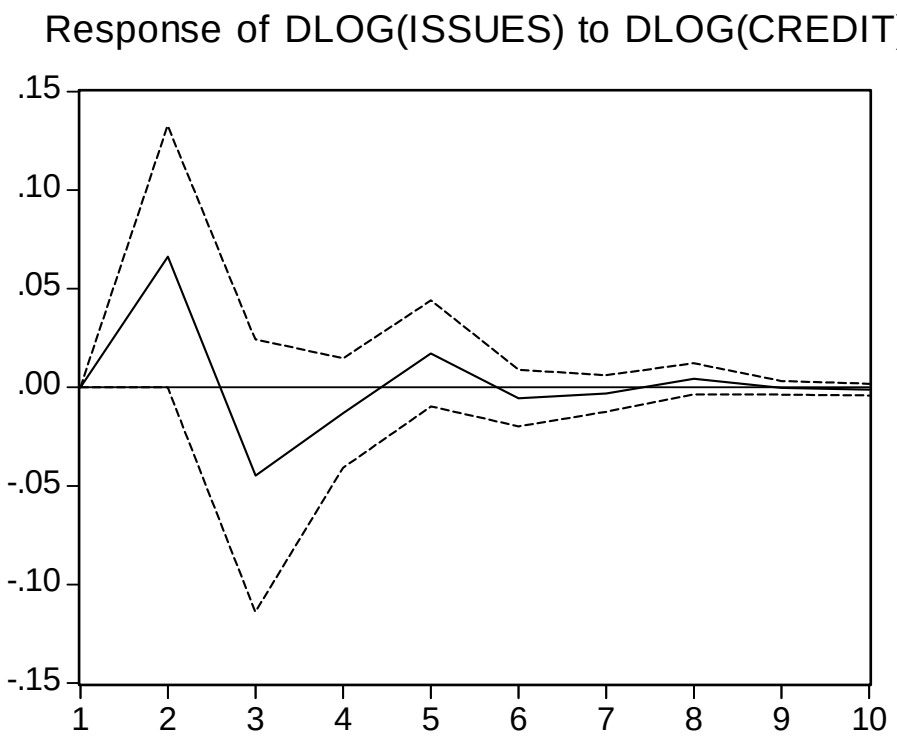


FIGURE 3