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Abstract

In this paper, the authors examine the aggregate national balance-sheets of non-financial corporations in Australia and the G7 countries with a view to assessing both their financial structure and their financial position. More importantly, the authors investigate whether the financial position of non-financial corporations (i.e., debt-to-equity ratio) is material to the economy's investment prospects and whether the importance of this channel differs depending on the structure of corporate financing i.e., bank-based or market-oriented financing structures. Based on a dynamic business investment error-correction model that controls for the opportunity cost of capital and output growth, the authors test the above hypotheses using a quarterly panel dataset of eight developed economies over the 1992-2005 period. Their empirical results suggest that the financial position of non-financial corporations has a statistically significant impact on aggregate business investment growth, although the effect is quantitatively modest. Thus, their findings are consistent with the prediction of models that feature credit market imperfections such as costly information and asymmetric information. Moreover, the effect of corporate financial position appears to be statistically equivalent regardless of whether a country's corporations predominantly finance their investments through bank borrowing or market-oriented financing.

JEL classification: E22, E32, E44
Bank classification: Business fluctuations and cycles; International topics

Résumé

Les auteurs examinent les bilans nationaux globaux des sociétés non financières de l'Australie et des pays du Groupe des Sept en vue d'évaluer leur structure et leur situation financières. Ils cherchent en particulier à déterminer si la situation financière de ces sociétés (c'est-à-dire leur ratio emprunts / capitaux propres) influe sur les perspectives de l'économie en matière d'investissement et si l'importance de ce canal dépend de la structure du financement des entreprises (financement obtenu auprès des banques ou sur le marché). Les auteurs testent ces hypothèses à l'aide d'un modèle d'investissement dynamique à correction d'erreurs qui prend en compte l'incidence du coût d'opportunité du capital et de la croissance de la production; ils ont recours pour ce faire à un ensemble de données de panel trimestrielles concernant huit économies développées et portant sur la période 1992-2005. Leurs résultats empiriques donnent à penser que la situation financière des sociétés non financières a un effet statistiquement significatif sur la croissance globale de l'investissement des entreprises, encore que cet effet reste quantitativement modeste. Les conclusions des auteurs cadrent par conséquent avec celles des modèles qui tiennent compte de l'existence d'imperfections sur le marché du crédit (telles que la présence d'une information coûteuse et asymétrique). De plus, l'incidence de la situation financière des sociétés semble équivalente sur le plan statistique, que les entreprises d'un pays financent de façon prédominante leurs investissements par voie d'emprunt bancaire ou sur le marché.

Classification JEL: E22, E32, E44
Classification de la Banque: Cycles et fluctuations économiques; Questions internationales

1. Introduction

Over the past decade, issues pertaining to the financial structure and financial position of economic agents have received growing attention in the economic literature. Indeed, the financial structure and financial position of economic agents are of particular interest for central banks because they may have an impact on the way monetary policy is transmitted through the banking system and financial markets. Corporations have a significant impact on the performance of the economy, in part through their ability to invest and thereby generate income and employment. Thus, it is important to consider whether or not the financial position of corporate balance sheets, at an aggregate level, can affect corporate investment decisions.

One theoretical benchmark, based on Modigliani and Miller (1958), assumes perfect capital markets, and suggests that the financial structure of corporations i.e. the way corporations finance their assets, whether through debt or equity, is not material to investment prospects. Thus, given perfect information, this framework also implies that the cost of external funds faced by corporations is identical to that of internal financing.

A number of influential theoretical papers have shown, however, how capital market imperfections arising from imperfect information can cause net worth to affect corporate investment decisions. Indeed, credit markets may be inefficient due to costly information; therefore, prices cannot perfectly reflect all available information (Grossman 1976, Grossman and Stiglitz 1980). Similarly, Stiglitz and Weiss (1981) suggest that credit is rationed at current asset prices due to imperfect information about the quality of investment projects. More generally, credit market imperfections associated with asymmetric information can lead to an external finance premium, which depends inversely on borrowers' creditworthiness (as measured by borrowers' financial positions). This external finance premium might reflect the expected cost faced by lenders in terms of screening, evaluating and monitoring the quality of investment projects (Bernanke and Gertler 1989).

Empirical studies featuring credit market imperfections in the form of asymmetric information are often disaggregated panel data studies. In examining financial constraints on investment, this literature has focused on firm-level data, given that cost and quantity constraints are likely related to firm-specific characteristics (see the evidence presented in Fazzari, Hubbard, and Petersen 1988, Gertler and Gilchrist 1994, Bernanke, Gertler, and Gilchrist 1996, Von Kalckreuth 2001, and La Cava 2005). At the same time, some evidence of financial constraints on investment is found at the aggregate level, in the form of a financial accelerator (see Bernanke, Gertler and Gilchrist (BGG) 1999). Nevertheless, current macroeconomic forecasting models do not

generally define an explicit role for financial constraints on investment. In other words, such aggregate investment equations do not allow for a direct impact on investment from the borrower's financial position, although an indirect effect may exist through the cost of capital. As such, to the extent that the financial position of borrowers worsens (improves), forecasting investment with these macroeconomic models will inevitably overestimate (underestimate) aggregate investment.

Within the context of the existing literature, one objective of this paper is to examine aggregate national balance-sheets of non-financial corporations in Australia and the G7 countries with a view to assessing both their financial structure and their financial position. More importantly, the paper investigates whether the financial position of non-financial corporations (i.e., debt-to-equity ratio) is material to the economy's investment prospects and whether the importance of this channel differs depending on the structure of corporate financing i.e., bank-based or market-oriented financing structures. Note, however, that this paper does not attempt to estimate the structural parameters associated with the financial accelerator or any other type of financial friction. Instead, the paper takes a more general approach, asking whether or not the financial position of corporate balance sheets is important in explaining investment growth within a reduced-form framework. To our knowledge, no studies have yet been published that examine the connection between the financial position of non-financial corporations and business investment at the aggregate level using a panel dataset of industrialized countries.

Our methodology is as follows. We begin with a quarterly panel dataset containing national balance sheet data for eight developed economies (i.e., Australia, Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) over the 1992 to 2005 period. Given the complexity of national balance sheet accounts and the differences in such accounts across countries, we chose to focus on data for the total non-financial sector of each country, which includes both private and government-sponsored enterprises to ensure comparability across countries (see Appendix A for details).[1] Although a longer time sample would be preferable, a lack of available national data did not permit this. At the same time, beginning our sample in the early 1990s limits the extent to which structural changes may affect our econometric results.

Using this dataset, we first construct several ratios so as to assess corporate financial structure and financial position. More specifically, light is shed on financial structure using indicators such as loans, issued debt and equity, each as a share of corporate liabilities. These ratios allow us to determine whether a country's corporate sector finances its assets mainly through banks or via the

1. For all countries in our panel dataset, the private non-financial corporate sector represents about 90 per cent of total non-financial corporations. Note also that our balance sheet data are expressed on a market-value basis.

market. Attention is then turned toward an assessment of corporate financial position based on the debt-to-equity ratio which, as a measure of leverage, is the most relevant balance sheet indicator when considering investment decisions. At the same time, the debt-to-equity ratio also summarizes the structure of corporate financing.

On the whole, our financial structure indicators reveal that non-financial corporations in Australia, Canada, France, the United Kingdom, and the United States tend to finance their assets through the market i.e., debt and equity issuances, while non-financial corporations in Germany, Japan, and Italy tend to finance their assets through bank loans. With regard to corporate financial position, the debt-to-equity ratio has exhibited a downward trend in recent years in most economies with a brief increase early in the present decade following the decline in technology share prices.

Moving on to address the main question of the paper, panel cointegration and error-correction techniques are applied to our dataset in an effort to analyze the short-term determinants of business investment. Based on a dynamic business investment error-correction model that controls for the opportunity cost of capital and output growth, we test whether financial positions of non-financial corporations matter for aggregate investment growth using the debt-to-equity ratio as a measure of corporate financial position.

To summarize our main empirical results, having corrected for potential endogeneity bias using the Arellano and Bond (1991) generalized method of moments (GMM) methodology, we find evidence that the financial position of non-financial corporations does indeed have a statistically significant impact on aggregate business investment growth, although the effect is quantitatively modest. Moreover, the importance of corporate financial position appears to be statistically equivalent regardless of whether a country’s corporations predominantly finance their investments through bank borrowing or bond/equity financing. At the same time, changes in overall real economic activity and the real cost of capital are found to affect investment growth, although the latter is not statistically significant in all specifications. On the whole, these results, which are contrary to the prediction of Modigliani and Miller’s theoretical model, are thus consistent with the prediction of models that feature credit market imperfections such as costly information and asymmetric information.

Taken as a whole, our empirical results suggest that, large movements in the rate of change of the debt-to-equity ratio may pose a risk to the outlook for investment growth, in light of the fact that most macroeconomic models used to formulate monetary policy do not allow corporate financial position to impact investment directly.

The remainder of the paper is organized as follows. Section 2 briefly surveys the related literature. Section 3 examines both the financial structure and financial position of non-financial corporations. Section 4 provides some empirical evidence on whether the financial position of non-financial corporations affects investment beyond the usual neoclassical and Keynesian channels, and whether the importance of this channel differs between bank-based and market-oriented financial structures. Section 5 concludes and suggests paths for future research.

2. Literature Relevant to Our Research

The interaction between the financial position of economic agents and the transmission of monetary policy has been of interest to economists and policymakers for decades. Indeed, by the first half of the 1900s, the investment literature was already addressing the interaction between real and financial variables (i.e., balance sheet variables). For example, Irving Fisher (1933), in examining how the role of deflating prices may have augmented the decline in aggregate demand during the great depression, noted the important role played by the level of private debt.

In contrast to Fisher's view, Modigliani and Miller (1958) demonstrated that, under certain strict conditions, the structure of corporate financing was irrelevant to the cost of capital, and implicitly to the assessment of risk by lenders. This result implies that the cost of external funds is identical to that of internal financing (i.e., they are perfect substitutes). However, these conclusions depend on the assumption of perfect capital markets, symmetry of information and complete contracts between borrowers and lenders.

Despite Modigliani and Miller's theorem, other authors remained concerned with the interaction between real and balance sheet variables. Until the late 1970s, however, a theoretical basis for using variables representing constraints on financing was largely absent and, in light of the Modigliani and Miller's theorem, macroeconomic modelling had largely abstracted from the influence of firms' financial decisions on the evolution of the real economy. At the same time, empirical studies in the 1970s and 1980s that attempted to find a relationship between the cost of capital and investment spending were largely unsuccessful.[2] The literature then focused on explaining this result.

Beginning in the mid-eighties, theoretical developments suggested that the Modigliani-Miller theorem may not hold under imperfect information. A number of influential papers followed, showing how capital market imperfections can arise under asymmetric information. Building on

2. Blanchard (1986) suggests that this result may be due to a positive correlation between the real user cost of capital and a productivity variable that is omitted from the neoclassical investment framework.

the conceptual work of papers such as Akerlof (1970), Grossman (1976), Grossman and Stiglitz (1980) and Stiglitz and Weiss (1981), the seminal papers of Bernanke and Gertler (1989, 1995) assumed imperfect capital markets and asymmetry of information, linking the cost of a firm's external financing to the quality of their balance sheet in a simple real business cycle model. The authors concluded that the magnitude and persistence of business-cycle fluctuations can be amplified by informational asymmetries in credit markets that introduce a wedge between the cost of external and internal funds, i.e., the external finance premium. This channel has come to be known as the balance-sheet channel of monetary policy.[3]

Drawing from their earlier work, Bernanke, Gertler, and Gilchrist (BGG, 1999) develop a financial-accelerator model which specifies an explicit formal link between the borrowing costs of firms and their net worth. The authors find that the financial accelerator is quantitatively important in their calibrated sticky-price dynamic stochastic general-equilibrium model of the United States. Similarly, Hall (2001a) and Fukunaga (2002) find that the BGG model can help explain weak investment periods in the United Kingdom and Japan. In particular, Hall (2001b) shows that financial accelerator effects appeared more important in the early 1990s recession than in the 1980s recession as U.K. corporations were much more dependent on external financing in the early 1990s. Following on the work of BGG, Christensen and Dib (2006) estimate a sticky-price dynamic stochastic general-equilibrium model with a financial accelerator. They find some quantitative evidence in favour of the financial-accelerator model which helps explain investment fluctuations in the United States.

Other studies that are more empirical in nature have examined the interaction between balance sheet and real variables. For instance, Vermeulen (2002) using firm-level data for Germany, France, Italy and Spain finds ample evidence of a financial accelerator with different strength across firm size classes and asymmetric effects over the business cycle. Kennedy and Sløk (2005) examine how corporate sector vulnerability may affect output growth in the G7 countries. Two measures of vulnerability are developed using firm-level data. The first measure is the share of employment represented by firms with both high debt-to-equity ratios (equal to or greater than 100 per cent) and a low ability to service that debt as measured by the current ratio (equal to or less than 1.5). The second measure is the share of market capitalisation represented by firms with high debt-to-equity ratios. Using a panel regression model that controls for lagged real GDP growth and the yield curve, the authors find that both measures of vulnerability are statistically

3. Although the balance-sheet literature focused on corporations, this channel has been applied to consumer spending as well. For example, Mishkin (1977) explores the role of consumers' balance sheet position in consumption equations and finds that it was an important factor in explaining the severity of 1973–1975 recession in the United States. Similarly, Mishkin (1978) and Bernanke (1983) argued that the weakness of borrowers' balance sheets in 1929–1933 contributed significantly to the severity of the Great Depression in the United States.

significant in explaining GDP growth one year ahead for the G7 economies over the 1990–2003 period.[4] Furthermore, similar results were found using business investment as opposed to GDP, suggesting that business investment may be the relevant transmission channel. Relatedly, Jaeger (2003) estimates a reduced-form time-series investment equation for the Euro Zone, finding that higher leverage (i.e., debt-to-equity ratio or debt-to-internal-funds ratio) has statistically and economically significant negative effects on corporate investment, particularly during periods of above-average leverage.

Davis and Stone (2004) examine the link between corporate financial structure and contractions in investment and inventories. After accounting for fundamental factors, the authors find a marked correlation between the debt-to-equity ratio and investment/inventory declines following crises. Thus, the study suggests that changes in corporate financial flows following crises impinge significantly on bank lending, and, thus, investment and GDP, and are of greater magnitude for emerging market countries and after banking crises. The effect is found to be less important for OECD countries or following currency crises. As a result, the authors suggest that industrialized countries benefit from the existence of multiple channels of intermediation. For example, bond issuance is shown to pick up in the wake of banking crises. In the end, Davis and Stone advise authorities to give corporate sector balance sheet indicators priority when monitoring financial stability.

Although the credit channel literature generally refers to the external finance premium within the context of bank-based financing, firms may also face an external finance premium when issuing bonds. As such, monetary authorities should monitor developments in the corporate bond market, in addition to the loan market. Using aggregate data, De Bondt (2004) investigates the balance sheet channel of monetary policy working through the euro area corporate bond market and finds that variations in the price and availability of corporate bonds may act as an important monetary transmission channel.[5]

Taken as a whole, the economic literature appears to find that corporate balance sheet indicators play a significant role in determining the growth of business investment. As such, this paper investigates such a relationship for Australia and the G7 countries in Section 4. In preparation for this, however, Section 3 begins by briefly discussing firms' requirement for financial capital, including the choice between different types of external financing. Non-financial corporate sector

4. In addition to the measures of vulnerability, lagged of GDP growth and the yield curve were also found to be statistically significant in explaining output growth, while the flow-of-funds measure of the debt-to-equity ratio was not.
5. Note that, in De Bondt's study, the external finance premium on corporate bonds is proxied by the spread between long-term BBB-rated euro area corporate bond yields and government bond yields.

national balance sheet accounts are then used to built several financial ratios in order to assess corporate financial structure and financial position in developed economies.

3. Financial Analysis of Non-Financial Corporate Balance Sheets

Firms require financial capital to finance their operations. In addition to using internally generated funds such as retained earnings, firms can also finance their operations with external funds such as bank loans, and issued debt or equity. A corporation's need to use external funds is primarily influenced by its financing gap, i.e., the difference between capital expenditures and internally generated funds. Although the reasons behind a firm's choice between different forms of capital are complex, mainstream theories suggest that a firm's capital structure is based on minimizing its cost of capital. Nevertheless, several factors can influence this decision including inflation, taxes, interest rates, and expectations about the future evolution of these variables.

In the following subsections, we use the national balance sheet accounts for the non-financial corporate sector in order to build several financial ratios which will assist us in assessing corporate financial structure and financial position (See Table 1 for a summary of these ratios). In our assessment of financial structure, we calculate bank loans, issued debt, and equity, each as a share of total liabilities. These ratios allow us to determine whether a country's non-financial corporate sector finances its assets mainly through banks (or other financial institutions) or through the market. Finally, in our assessment of corporate financial positions, we focus on the debt-to-equity ratio as it is the most relevant indicator from a lender's point of view when evaluating firms' ability to repay their debt.

3.1 National Balance Sheet Account Data

Focusing on the non-financial corporate sector, we use national balance sheet accounts to build several key financial ratios that are useful in assessing a corporation's financial structure and financial position. Although it is ideal to create these statistics only for the *private* non-financial corporate sector, private and public corporations are only shown separately in the national balance sheet accounts for Australia, Canada, Japan, the United Kingdom, and the United States. In the case of France, Germany, and Italy, private and public non-financial corporations are grouped together and are unavailable separately in the national balance sheet accounts. Therefore, to ensure comparability across countries in our panel dataset, we use data for the total non-financial corporate sector. Including government-sponsored non-financial corporations is unlikely to alter the data to a great extent, however, given that roughly 90 per cent of the non-financial corporate sector in Australia, Canada, Japan, the United Kingdom, and the United States is made up of

private non-financial corporations. Balance sheet data for most countries are available on a quarterly basis, reaching back to the early 1990s, although longer time horizons are available for some countries. Note that the national balance sheet account data used in this paper are constructed on a market-value basis (See Appendices A and B for details).

3.2 Structure of Corporate Financing

The financial structure of non-financial corporations in Australia and the G7 countries is illustrated in Figures 1a and 1b. Of note, equity financing is currently the most important source of external funds for Australia and the G7 countries. It is also worth mentioning that for most countries, however, we cannot distinguish between outstanding shares and retained earnings as they are grouped together under the heading of "shares and other equity." That said, in 2005, Australia, France, the United Kingdom, Canada, and the United States had the largest proportion of financing in the form of equity while Japan, Germany, and Italy had the smallest. Total loans, on the other hand, are the second most important source of external financing for France, Germany, Italy, the United Kingdom, Japan, and Australia, while issued debt and "other liabilities" take that rank for Canada and the United States. On the whole, our financial structure indicators reveal that non-financial corporations in Australia, Canada, France, the United Kingdom, and the United States tend to finance their assets through the market i.e., debt and equity issuances, while non-financial corporations in Germany, Italy, and Japan tend to finance their assets through bank loans.[6]

3.3 A Key Indicator of Corporate Financial Position

In our assessment of corporate financial position, we focus on the debt-to-equity ratio as it is the most relevant indicator, from a lender's point of view, when evaluating the ability of firms to repay debt incurred to finance investment projects. It is also the best proxy of a firm's net worth.[7] In addition to being an indicator of financial position, the debt-to-equity ratio also summarizes the structure of corporate financing by calculating the relationship between loans and issued debt in comparison to equity. As such it is the debt-to-equity ratio that we make use of in our empirical investigation in Section 4.

A high debt-to-equity ratio generally denotes a relatively highly leveraged non-financial corporate sector (i.e. corporations finance more of their investment through bond issuances or loans than

6. While France has traditionally been described as a "bank-based" economy in the existing literature, we classify France as a market-based economy based on recent national balance sheet statistics.
7. Other financial position indicators which focus more on short-term balance sheet considerations such as the current ratio and the ratio of short-term liabilities to total liabilities are discussed in Appendix C and illustrated in Figures 3 and 4 of Appendix E.

they do through issuing shares or retained earnings). Moreover, a comparatively high ratio generally suggests increased financial fragility as corporations are more likely to default on their debt obligations, *ceterus paribus*. In addition, a high debt-to-equity ratio may also suggest that corporations are experiencing difficulty in obtaining capital through equity markets, perhaps because the market holds a negative outlook in regard to the corporation's management or business/industry outlook. Within this context, differences in determining factors such as agent preferences, regulation (including the tax framework), and financial market development, may lead corporations in some countries to maintain a higher sectoral debt-to-equity ratio, *ceterus paribus*, than corporations in other countries. In such cases, higher leverage may be sustainable over time.

To the extent that debt-to-equity ratios have trended downward in recent decades, the overall financial position of non-financial corporations has improved. After generally reaching a low in 1999, leverage in most countries has increased somewhat during the present business cycle following the decline in technology share prices. Nevertheless, leverage remains low by historical standards. Referring to Figure 2, lower corporate leverage in the mid-2000s compared with the early 1990s indicates that non-financial corporations are currently in better financial position to deal with interest rate changes, pursue new investment opportunities and confront unanticipated economic and financial shocks. Non-financial corporations in Japan, Germany, and Italy continue, on average, to maintain a higher debt-to-equity ratio in comparison to the non-financial corporate sectors in the other countries. Japan, however, is a special case. Following a significant decline throughout the 1980s, the leverage of Japanese non-financial corporations remained unusually high for a sustained period of time throughout most of the 1990s following the end of Japan's asset price bubble (1990–92). In more recent years, however, the debt-to-equity ratio of the Japanese non-financial corporate sector has improved substantially, having nearly returned to the low level seen in early 1989, close to levels presently observed in Germany and Italy. As such, concern over the financial vulnerability of Japanese corporations has eased considerably.

4. Does Financial Position of Non-Financial Corporations Matter for Aggregate Investment Growth?

This section of the paper examines whether the financial position of non-financial corporations is material to the economy's investment prospects. In particular, it examines whether the composition of corporate balance sheets (i.e., debt-to-equity ratio) affects investment beyond the usual neoclassical and Keynesian channels. Given the significant deepening that has taken place in many corporate bond and equity markets in recent years, it is also important to assess whether

the effect of corporate balance sheets on investment differs between countries with financial systems that are more bank-based as opposed to market-based. These questions are investigated by applying an error-correction framework to a panel dataset of developed countries (namely, Australia, Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States).

Underlying this error-correction model is a long-run investment equation. This investment equation is based on the neo-classical model first proposed by Jorgensen (1963) and later expanded in Jorgensen (1967, 1971), in which the simple Keynesian accelerator model is augmented to include the effects of relative price variables, specifically a proxy for the real user cost of capital. The model is derived by solving for the desired long-run stock of capital in a firm profit-maximization problem subject to a production technology assumption and a capital accumulation identity.

Abstracting from the implications of taxation and uncertainty, the profit of a firm can be defined as follows:

$$R_t = P_t Y_t - W_t L_t - q_t GI_t \tag{1}$$

where R_t is profit, P_t is the product price, Y_t is real output, W_t is the wage, L_t is hours worked, q_t is the price of investment goods, and GI_t is real gross investment.[8,9]

$$V_t = \sum_{i=1}^{T} \frac{R_{t+i}}{\prod_{j=1}^{i} (1 + i_{t+j})} \tag{2}$$

Given the nominal discount rate, i_t, the objective of the firm is to choose the desired capital stock and labour, K_t and L_t, so as to maximize V_t, the present value of the future path of profits (or earnings) subject to a production function and a capital accumulation condition. The production function can be characterized by a Cobb-Douglas production technology (equation 3), where A_t is total factor productivity, K_t is the aggregate capital stock, and α is the capital share of total income:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha} \tag{3}$$

8. Jorgensen uses Q_t to denote production at the firm level. In contrast, we use Y_t throughout the paper to denote real output.
9. q_t represents the shadow price of capital, or Tobin's q, and is equal to the price of investment goods under the assumption of no adjustment costs.

Assuming that the capital stock depreciates at the rate δ, the capital accumulation condition is as defined by equation 4:

$$K_{t+1} = (1-\delta)K_t + GI_t \tag{4}$$

Assuming no adjustment costs, the firm's intertemporal choice can be approximated by a two-period optimization problem. Substituting equations (1), (3) and (4) into equation (2), and taking the derivative with respect to K_t, yields the following first-order condition for the desired capital stock:

$$K_t = \frac{\alpha Y_t}{C_t} \tag{5}$$

where C_t denotes the real user cost of capital:

$$C_t = \left(q_t\left(\frac{(1+i_t)}{(q_t/q_{t-1})} - 1 + \delta\right)\right)/P_t \tag{6}$$

Assuming a constant growth rate of the capital stock in steady state and given the capital accumulation identity (equation 4), real gross investment can be represented as a constant ratio of the capital stock. Thus, the desired long-run capital stock can be reorganized into a long-run log-linear relationship between real gross investment, real output, and the real user cost of capital as shown in equation 7:

$$I_t = \alpha_1 y_t + \alpha_2 c_t + \upsilon_t, \tag{7}$$

In essence, this specification captures supply and demand factors that define the level of real gross investment in the long run.

To address the main question of the paper, Jorgensen's model can be slightly modified to account for financial imperfections in capital markets which can cause firms' financial positions (i.e., net worth) to affect investment decisions. This is done under the assumption that firms, when maximizing the present value of the future path of profits, do not internalize the effect that the debt-to-equity ratio may have on the interest rate. Thus, the real user cost of capital, denoted C^*_t, can be augmented by an external finance premium which depends on firms' net worth as proxied by the debt-to-equity ratio, D_t/E_t:

$$C^*_t = C_t + \alpha_3 \Psi(D_t/E_t) \tag{8}$$

where ψ is a positive function of the debt-to-equity ratio, and $\psi' > 0$. In line with standard models, we expect α_3 to equal zero in the long run. This may not be the case, however, when one considers the short run.

Along these lines, our analysis uses a modified version of Jorgensen's investment model, as shown in equation 9, which accounts for the effect of firms' financial positions on investment decisions:

$$I_t = \alpha_1 y_t + \alpha_2 c_t + \alpha_3 (d_t/e_t) + \upsilon_t, \quad (9)$$

where,

I_t = natural logarithm of real gross business investment at time *t*,

y_t = natural logarithm of real GDP at time *t*,

c_t = natural logarithm of the real user cost of capital at time *t*, defined as: $log(1 + rrl_t*(pibus_t/pgdp_t))$, where rrl_t = the real 10-year bond yield, $pibus_t$ = the business investment price deflator, $pgdp_t$ = the gross domestic product price deflator,

d_t/e_t = natural logarithm of the debt-to-equity ratio at time *t*.

Equation 9 can be interpreted as a long-run investment equation under the cointegration hypothesis, i.e., if the "residual" υ_t is I(0). Therefore, one must find evidence that the variables of interest are I(1) and, moreover, that a unique cointegrating relationship exists between them. Evidence of the former is provided by way of a variety of unit-root tests displayed in Table 2. The Hadri panel unit-root test, the Levin-Lin-Chu test, and the Im-Pesaran-Shin test suggest, overall, that the log-levels of variables included in equation 9 are non-stationary (i.e., I(1)), although evidence is somewhat mixed in the case of the real user cost of capital.

We test for cointegration using the Johansen panel cointegration trace and maximum eigenvalue tests, as well as Pedroni panel and group cointegration tests. Using the general-to-specific approach, we begin with all four variables included in equation 9, i.e., real gross investment, real output, the real cost of capital, and the debt-to-equity ratio. Referring to the lower portion of column (1) in Table 3, the Johansen tests and some Pedroni tests (without a trend) give limited evidence of cointegration between these four variables. As shown in the lower portion of column (2) in Table 3, if one removes the debt-to-equity ratio from equation 9 and considers real gross investment, real output, and the real cost of capital, no evidence of cointegration is found between the three variables using the Johansen tests, although the Pedroni panel and group cointegration tests (with a trend) do provide some evidence of cointegration. On the other hand, if one considers

only real gross investment and real output (see column (3) in Table 3), strong evidence of cointegration is obtained using both the Johansen tests and Pedroni tests. Thus, overall, this latter combination (i.e., real investment and real output) provides solid evidence of cointegration, although mixed evidence is also found for all the other aforementioned combinations of variables. Therefore, one can interpret equation 9, as an investment equation and draw valid inferences from its estimated parameters.

Empirical estimation of equation 9 uses a quarterly panel dataset covering Australia and the G7 countries over the period 1992Q1 to 2005Q4. Estimated long-run parameters are obtained using the panel Dynamic Ordinary Least Squares (DOLS) leads-and-lags procedure which corrects for potential endogeneity bias (Kao and Chiang 2000, Mark and Sul 2002). More specifically, these estimates are derived with four leads and four lags on the first difference of the long-run determinants.[10]

Column (1) of Table 3 presents the panel estimation results with all four variables included in equation 9, i.e., real gross investment, real output, the real cost of capital, and the debt-to-equity ratio. As can be seen from the table, the estimated parameter associated with real output is statistically significant while those associated with the real cost of capital and the debt-to-equity ratio are not statistically significant. Although not reported in Table 3, the estimated parameter associated with the debt-to-equity ratio remains not statistically significant when one considers real output but excludes the real cost of capital.

Column (2) of Table 3 presents the panel estimation results for a traditional Jorgensen-type specification of our long-run total business investment equation, including real output and the real cost of capital as explanatory variables. In line with the Keynesian accelerator model, the estimated parameter associated real output is positive and statistically significant. However, consistent with previous studies (see Section 2 above), the estimated parameter associated with the real cost of capital is not statistically significant. Thus, we drop the real cost of capital from the long-run investment equation, recalling also that strong evidence of cointegration was found when one considered only real business investment and real output (i.e., the real cost of capital and the debt-to-equity ratio are absent from the long-run investment equation 9 such that $\alpha_2 = 0$ and $\alpha_3 = 0$). Therefore, column (3) of Table 3 presents our preferred specification of the long-run real investment equation which includes only one explanatory variable: real output.

10. Note that we include country dummies in our long-run equations to account for country-specific effects such as currency units. Traditional fixed-effects panel estimation is not used so as to avoid the demeaning inherent in such “within” estimators. Note also that our long-run conclusions hold if the lag-structure in equation 9 is reduced from four to two. All panel estimations and statistical tests were performed using the Stata and Eviews software packages.

Thus, taking our long-run investment equation as a cointegrating vector, we then use the two-step Engle-Granger procedure to estimate an investment error-correction model of the following form:

$$A(L)\Delta I_t = B(L)\Delta I_{t-1} + C(L)\Delta y_t + D(L)\Delta c_t + E(L)\Delta(d_t/e_t) + \gamma[I_{t-1} - \alpha S_{t-1}] + \varepsilon_t \qquad (10)$$

where,
$$\alpha S_t = \alpha_1 y_t + \alpha_2 c_t + \alpha_3(d_t/e_t) \qquad (10.1)$$

with *A(L), B(L), C(L), D(L),* and *E(L)* being polynomials in the lag operator. The residual from our long-run estimation (equation 9 with α_2=0 and α_3=0) is taken as an error-correction term within equation 10. More specifically, the long-run parameters of our preferred specification, as shown in column (3) of Table 3, appear as vector α in equation 10. Furthermore, the short-run dynamics are modelled by a fourth-order lag process of the first difference of the log of real business investment, real output, the real cost of capital and the debt-to-equity ratio.

In this error-correction framework, actual business investment moves toward its long-run level with a speed of adjustment, γ. For $\gamma < 0$, the error-correction term ensures that I_t converges towards S_t in the long run and provides further evidence of cointegration.[11] A rejection of the non-cointegration hypothesis, $\gamma = 0$, against the (stationarity) alternative hypothesis, $\gamma < 0$, is evidence that I_t and S_t are cointegrated. This suggests that one can test for cointegration in the context of equation 10 by making inferences on the basis of the *t*-statistic corresponding with $\hat{\gamma}$, which we will refer to as $\hat{\tau}_\gamma$.[12]

Based on our preferred long-run relationship between real business investment and real output, column (1) of Table 4 gives the key estimated parameters of equation 10 using the standard panel ordinary least squares estimator. Noting that we find further evidence of cointegration given the statistical significance of the error-correction term, we focus primarily on the dynamic portion of equation 10. In general, the estimated parameters suggest that the growth of investment is affected positively by an increase in output growth and negatively by a deterioration in the financial position of non-financial corporate balance sheets (i.e., a rise in the debt-to-equity ratio), but is unaffected by the cost of capital.[13] Note, however, that the effect of a change in the growth rate of the debt-to-equity ratio on the change of the growth of investment is modest, such that an increase

11. The Granger Representation Theorem states that, if two variables (or a variable versus a vector of variables) are cointegrated, then there exists an error-correction model that can capture the dynamics underlying the cointegrating relationship between the variables (see Engle and Granger 1987).
12. In the estimation procedure, γ is constrained to be equal across countries.
13. As mentioned previously, it has not been uncommon in the investment literature to find statistically insignificant estimates on the user cost of capital. Blanchard (1986) suggests this is likely due to misspecification error inherent in the neoclassical investment model whereby the user cost of capital may be positively correlated with an omitted productivity variable.

of one percentage point in the growth of the debt-to-equity ratio implies a decline of 0.03 of a percentage point on the growth of business investment.[14]

Given the above evidence that changes in the financial position of non-financial corporations affect investment growth, it is of interest to explore whether this effect differs between countries whose corporations are typically financed through bank lending as opposed to market funding. If investment is more sensitive to corporate leverage under one type of financial structure than another, this holds important implications for the transmission of monetary policy in a given economy. Thus, we split our debt-to-equity ratio variable in equation 10 into two separate variables, one for countries with corporations with predominantly bank-based financing and the other for countries with corporations with predominantly market-based financing.[15] The debt-to-equity ratio is found to have a statistically significant effect in both bank-based countries and market-based countries (see column (2) of Table 4). Moreover, the sum of statistically significant lags on the debt-to-equity ratio is over twice as large in the case of the bank-based economies. However, the results of a Wald restriction test suggest that one cannot statistically differentiate between the overall estimated effect of the debt-to-equity ratio in bank-based or market-based economies.

Although the panel OLS results presented thus far appear reasonable, it is possible that the estimated parameters may suffer from endogeneity bias. Thus, it is prudent to verify our results using the generalized method of moments (GMM) estimator, which attempts to correct for possible endogeneity bias through the use of instrumental variables. More specifically, the Arellano and Bond first-difference GMM estimator, as put forth in Arellano and Bond (1991), can be used in cases where country-specific fixed effects may also be present in the data.[16] Indeed, based on a "redundant fixed effects" likelihood ratio test, we find evidence of country-specific fixed effects in our data, thus suggesting it is proper to remove these fixed effects using the Arellano and Bond GMM estimator.

Of course, the specification of instruments in a GMM setting depends on one's use of instrumental variables. Column (3) in Table 4 applies the Arellano and Bond GMM methodology

14. Actual data may be used to quantify this effect over history. For example, based on Canadian data, the average annualized quarterly growth rate of investment over our sample was about 5 per cent. Based on our estimated parameter, the growth rate of the debt-to-equity ratio, which has been negative on average, contributed to increase the growth rate of investment by 0.05 of a percentage point. Thus, the effect has been limited.
15. Based on the stylized facts reported previously regarding the structure of corporate financing, corporations in Germany, Italy and Japan rely relatively more on bank-based financing, while the financing of corporations in Australia, Canada, France, the United Kingdom and the United States is relatively more market-based.
16. The Arellano and Bond GMM estimator is a particular type of GMM estimator that uses lagged differences of the dependent variable with contemporaneous and lagged differences of explanatory variables as instruments to remove potential endogeneity bias. The Arellano and Bond GMM estimator also removes country-specific fixed effects by first-differencing the equation of interest.

to our standard specification of the error-correction model using lags of the dependent variable as predetermined instruments while including all other explanatory variables as strictly exogenous instruments.[17] In broad terms, the conclusions drawn above in the case of panel OLS remain robust under panel GMM estimation in that changes in output and the debt-to-equity ratio remain statistically significant in explaining in investment growth. Interestingly, when statistically significant lags are summed, the estimated impact on investment growth of a change in the debt-to-equity ratio is found to be more than twice as large under GMM, about -0.069, compared to about -0.027 when estimated using panel OLS. Moreover, changes in the cost of capital are also found to have a negative effect on investment growth. Note also that the statistical significance of the error-correction term gives further evidence of a cointegrating relationship taking the form of equation 9.

Although these initial GMM results are generally encouraging, it is likely more realistic to include changes in output, the cost of capital and the debt-to-equity ratio as predetermined rather than exogenous instruments. Thus, column (4) in Table 4 presents Arellano and Bond panel estimation results in which all explanatory variables, excluding the error-correction term, are used as predetermined instrumental variables. Again, our general findings remain robust with changes in output, the cost of capital and the debt-to-equity ratio explaining, in part, changes in investment while we continue to find evidence of cointegration. However, in this case, the combined magnitude of statistically significant lags of the change in the debt-to-equity ratio returns to a level very similar to what was found in column (1) of Table 3 using the panel OLS estimator (i.e., -0.03). These findings are robust to various combinations of other predetermined instrumental variables.

Column (5) of Table 4 reports our GMM results when we consider if the impact of the balance sheet on investment growth differs between countries whose corporations depend relatively more on bank financing as opposed to market financing.[18] We find that our initial conclusions based on the panel OLS estimator are robust. Indeed, although the estimated effect of corporate balance sheet position on investment growth is larger in the case of bank-based economies, a Wald restriction test cannot reject the null hypothesis that this effect is statistically the same in both bank-based and market-based economies.

To summarize our empirical results, we find evidence that the financial position of non-financial corporations does indeed have a statistically significant impact on aggregate business investment growth, although the effect is quantitatively modest. Moreover, the importance of corporate

17. Please see footnotes to Table 4 for a description of the specific instruments used in our GMM estimation.
18. Note that, in all instances, our GMM results are found to satisfy the Arellano and Bond assumption that no second-order autocorrelation is present in the model (See Table 4).

financial position appears to be statistically equivalent regardless of whether a country's corporations predominantly finance their investments through bank borrowing or bond/equity financing. At the same time, changes in overall real economic activity and the real cost of capital are found to statistically affect investment growth, although the latter is not statistically significant in all specifications.

Finally, our empirical results, as presented above, are qualitatively robust with respect to alternative measures of expected inflation (i.e., backward-looking versus more forward-looking measures calculated using a Hodrick-Prescott (HP) filter on the year-over-year inflation rate), alternative measures of long-term bond yield (i.e., government bond yields versus corporate bond yields), as well as alternative dynamic error-correction specifications (i.e., a lag length of four versus two).[19]

5. Conclusions

In this paper, we have examined the aggregate national balance-sheets of non-financial corporations in Australia and the G7 countries over the 1992 to 2005 period, with a view to assessing both their financial structure and their financial position. More importantly, the paper has investigated whether the financial position of non-financial corporations (i.e., the debt-to-equity ratio) is material to the economy's investment prospects. The paper also examined whether the importance of this channel differs depending on the structure of corporate financing i.e., bank-based or market-oriented financing structures. Our financial structure indicators reveal that non-financial corporations in Australia, Canada, France, the United Kingdom, and the United States tend to finance their assets through the market i.e., debt and equity issuances while non-financial corporations in Germany, Japan, and Italy tend to finance their assets through bank loans.

To summarize, the main conclusion that we draw from our empirical analysis is that the financial position of non-financial corporations has a statistically significant impact on aggregate business investment growth, although the effect is quantitatively modest. At the same time, changes in overall real economic activity and the real user cost of capital are found to affect aggregate investment growth, however, the latter is not statistically significant in all specifications. Moreover, the importance of corporate financial position appears to be statistically equivalent regardless of whether a country's corporations predominantly finance their investments through bank borrowing or bond/equity financing. These results are thus consistent with the prediction of

19. These alternative empirical results are available upon request.

models that feature credit market imperfections such as costly information and asymmetric information.

We reach these conclusions using panel cointegration and error-correction techniques to analyze the short-term determinants of business investment. Our results are supported by formal panel cointegration tests. Potential endogeneity bias is also addressed using the Arellano and Bond (1991) generalized method of moments (GMM) methodology within the error-correction framework. Our empirical results are qualitatively robust with respect to alternative measures of the real user cost of capital (i.e., backward-looking versus more forward-looking measures of expected inflation, and long-term government bond yield versus long-term corporate bond yield), as well as alternative dynamic error-correction specifications (i.e., a lag length of four versus two).

In the final analysis, given that most macroeconomic models used to formulate monetary policy do not allow borrowers' financial positions to directly affect investment, the results of this paper suggest that large movements in the rate of change of the debt-to-equity ratio may pose a risk to the outlook for investment growth.

Although it would have been preferable to base these conclusions on a larger sample of data, a lack of available national time-series observations did not permit this. Thus, given our limited panel dataset, we assumed homogeneous dynamics across countries. Going forward, when additional data become available, our analysis could be extended to allow for cross-sectional heterogeneity whereby the response of investment growth to aggregate corporate financial position differs across countries. Additionally, depending on balance sheet data availability, our methodology could be extended to allow comparison between developed and developing economies. For instance, one could investigate whether the effect of balance sheet position on investment growth is more binding for corporations in developing countries.

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Appendix A: National Balance Sheet Accounts

With the advent of the European System of Accounts (ESA 95) in 1995, differences between countries with respect to national balance sheets have become less important. This implies that cross-country comparisons are likely to be more accurate over the recent years. In this section, we highlight the key components of the non-financial corporate sector of the national balance sheet accounts of Australia and the G7 countries.[20]

In Australia, aggregate balance sheet items for "non-financial corporations" are drawn from the Australian System of National Accounts. Non-financial corporations are mostly privately-owned, but there are some public corporations for which data are published separately. Private non-financial corporations represent about 90 per cent of the all non-financial corporations, and are defined as those private corporations which exist to produce goods and non-financial services. Public non-financial corporations, on the other hand, cover the national, state and local level of public non-financial corporations.

Aggregate balance sheet items for "non-financial corporations" in Canada are published in the National Balance Sheet Accounts. The non-financial corporate sector includes both the non-financial private corporate sector and government business enterprises. The former represents about 90 per cent of the total non-financial corporate sector. The non-financial private corporate sector is comprised of the domestic transactions of private, industrial, Canadian resident corporations. This sector excludes unincorporated businesses which are instead included in the "Persons and unincorporated business" sector. It also includes branches and subsidiaries of foreign corporations operating in Canada. Values for assets, liabilities and equity are measured on an accounting or book value basis. Since June 2004, values for assets, liabilities and equity are also available on a market value basis going back to 1990.

Aggregate balance sheet items for "non-financial corporations" in France are published by the Banque de France. The sector comprises private corporations and public corporations. Aggregate balance sheet items for "non-financial corporations" in Germany are released as part of the "Financial Accounts for Germany" and include both non-financial private corporations and government business enterprises. With the advent of the ESA 95 accounting standard, the non-financial corporate sector now comprises genuine corporations and so-called quasi-corporations (principally partnerships such as general partnerships and limited partnerships). Sole proprietors and self-employed persons, whose entrepreneurial activities are indistinguishable from the

20. National balance sheet accounts of France, Germany, Italy, Japan and the United States are produced by their respective central banks. In Australia, Canada and the United Kingdom, they are produced by their respective national statistical agency.

transactions of private individuals are classified as belonging to the “Household” sector. Aggregate balance sheet items for “non-financial corporations” in Italy are produced by the Banca D’Italia. The sector includes both private and public corporations, as well as cooperatives.

Aggregate balance sheet items for “non-financial corporations” in Japan are released within the “Bank of Japan Quarterly Bulletin”. Non-financial corporations are primarily privately-owned, but there are some public corporations which are shown separately. Private non-financial corporations represent about 90 per cent of aggregate “non-financial corporations.” Private nonfinancial corporations are defined as nonfinancial corporations that are owned and controlled by entities other than government. This includes profit-making corporations such as joint-stock corporations, limited companies, limited partnerships, unlimited partnerships and medical corporations.

In the United Kingdom, aggregate balance sheet items for “non-financial corporations” are part of the United Kingdom Economic Accounts. Non-financial corporations are mostly privately-owned, but there are some public corporations which are shown separately. Private non-financial corporations represent about 90 per cent of total non-financial corporations. Private non-financial corporations are those which exist to produce goods and non-financial services. Total non-financial corporations also include public limited companies, in addition to private companies and partnerships.

In the United States, aggregate balance sheet items for “Nonfarm non-financial Corporate Business” are drawn from the Flow of Funds Accounts. The nonfarm non-financial corporate business sector includes all private domestic corporations with the exception of corporate farms and financial institutions. The nonfarm non-financial corporate business sector includes holding companies, S-corporations, and real estate management corporations.[21] Like Canada, this sector excludes unincorporated businesses. However, unlike Canada, the transactions of “unincorporated businesses” are not included in the “Households or Personal” sector but are instead part of the “Nonfinancial Nonfarm Noncorporate Business and Farm Business” sector. The nonfarm non-financial corporate business sector covers only domestic activities; as such it does not include financial transactions of foreign subsidiaries of U.S. corporations. The operations of foreign corporations within the United States are, however, included in the nonfarm non-financial corporate business sector.[22]

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21. S-corporations are corporations having thirty-five or fewer stockholders that elect to be taxed as if they were partnerships under the provisions of subchapter S of the Internal Revenue Code (see Guide to the Flow of Funds Accounts).
22. Earnings from the operations of foreign subsidiaries and foreign branches of U.S. corporations are reflected only in profit elements—either as earnings retained abroad or as dividends received. Earnings retained in the U.S. and dividends paid to U.S. stockholders being offset against the items’ respective counterparts for U.S. corporations.

Appendix B: A Description of National Balance Sheet Data

Australia

Source: Produced by the Australian Bureau of Statistics
Publication: Financial Accounts, Australian National Accounts, No. 5232.0. Tables: 2, 3, and 4. Financial Assets and Liabilities of Private non-financial corporations, National public non-financial corporations and State and local public non-financial corporations.
Website: http://www.abs.gov.au
Data: Quarterly series from 1988 online. Billions of dollars.

Financial Assets

Short-term assets: Currency and deposits, Holdings of bills of exchange accepted by Banks, One name paper issued, Prepayment of premiums and reserves, Other accounts receivable

Long-term assets: Bonds, Derivatives, Loans and placements, Equities issued by: Other depository corporations, Financial intermediaries, and Rest of world

Financial Liabilities

Total loans: Loans and placements

Trade credit: Other accounts payable

Short-term liabilities: Drawings of bills of exchange, One name paper issued in Australia, One name paper issued offshore, Other accounts payable

Long-term liabilities: Bonds etc. issued in Australia, Bonds etc. issued offshore, Derivatives, Loans and placements

Issued debt: Drawings of bills of exchange, One name paper issued in Australia, One name paper issued offshore, Bonds etc. issued in Australia, Bonds etc. issued offshore, Derivatives

Equity: Listed shares and other equity, Unlisted shares and other equity

Financial Position Indicators

Current ratio: Short-term assets/Short-term liabilities
Debt-to-equity ratio: (Total loans + Issued debt)/Equity

Canada

Source: Produced by Statistics Canada
Publication: National Balance Sheet Accounts, Catalogue no. 13-214-XIE.
Reference: A Guide to the Financial Flow and National Balance Sheet Accounts
Website: http://www.statcan.ca
Data: Quarterly series from 1990 online. Millions of dollars.

Financial Assets

Short-term assets: Currency and bank deposits, Other deposits, Foreign currency deposits, Consumer credit, Trade receivables, Other loans, Canada short-term paper, Other short-term paper, Other financial assets

Long-term assets: Mortgages, Canada bonds, Provincial bonds, Municipal bonds, Other bonds, Corporate claims, Government claims, Shares, Foreign investments

Financial Liabilities

Total loans: Bank loans, Other loans, Mortgages

Trade credit: Trade payables

Short-term liabilities: Trade payables, Bank loans, Other loans, Other short-term paper, Other liabilities

Long-term liabilities: Mortgages, Provincial bonds, Municipal bonds, Other bonds, Corporate claims, Government claims

Issued debt: Other short-term paper, Provincial bonds, Municipal bonds, Other bonds

Equity: Shares

Financial Position Indicators

Current ratio: Short-term assets/Short-term liabilities
Debt-to-equity ratio: (Total loans + Issued debt)/Equity

France

Source: Produced by Banque de France
Publication: Provisional Annual Financial Accounts
Reference: see publication above.
Website: http://www.banque-france.fr
Data: Annual series from 1977 online. Millions of euros.

Financial Assets

Short-term assets: Currency and deposits, Short-term loans, Other accounts receivable, Interest accrued but not yet due on negociable debt securities, Insurance technical reserves

Long-term assets: Securities other than shares, Long-term loans, Shares and other equity

Securities other than shares: Negotiable short and medium term securities (TCN) and similar paper, Bonds and similar paper, Financial derivatives

Financial Liabilities

Total loans: Short-term loans, Long-term loans

Short-term liabilities: Short-term loans, Other accounts payable, Interest accrued but not yet due on loan, Interest accrued but not yet due on negociable debt securities

Long-term liabilities: Securities other than shares, Long-term loans

Issued debt: Securities other than shares: Negociable short and medium term securities and similar paper, Bonds and similar paper, Financial derivatives

Equity: Shares and other equity

Financial Position Indicators

Current ratio: Short-term assets/Short-term liabilities
Debt-to-equity ratio: (Total loans + Issued debt)/Equity

Germany

Source: Produced by Deutsche Bundesbank
Publication: Financial Accounts for Germany, 1991 to 2005, July 2006, Special Statistical Publication 4.
Reference: see publication above.
Website: http://www.bundesbank.de
Data: Annual series from 1980 to 1990 are from publications. Annual series from 1991 online. Billions of euros.

Financial Assets

Short-term assets: Currency and deposits, Money market paper, Short-term loans, Short-term claims on insurance corporations, Other claims

Long-term assets: Bonds, Financial derivatives, Shares, Other equity, Mutual funds shares, Longer-term loans, Longer-term claims on insurance corporations

Financial Liabilities

Total loans: Short-term loans, Longer-term loans

Trade credit: Not disclosed

Short-term liabilities: Money market paper, Short-term loans, Claims from company pension commitments, Other liabilities

Long-term liabilities: Bonds, Financial derivatives, Longer-term loans

Issued debt: Money market paper, Bonds, Financial derivatives

Equity: Shares, Other equity, Mutual funds shares

Financial Position Indicators

Current ratio: Short-term assets/Short-term liabilities
Debt-to-equity ratio: (Total loans + Issued debt)/Equity

Italy

Source: Produced by the Banca D'Italia
Publication: Supplements to the Statistical Bulletin, Monetary and Financial Indicators: Financial Accounts, Volume XVI Number 36 – 23 June 2006.
Reference: The Italian financial accounts
Website: http://www.bancaditalia.it
Data: Annual series from 1991 online. Millions of euros.

Financial Assets

Short-term assets: Currency and transferable deposits, Other deposits, Short-term securities, Short-term loans (other residents), Other accounts receivable, Insurance technical reserves

Long-term assets: Bonds, Derivatives, Shares and other equity, Mutual fund shares

Financial Liabilities

Total loans: Short-term loans of Monetary financial institutions (MFIs), Other short-term loans, Medium and long-term loans of Monetary financial institutions (MFIs), Other Medium and long-term loans

Trade credit: Other accounts payable

Short-term liabilities: Short-term loans of MFIs, Other short-term loans, Short-term securities, Other accounts payable, Insurance technical reserves

Long-term liabilities: Bonds, Derivatives, Medium and long-term loans of Monetary financial institutions (MFIs), Other Medium and long-term loans

Issued debt: Short-term securities, Bonds, Derivatives

Equity: Shares and other equity

Financial Position Indicators

Current ratio: Short-term assets/Short-term liabilities
Debt-to-equity ratio: (Total loans + Issued debt)/Equity

Japan

Source: Produced by the Bank of Japan
Publication: Guide to Japan's Flow of Funds Accounts
Website: http://www.boj.or.jp
Data: Quarterly series from 1965 online. Hundred millions of yens.

Financial Assets

Short-term assets: Currency and deposits, Deposits with the Trust Fund Bureau, Loans, Commercial paper, Deposit money, Accounts receivable, Trade credits and foreign trade credits

Long-term assets: Financing bills, Central, Local and Public government securities, Bank debentures, Industrial securities, Investment trust beneficiary certificates, Trust beneficiary rights, Structured-financing instruments, Shares and other equities, Financial derivatives, External claims (Outward direct investment, Outward investment in securities, and Other external claims and debts)

Financial Liabilities

Total loans: Loans by private financial institutions, Loans by public financial institutions

Short-term liabilities: Loans, Commercial paper, Deposit money, Accounts payable, Trade credits and foreign trade credits

Long-term liabilities: Industrial securities, Financial derivatives, External claims (Outward direct investment, Outward investment in securities, and Other external claims and debts)

Issued debt: Industrial securities, Commercial paper, Financial derivatives

Equity: Shares and other equities

Financial Position Indicators

Current ratio: Short-term assets/Short-term liabilities
Debt-to-equity ratio: (Total loans + Issued debt)/Equity

United Kingdom

Source: Produced by the Office of National Statistics
Publication: United Kingdom Economic Accounts, Quarter 4 2005
Website: http://www.statistics.gov.uk
Data: Quarterly series from 1987 online. Billions of pounds.

Financial Assets

Short-term assets: Currency and deposits, Short-term money market instruments' issued, Other accounts receivable, Prepayments of insurance premiums etc.

Long-term assets: Bonds issued, Long-term loans, Shares and other equity (incl. UK mutual funds shares)

Financial Liabilities

Short-term loans: Sterling loans by UK monetary financial institutions (UK MFI's), Foreign currency loans by UK MFI's, Sterling loans by building societies, By rest of the world MFIs

Long-term loans: Direct investment loans (outward and inward), Finance leasing, by UK residents, Other by the rest of the world

Total loans: Short-term loans, Long-term loans

Short-term liabilities: Short-term loans, Money market instruments issued by other UK residents, Other accounts payable

Long-term liabilities: Long-term loans, Bonds issued by other UK residents

Issued debt: Money market instruments issued by other UK residents, Bonds issued by other UK residents

Equity: Shares and other equity

Financial Position Indicators

Current ratio: Short-term assets/Short-term liabilities
Debt-to-equity ratio: (Total loans + Issued debt)/Equity

United States

Source: Produced by Board of Governors of the Federal Reserve System
Publication: Flow of Funds Accounts of the United States, Volumes 1 and 2.
Reference: Guide to the Flow of Funds Accounts
Website: http://www.federalreserve.gov
Data: Quarterly series from 1952 online. Billions of dollars.

Financial Assets

Short-term assets: Foreign deposits, checkable deposits and currency, Time and savings deposits, Money market fund shares, Security RPs, Commercial paper, Consumer credit, Trade receivables, Miscellaneous assets

Long-term assets: Treasury securities, Agency- and GSE-backed securities, Municipal securities, Mortgages, Mutual fund shares

Financial Liabilities

Total loans: Bank loans n.e.c., Other loans and advances, Mortgages

Trade credit: Trade payables

Short-term liabilities: Commercial paper, Bank loans n.e.c., Other loans and advances, Trade payables, Taxes payable, Miscellaneous liabilities

Long-term liabilities: Municipal securities, Corporate bonds, Mortgages

Issued debt: Commercial paper, Municipal securities, Corporate bonds

Equity: Equities outstanding

Financial Position Indicators

Current ratio: Short-term assets/Short-term liabilities
Debt-to-equity ratio: (Total loans + Issued debt)/Equity

Appendix C: Other Financial Position Indicators

The current ratio, a measure of liquidity, is defined as the ratio of short-term assets to short-term liabilities. The higher the current ratio, the more liquid, on average, are corporations. Generally, corporations in good financial standing will attempt to match the duration and composition of assets to liabilities so as to minimize the possibility of illiquidity. Indeed, a high current ratio generally implies that corporations are less likely to default on their obligations to suppliers and short-term lenders. The liquidity of non-financial corporations, as measured by the current ratio, has improved since the early 1990s. Figure 3 suggests that five of the eight countries examined feature a non-financial corporate sector in which short-term assets more than cover short-term liabilities. These countries are Australia, Canada, France, Germany, and the U.S. Corporations in the United Kingdom, Japan, and Italy report a moderate current ratio, with current assets covering 70 to 90 per cent of current liabilities. Generally, if corporations have easier access to short-term credit, a lower current ratio may be sustainable. In this case, corporations would, on average, need to hold less liquid assets at any given time since they could more easily raise additional funds at short notice. In terms of trends, the non-financial corporate sector of most countries have seen a gradual upward trend in their current ratio over the past ten to twenty years, a sign of improving liquidity. This trend could, in part, be explained by the growing role of service industries in the world economy. Service industries, unlike the manufacturing sector, are often more reliant on short-term investment as opposed to large long-term investments. Thus, a healthy, growing service sector could imply an upward trend in the corporate sector current ratio.

The ratio of short-term liabilities to total liabilities (plus equity) provides information as to the timing of future cash out-flows. A high ratio, which implies that corporations' liabilities are short-term in nature, may be indicative of a coming cash shortage. As illustrated in Figure 4, short-term liabilities of non-financial corporations in most countries presently make up a about 20 to 30 per cent of their total liabilities, suggesting that corporations, in general, are well positioned to avoid short-term cash shortages. Corporations in the United States represent the top of this range, with a ratio of about 30 per cent. Non-financial corporations in Australia and Japan are outliers, with short-term liabilities making up about 10 per cent of total liabilities in the former country and about 45 per cent in the latter country. In general, all countries, especially Japan, have experienced a trend decline in the ratio of short-term liabilities to total liabilities over the past ten to twenty years. Thus, it appears that, in this respect, the financial position of non-financial corporations in Australia and the G7 countries has improved in recent decades, despite deteriorating somewhat during the early 2000s.

Appendix D: Data Description

This appendix describes the data mnemonics used in this paper. Data are taken from Statistics Canada, OECD (2006), BIS, and IMF databases.[23] All time-series mnemonics consist of an "economic variable" component, as shown in the table below. Each mnemonic also contains a second component that denotes the country.

Mnemonic	Description
Economic and Financial Variable Component	
ibus<country>	Real business gross fixed investment.
ecpi<country>	Expected inflation calculated as an 8-quarter moving average of the annual percentage change in the national quarterly consumer price index with geometrically declining weights.
ecpihp<country>	Expected inflation generated using the low-frequency component of the annual percentage change in the national quarterly consumer price index; a Hodrick-Prescott filter with a lambda value of 1600 is used in the filtering process. CPI inflation forecasts for 2007 and 2008 are from Consensus Forecasts, survey date 9 October 2006.
d/e<country>	Debt-to-equity ratio as defined in Appendix B.
pibus<country>	Business investment price deflator.
pgdp<country>	Gross domestic product price deflator.
pc<country>	Consumer price index.
rl<country>	10-year nominal government bond yield.
rrl<country>	Real 10-year government bond yield (deflated using *ecpi*).
rrlhp<country>	Real 10-year government bond yield (deflated using *ecpihp*).
rlc<country>	10-year nominal corporate bond yield (middle rate) from Datastream.
rrlc<country>	Real 10-year corporate bond yield (deflated using *ecpi*).
rrlchp<country>	Real 10-year corporate bond yield (deflated using *ecpihp*).
y<country>	Real gross domestic product.
<Country> Component	
Australia and G7 Countries	Australia (*aut)*, Canada (*ca)*, France (*fr)*, Germany (*gy)*, Italy (*it)*, Japan (*jpn)*, *the* United Kingdom (*uk), and* United States of America (*us).*

23. Any Canadian statistics taken from OECD (June 2006) were originally collected by Statistics Canada and supplied to the OECD.

Appendix E

Table 1. Non-Financial Corporation Balance Sheet Indicators

Structure of Corporate Financing and Financial Position Indicators, Per Cent, 1980-2005

		Australia	Canada	France	Germany	Italy	Japan	U.K.	U.S.
Total	1980	-	-	91.0	60.2	-	167.7	-	68.9
Corporate	1990	85.1	105.7	105.7	63.3	77.1	208.2	88.8	80.9
Liabilities (less	1999	72.4	110.5	112.5	73.3	82.8	187.4	91.1	88.3
equity)	2000	78.3	108.3	120.7	84.2	85.0	180.3	99.6	96.6
to nominal GDP	2005	77.3	99.4	128.6	84.8	94.2	156.4	115.1	79.5
Total Loans	1980	-	-	37.5	51.9	-	42.7	-	14.0
to Total	1990	33.9	20.1	29.0	45.6	41.1	37.1	32.2	16.8
Corporate	1999	22.3	13.9	16.7	31.2	29.3	35.5	19.5	7.4
Liabilities	2000	23.8	14.1	17.9	34.9	29.6	37.1	21.1	8.4
	2005	23.6	10.2	19.8	34.7	31.9	29.0	29.5	9.9
Issued	1980	-	-	3.1	2.6	-	7.4	-	13.1
Debt to	1990	13.9	17.3	5.0	2.7	2.0	7.7	5.0	16.1
Total Corporate	1999	10.1	14.9	4.6	1.3	1.0	8.9	6.7	10.4
Liabilities	2000	12.1	15.4	5.0	1.5	1.1	9.2	7.9	11.9
	2005	11.9	12.5	5.8	2.9	2.5	8.3	10.1	15.6
Equity	1980	-	-	29.9	19.2	-	21.6	-	40.1
to Total	1990	44.6	35.6	45.2	26.5	36.0	36.2	51.8	38.5
Corporate	1999	61.6	46.6	67.6	56.8	52.9	38.1	68.9	64.3
Liabilities	2000	57.7	44.0	65.3	51.8	54.4	33.6	66.1	56.9
	2005	57.9	55.0	62.4	47.4	49.8	43.7	55.8	51.9
Trade Credit	1980	-	-	31.9	-	-	22.7	-	10.6
to Total	1990	5.9	8.9	19.9	-	-	14.3	11.0	8.1
Corporate	1999	6.0	7.7	11.1	-	13.2	13.2	4.9	5.2
Liabilities	2000	6.4	8.4	11.8	-	11.5	15.2	4.8	6.9
	2005	6.7	6.8	11.9	-	12.0	13.6	4.6	7.7
Other Liabilities	1980	-	-	0.0	26.3	-	5.6	-	22.2
to Total	1990	1.8	18.0	0.0	25.2	-	4.7	0.0	20.4
Corporate	1999	0.0	16.9	0.0	10.7	3.5	4.3	0.0	12.7
Liabilities	2000	0.0	18.1	0.0	11.9	3.4	4.8	0.0	15.8
	2005	0.0	15.6	0.0	15.0	3.9	5.5	0.0	14.9
Current	1980	-	-	0.8	0.5	-	0.7	-	0.9
Ratio	1990	1.4	0.8	0.9	0.6	0.7	0.6	0.7	1.0
(not in per cent)	1999	1.6	1.0	1.0	1.0	0.7	0.6	0.8	1.3
	2000	1.5	1.0	1.0	0.9	0.7	0.6	0.8	1.4
	2005	1.7	1.4	1.2	1.0	0.8	0.8	0.9	1.7
Short-Term	1980	-	-	43.2	44.7	-	70.4	-	43.8
Liabilities	1990	16.3	32.2	27.9	40.2	50.2	56.2	32.2	43.4
to Total	1999	12.1	25.2	15.5	20.9	34.0	52.5	17.2	24.8
Liabilities	2000	13.5	26.6	17.1	23.8	32.6	56.2	18.0	30.8
	2005	11.7	20.3	18.2	24.6	31.0	46.0	23.1	29.8
Debt-to-	1980	-	-	136.1	283.0	-	232.2	-	67.5
Equity	1990	107.1	105.2	75.2	182.4	119.7	123.9	71.8	85.7
Ratio	1999	52.6	61.8	31.5	57.3	57.3	116.5	37.9	27.6
	2000	62.2	67.1	35.1	70.3	56.3	137.8	43.9	35.8
	2005	61.3	41.3	41.1	79.3	69.1	85.3	70.8	49.0

Table 2: Unit-Root Tests[a]

Panel Dataset of Australia and the G7 Countries, Sample: 1992:01–2005:04, N=448						
(natural logarithms)	**Hadri Panel Test (p-value)**		**Levin-Lin-Chu Test (p-value)**		**Im-Pesaran-Shin Test (p-value)**	
	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend
Real Gross Business Investment ($ibus_t$)	[0.000]	[0.000]	[0.427]	[0.118]	[0.984]	[0.171]
Real Output (y_t)	[0.000]	[0.000]	[0.083]	[0.510]	[0.999]	[0.804]
Real Cost of Capital (10-year government bond yield deflated using *ecpi* (backward looking inflation expectations)) ($cost_t$)	[0.000]	[0.002]	[0.975]	[0.563]	[0.877]	[0.001]
Real Cost of Capital (10-year government bond yield deflated using *ecpihp* (HP-filtered inflation expectations)) ($costhp_t$)	[0.000]	[0.001]	[0.804]	[0.730]	[0.906]	[0.010]
Real Cost of Capital (10-year corporate bond yield deflated using *ecpi* (backward looking inflation expectations)) ($costc_t$)	[0.000]	[0.025]	[0.997]	[0.062]	[0.954]	[0.000]
Real Cost of Capital (10-year corporate bond yield deflated using *ecpihp* (HP-filtered inflation expectations)) ($costchp_t$)	[0.000]	[0.019]	[0.432]	[0.069]	[0.731]	[0.000]
Debt-to-Equity Ratio ($debtratio_t$)	[0.000]	[0.000]	[0.177]	[0.121]	[0.769]	[0.507]

a. Under the Hadri panel unit-root test, the null hypothesis states that the series is stationary. Under the Levin-Lin-Chu test and the Im-Peseran-Shin test, the series is non-stationary under the null hypothesis.

Table 3: Panel DOLS Estimations of Long-Run Investment Equation and Cointegration Test Results[a]

Panel Estimations, Australia and the G7 Countries, Sample: 1992:01–2004:04, N=416						
Dependent Variable: Real Gross Business Investment (I_t)						
Long-Run Factors ***(natural logarithms)***	(1)		(2)		(3)	
Real Output (y_t)	1.495 (10.374)***		1.653 (10.443)***		1.659 (21.963)***	
Real Cost of Capital (10-year government bond yield deflated using *ecpi*)[b] $(cost_t)$	-0.215 (0.149)		0.126 (0.091)		-	
Debt-to-Equity Ratio (d_t/e_t)	-0.072 (1.294)		-		-	
Country Intercept Dummies (Numbers in brackets refer to columns in Table 3)	**(1)** aut: -8.70, ca: -8.99, fr: -9.28, gy: -9.32, it: -8.98, jpn: -11.81, uk: -9.25, us: -10.28 **(2)** aut: -10.81, ca: -11.16, fr: -11.49, gy: -11.62, it: -11.17, jpn: -15.02, uk: -11.38, us: -12.76 **(3)** aut: -10.86, ca: -11.22, fr: -11.55, gy: -11.69, it: -11.23, jpn: -15.13, uk: -11.44, us: -12.83					
$RBAR^2$	0.999		0.999		0.999	
Cointegration Tests (p-value), Sample: 1992:01–2005:04, N=448[c]						
Johansen Trace Test [0 or 1 cointegrating vectors]	[0.000/0.805]		[0.084 / 0.606]		[0.288 / 0.082]	
Johansen Eigenvalue Test [0 or 1 cointegrating vectors]	[0.000/0.621]		[0.052 / 0.605]		[0.503 / 0.082]	
Pedroni Tests	**No Trend**	**With Trend**	**No Trend**	**With Trend**	**No Trend**	**With Trend**
Panel v Test	[0.672]	[0.164]	[0.716]	[0.801]	[0.439]	[0.834]
Panel rho Test	[0.134]	[0.312]	[0.133]	[0.054]	[0.350]	[0.044]
Panel pp Test	[0.115]	[0.505]	[0.088]	[0.057]	[0.284]	[0.039]
Panel adf Test	[0.072]	[0.524]	[0.259]	[0.024]	[0.650]	[0.078]
Group rho Test	[0.021]	[0.061]	[0.008]	[0.007]	[0.047]	[0.007]
Group pp Test	[0.018]	[0.219]	[0.003]	[0.011]	[0.033]	[0.006]
Group adf Test	[0.033]	[0.318]	[0.083]	[0.007]	[0.256]	[0.022]

a. Four leads and four lags are used in panel DOLS estimation. The estimated parameters of the first-difference terms are constrained to be the same across countries (i.e., homogeneous dynamics). White heteroskedasticity-consistent errors are used in the calculation of the t-statistics (in parentheses). *(**)(***) denotes that the parameter is statistically different from zero at a 10 per cent (5 per cent) (1 per cent) level. Critical values are from the standard distribution. See Kao and Chiang (2000) for a discussion of the properties of panel DOLS.

b. Similar results obtained using alternative measures of the real cost of capital as listed in Table 2.

c. Null hypothesis for Johansen tests is "at most zero/one cointegrating vector." Null hypothesis for Pedroni tests is "no cointegration."

Table 4: Investment Error-Correction Model[a,b]

Panel ECM Estimations, Australia and the G7 Countries, Sample: 1992:01–2005:04, N=448

Dependent Variable: $\Delta\ln(I)_t$

	Panel OLS				Arellano & Bond GMM[c]					
(natural logarithms)	(1)		(2)		(3)		(4)		(5)	
Constant	-0.006	(-4.369)**	-0.006	(-4.264)**		-		-		-
Real Output	1.643	(5.974)**	1.612	(6.012)**	1.829	(6.769)**	1.731	(7.525)**	1.774	(8.940)**
(dy_t)	0.500	(3.893)**	0.531	(3.826)**	0.836	(7.547)**	0.685	(3.717)**	0.722	(3.490)**
Contemporaneous to lag 4	0.301	(1.226)	0.274	(1.129)	0.753	(4.832)**	0.554	(1.887)*	0.522	(1.692)*
	0.412	(2.384)*	0.369	(1.931)*	0.868	(4.351)**	0.725	(3.945)**	0.665	(3.548)**
	-0.124	(-0.617)	-0.087	(-0.413)	0.345	(2.112)*	0.166	(0.692)	0.185	(0.691)
Real Cost of Capital	-0.111	(-0.222)	-0.119	(-0.234)	-0.319	(-0.631)	-0.234	(-0.426)	-0.224	(-0.420)
(10-year government bond	-0.090	(-0.468)	-0.063	(-0.289)	-0.216	(-1.254)	-0.174	(-1.015)	-0.123	(-0.527)
yield deflated using *ecpi*)	-0.283	(-1.185)	-0.334	(-1.222)	-0.388	(-1.711)*	-0.297	(-1.690)*	-0.353	(-1.565)
($dcost_t$)	-0.202	(-0.614)	-0.139	(-0.390)	-0.411	(-1.594)	-0.423	(-1.437)	-0.349	(-1.035)
Contemporaneous to lag 4	-0.025	(-0.146)	0.005	(0.030)	-0.093	(-0.597)	-0.078	(-0.416)	-0.134	(-0.691)
Debt-to-EquityRatio	-0.002	(-0.137)			-0.020	(-1.594)	-0.007	(-0.443)		
($ddebtratio_t$)	-0.017	(-0.714)			-0.032	(-1.871)*	-0.028	(-1.371)		
Contemporaneous to lag 4	0.002	(0.103)		-	-0.009	(-0.504)	-0.009	(-0.460)		-
	-0.014	(-0.966)			-0.019	(-0.941)	-0.022	(-1.115)		
	-0.027	(-2.60)**			-0.037	(-1.874)*	-0.028	(-1.774)*		
Debt-to-Equity Ratio for			0.035	(1.707)*					0.026	(0.715)
Bank-Based Economies		-	-0.085	(-3.951)**		-		-	-0.084	(-4.404)**
($ddebtatio\_bank_t$)			0.065	(2.812)**					0.060	(1.988)*
Contemporaneous to lag 4			-0.026	(-1.669)*					-0.037	(-1.860)*
			-0.035	(-5.045)**					-0.030	(-2.390)*
Debt-to-Equity Ratio for			-0.006	(-0.455)					-0.004	(-0.190)
Countries with Market-		-	0.002	(0.073)		-		-	-0.007	(-0.316)
Based Economies			-0.018	(-3.726)**					-0.020	(-2.520)*
($ddebtratio\_mkt_t$)			-0.017	(-0.849)					-0.021	(-0.812)
Contemporaneous to lag 4			-0.019	(-1.347)					-0.025	(-1.082)
Error-Correction Term	-0.112	(-6.495)**	-0.1122	(-6.473)**	-0.329	(-8.691)**	-0.160	(-6.494)**	-0.189	(-8.441)**
(I_{t-1} - αS_{t-1})										
RBAR^2	0.348		0.352		0.415		0.299		0.315	
AR(1)[d]	-		-		0.023		0.017		0.019	
AR(2)[d]	-		-		0.584		0.843		0.622	

a. White heteroskedasticity-consistent errors are used in the calculation of the t-statistics (in parentheses). *(**) denotes that the parameter is statistically different from zero at a 10 per cent (5 per cent) level.

b. Estimation performed using EViews 5.1 with the exception of the Arellano-Bond test for autocorrelation which was performed using STATA. Estimation results are the same using either package. Estimated parameters for lagged values of the dependent variable were included in the specification but are not shown in the table.

c. Estimations completed using the Arellano and Bond first-difference robust GMM estimator. Estimates in column (3) use up to five lags of the dependent variable as predetermined instruments, while treating the other explanatory variables as exogenous instruments. In column (4) up to three lags of the dependent variable, as well as output growth (one lag), the change in the log of the cost of capital (one lag), and the change in the log of the debt-to-equity ratio (up to two lags) are used as predetermined instruments. In column (5), up to three lags of the dependent variable, as well as output growth (one lag), the change in the log of the cost of capital (one lag), and the change in the log of the debt-to-equity ratio (one lag) are used as predetermined instruments. In all cases, four lags of the error-correction term are also included as exogenous instruments. (Results were found to be generally robust to various combinations of predetermined and strictly exogenous instrumental variables.)

d. Arellano-Bond test for autocorrelation (H_0: No autocorrelation). The Arellano and Bond estimator assumes no second-order autocorrelation.

Figure 1a
Structure of Corporate Financing
Percentage of Total Liabilities (1988Q1-2005Q4)

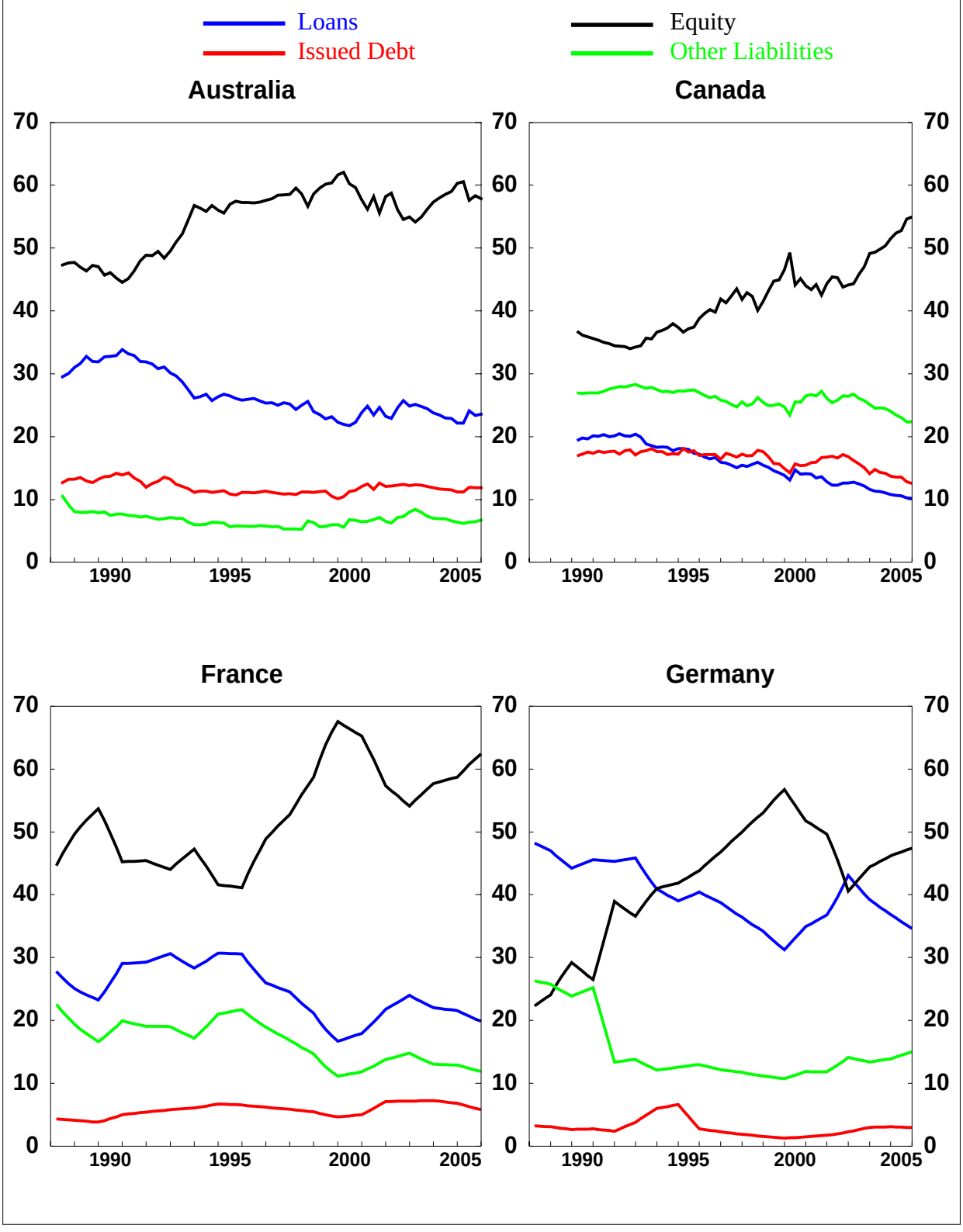


Figure 1b
Structure of Corporate Financing
Percentage of Total Liabilities (1988Q1-2005Q4)

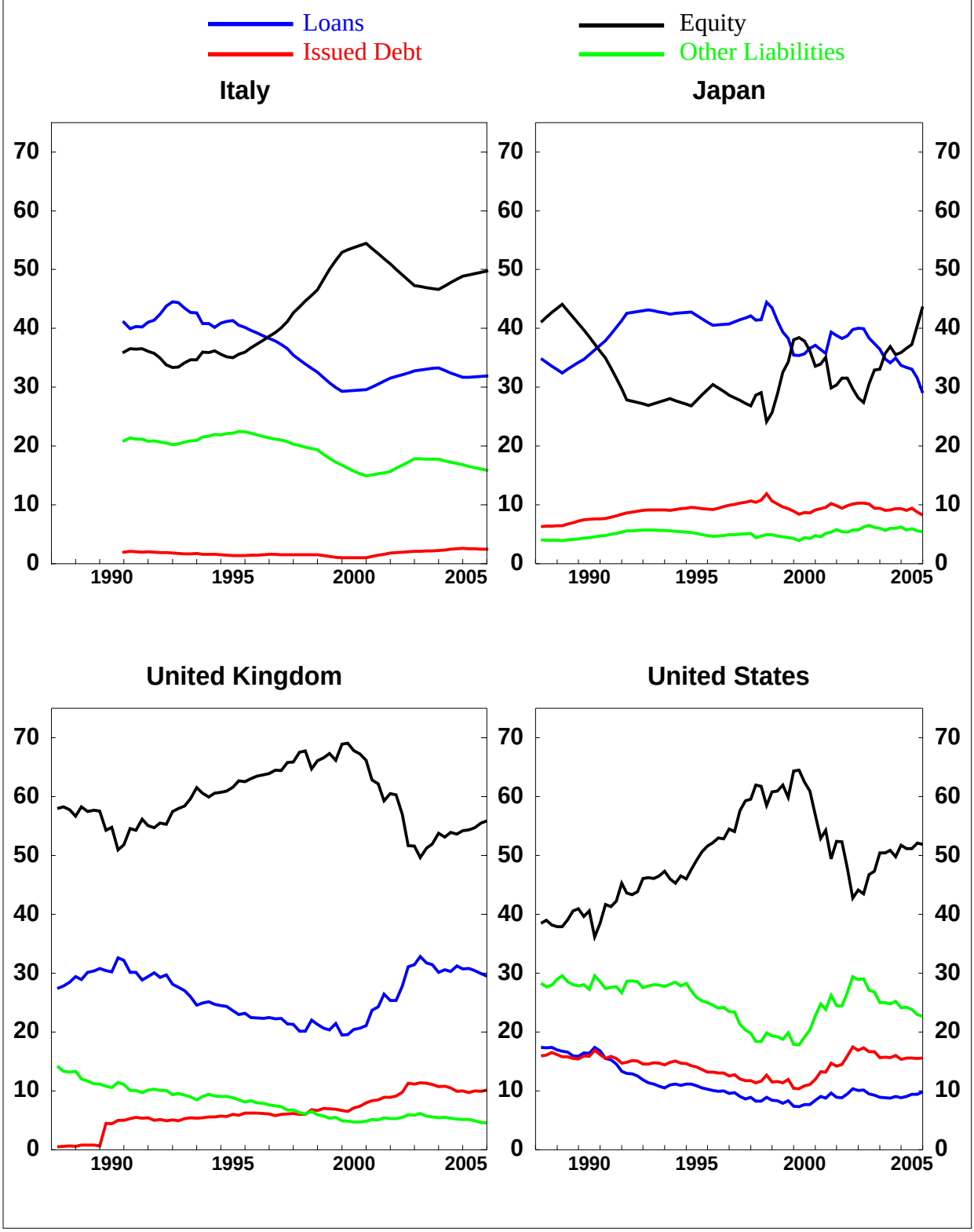
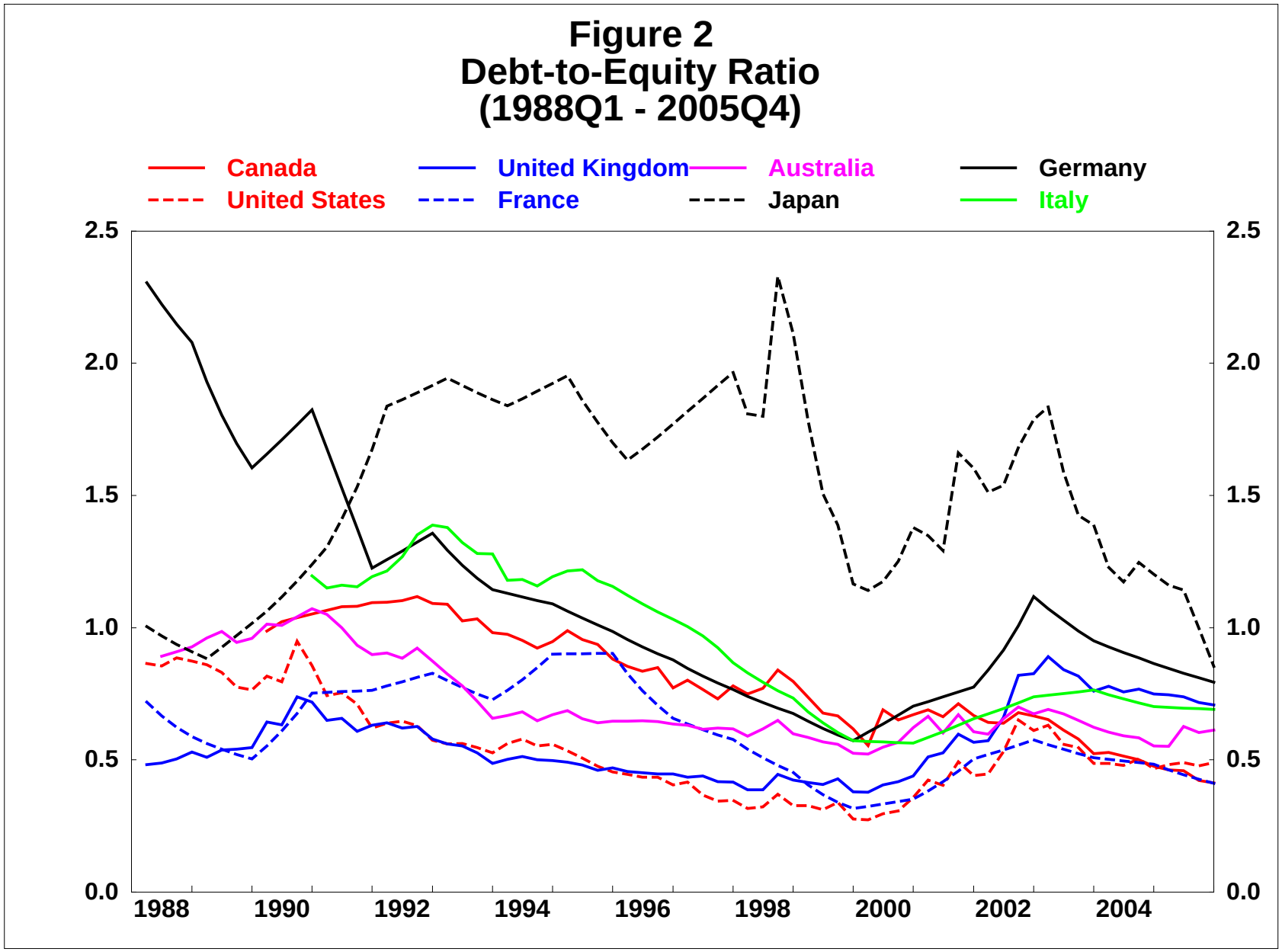


Figure 2
Debt-to-Equity Ratio
(1988Q1 - 2005Q4)



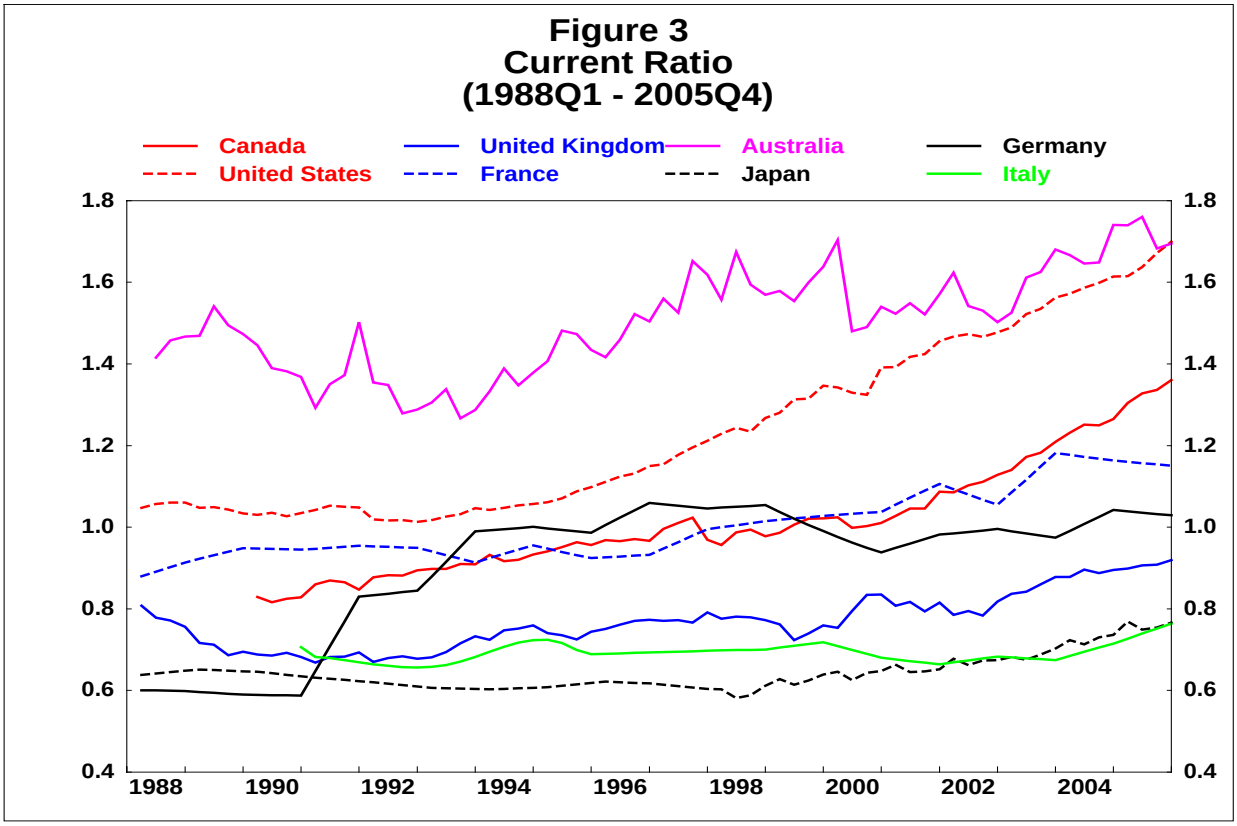


Figure 3
Current Ratio
(1988Q1 - 2005Q4)
Canada
United States
United Kingdom
France
Australia
Japan
Germany
Italy
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
1988
1990
1992
1994
1996
1998
2000
2002
2004

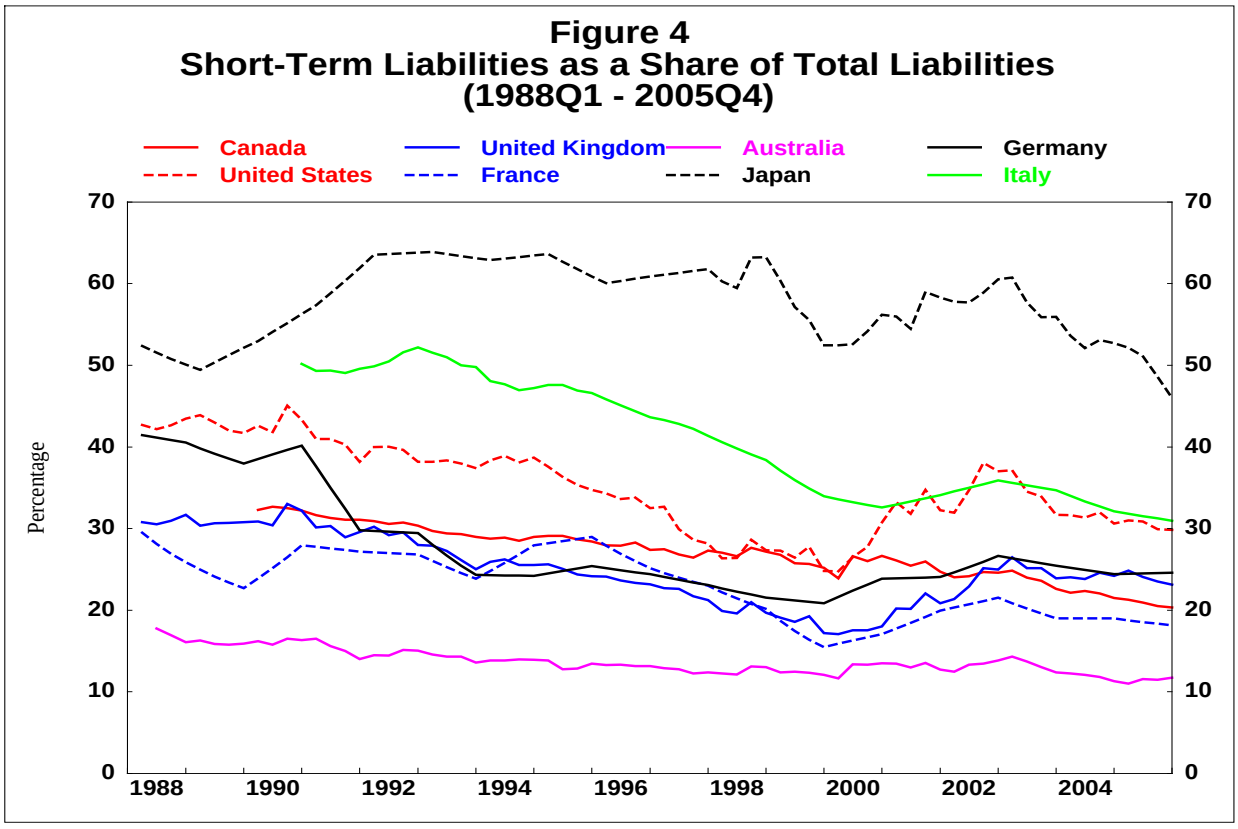


Figure 4
Short-Term Liabilities as a Share of Total Liabilities
(1988Q1 - 2005Q4)
Canada
United States
United Kingdom
France
Australia
Japan
Germany
Italy
Percentage
70
60
50
40
30
20
10
0
1988
1990
1992
1994
1996
1998
2000
2002
2004