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An Open Economy Model of the Credit Channel Applied to Four Asian Economies

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Abstract

This paper provides a theoretical model of an open economy credit channel including currency mismatch and financial fragility where exporting firms have access to international credit but non-exporting firms do not. The impact of the crisis is predicted to be dramatically different for exporters/non-exporters. We examine firms' access to external finance in four Asian economies after 1997 using a large panel of balance sheet data. Our paper demonstrates that firm heterogeneity is critical to understanding the open economy credit channel effects of the Asian crisis since smaller and less profitable firms are indeed less likely to obtain credit than larger, export-oriented firms.

JEL classification: E32, E44, E51

Keywords: Credit Channel, External Finance, Asian Crisis

Outline

Non-Technical Summary

The circumstances surrounding the Asian crisis have been a fertile ground for new models of currency crises and contagion. Currency mismatch in portfolios of firms and the fragility of the financial sector when faced with mismatches in their own portfolios have now been identified as potential underlying causes of the crisis itself and also a reason to believe that the crisis affected financial institutions and real activity in the aftermath. The implications of currency mismatch and dependence of domestic firms and banks on foreign currency sources have been recently explored using sticky-price DGE small open economy models that simulate the real effects of a crisis in models where an accelerator effect is driven by falling net worth as the exchange rate depreciates in open economy. However, there is limited evidence documenting corporate finance and firm-level activity using panel data to support the simulation work of the authors cited above. We expect the processes of currency mismatch, liability dollarization and financial fragility to have a heterogeneous effect on the relationships between financial institutions and firms.

In this paper we seek to explain the heterogeneous effects of the crisis on firms from four Asian economies most affected by the crisis – Thailand, Indonesia, Malaysia and Korea. We build a simple theoretical model to illustrate the binding nature of credit after the crisis on firms serving domestic markets, and the unconstrained behavior of exporting firms. The dichotomy between domestically-oriented firms and exporters derives mainly from the fact that for domestic producers credit is more constrained because they have domestic currency collateral assets that deteriorate in value after a crisis and are dependent on banks that are themselves less likely to obtain funds to on-lend. Exporters on the other hand have international sources of credit that are justified on collateralized export revenues that do not deteriorate after the crisis. In our empirical work we use balance sheets and profit and loss accounts to consider the impact of the Asian crisis on financial composition and real performance and activity by different types of firms.

What our study highlights is the extent to which the high degree of bank dependence by certain types of firms in Asian economies made those firms more prone to long lasting effects of the crisis as their own creditworthiness declined and fragile financial institutions drew back loans as their sources of funds dried up. Crucially for a credit-channel model that argues that firm heterogeneity is a major factor in the response to adverse conditions, we are able to shed more light on the likely impact of a crisis and subsequent policy stance on firms of different types. Domestically-focused firms, which are on average smaller and less profitable, would not benefit from the expansion of the export market after a crisis and would be more negatively affected than larger firms with international sales. Therefore the crisis itself and the tightening monetary policy after the crisis would be likely to affect domestically oriented firms much more than exporting firms.

1. Introduction

The circumstances surrounding the Asian crisis have been a fertile ground for new models of currency crises and contagion. Among this vast literature the observations of currency mismatch in portfolios of firms and the fragility of the financial sector when faced with mismatches in their own portfolios (as capital inflows came to a 'sudden stop' c.f. Calvo, 1999) have been embedded in many of the more prominent models (c.f. Krugman 1998, Furman and Stiglitz, 1998, Radlett and Sachs, 1998). These features have now been identified as potential underlying causes of the crisis itself and also a reason to believe that the crisis affected financial institutions and real activity in the aftermath. Krugman (1998) has stressed that because corporations balance sheets determine access to external finance and capital flows influence the domestic currency cost of foreign currency borrowing, they are 'candidates for third generation crisis modelling'. Goldfajn and Valdes (1997) and Chang and Velasco (1998, 1999) have emphasized the dependence of corporations and financial intermediaries on foreign capital as a reason for twin crises. When a sudden stop occurs the withdrawal of funds from banks has the potential to create a financial crisis; this can develop into a Dimond-Dybvig style run that depletes reserves that support a fixed exchange rate regime causing a currency crisis.

Recent papers by Cespedes (2001), Devereux and Lane (2003), Gertler *et al.* (2003), Choi and Cook (2004) and Cook (2004) have explored the implications of currency mismatch and dependence of domestic firms and banks on foreign currency sources. Calvo and Reinhart (2000) have termed this effect 'liability dollarization' to emphasize the significance of foreign currency denominated funds on the liability side of the balance sheet. Using sticky-price DGE small open economy models these authors simulate the real effects of a crisis in a model where an accelerator effect is driven by falling net worth as the exchange rate depreciates in open economy. These papers extend the closed economy modelling and simulations of Carlstrom and Fuerst (1997), Bernanke *et al.* (2000) to an open economy. However, simulations calibrated with macro data in the closed economy are backed by panel data studies of firm behavior that illustrate the effects of the accelerator and credit channels on firms with different characteristics. The open economy literature by contrast has very limited evidence documenting corporate finance and firm-level activity using panel data to support the

simulation work of the authors cited above.[1] We expect the processes of currency mismatch, liability dollarization and financial fragility to have a heterogeneous effect on the relationships between financial institutions and firms. In this paper we seek to explain the heterogeneous effects of the crisis on firms from four Asian economies most affected by the crisis – Thailand, Indonesia, Malaysia and Korea. We build a simple theoretical model using Bolton and Scharfstein (1990) and Caballero and Krishnamurthy (2001) as building blocks, to illustrate the binding nature of credit after the crisis on firms serving domestic markets, and the unconstrained behavior of exporting firms. The dichotomy between domestically-oriented firms and exporters derives mainly from the fact that for domestic producers credit is more constrained because they have domestic currency collateral assets that deteriorate in value after a crisis and are dependent on banks that are themselves less likely to obtain funds to on-lend. Exporters on the other hand have international sources of credit that are justified on collateralized export revenues that do not deteriorate after the crisis. We make use of the Thomson-Primark database 1996 – 2004 to examine firm's balance sheets and profit and loss accounts to consider the impact of the Asian crisis on financial composition and real performance and activity by different types of firms.

What our study highlights is the extent to which the high degree of bank dependence by certain types of firms in Asian economies made those firms more prone to long lasting effects of the crisis as their own creditworthiness declined and fragile financial institutions drew back loans as their sources of funds dried up. Crucially for a credit-channel model that argues that firm heterogeneity is a major factor in the response to adverse conditions, we are able to shed more light on the likely impact of a crisis and subsequent policy stance on firms of different types. Domestically-focused firms, which are on average smaller and less profitable, would not benefit from the expansion of the export market after a crisis and would be more negatively affected than larger firms with international sales. Therefore the crisis itself and the tightening

[1] One reason for the lack of evidence thus far is the fact that balance sheet information accrues annually and until recently too few years had passed to allow meaningful exploration in panels. To our knowledge the only detailed studies of the crisis using firm level data exist for Korea by Borensztein and Lee (2003), which explores the role of financial intermediaries in providing credit to corporations, and Gilchrist and Sim (2004), which considers the impact of balance sheet factors on investment.

monetary policy after the crisis would be likely to affect domestically oriented firms much more than exporting firms[2].

The paper is organized as follows. Section 2 presents brief stylized facts about the Asian crisis, section 3 develops our theoretical model that is used to explore the influence of firm-specific characteristics on the variation in the composition of external finance as a consequence of the crisis. The data sources and empirical methodology are discussed in Section 4 followed by the results in Section 5. Section 6 concludes.

2. The Asian Crisis

The roots of the Asian crisis are now well documented. Strong investment and GDP growth was built on the vast inflows of capital to emerging markets, where the returns were much greater than those in more established markets. Kaminsky and Reinhart (2000), Cook (2004) and Choi and Cook (2004) illustrate the high dependence of firms and the financial sector in Asia prior to the crisis on funds obtained from US or Japanese sources[3].

Investment in these markets may have been undertaken without a full appreciation of the risks involved. Asset markets had become overheated, fixed exchange rates were tied down by monetary policy, and these arrangements were taken as implicit guarantees of exchange rate levels. Firms borrowed heavily in foreign currency, and banks, which were poorly regulated or supervised, were imprudent in lending. The fact that domestic lending to domestic producers was justified by assets denominated in domestic currency created the potential for assets and liabilities to diverge in value particularly if the domestic currency were to devalue[4]. When commercial bank credit inflows of $50bn to the region in 1996 shifted to outflows of $21bn in 1997 the mismatch in currencies led to a substantial difference on the balance sheet between

[2] Radlett and Sachs (1998) and Furman and Stiglitz (1998) argue - with empirical support from Baig and Goldfajn (2002), Demirguc-Kunt and Detragiache (1997) and Goldfajn and Gupta (1999) - that tightening monetary conditions made matters worse not better post crisis. Aghion, Bacchetta and Banerjee (2001, 2004) argue that when credit supply responds adversely to increasing nominal interest rates it is better to loosen monetary policy after a crisis. We suggest that for domestically-focused firms tightening monetary conditions will have strong negative effects but access to international capital may enable exporting firms to survive and grow after the crisis. In other words there is not one story for all types of firms.

[3] Cook (2004) cites some 88% of syndicated bank loans to emerging East Asian countries 1992-97 were from industrialized countries denominated in dollars or yen. The borrowing by domestic banks from foreign banks in dollar or yen amounted to between 33.7 percent in Korea and 60.7 percent of total borrowing in Thailand in December 1996 according to BIS and US Treasury sources.

[4] Choi and Cook (2004) point out that although asset values of firms might appreciate with a devaluation of the currency provided there are not nominal rigidities, the assets of banks, which are denominated in domestic currency will not typically appreciate.

the domestic currency value of assets backing the borrowing and the debts built up by escalating commitments to loans obtained in foreign currency. This has since become a central plank in models of the crisis, as has the financial fragility of firms and financial institutions.

Post-crisis the depreciation in exchange rates and the subsequent loss of confidence caused stock market and property prices to fall, further undermining the creditworthiness of firms and financial institutions. Combined with the deterioration of capital flows, firms were unable to obtain credit due to the poor state of their own balance sheets and, because the currency crisis rapidly affected the stability of Asian financial sectors, weak financial institutions focused on restructuring and recapitalizing and reduced their lending to domestic borrowers. Monetary policy tightened in the aftermath of the crisis to counter the depreciating currency, which hit credit markets particularly hard. International agencies and commercial banks supported the countries in the post-crisis period with official assistance and loan rollovers of short-term debt and lengthened maturities of existing debts.

Post-crisis there was a sharp initial deterioration in real investment and GDP growth. For all four economies the real investment growth was negative in 1998 as was real GDP growth. Indonesia experienced a 46.6% real reduction in investment growth, similar to Malaysia at 40.5%, Thailand at 37.0, with Korea slightly less sever at 26.8%. GDP growth was strongly affected by investment and fell by 14.4% in Indonesia, 6.9% in Malaysia, 8.0% in Thailand, and 5.5% in Korea according to the International Monetary Fund *World Economic Outlook*, 1998. The most severe experiences were in those countries with the most highly leveraged companies prior to the crisis – Korea, Thailand and Indonesia. Much of the corporate debt was foreign currency denominated therefore the reversal of capital inflows with the subsequent depreciation of the exchange rate had a sharp adverse effect on investment and output. Indebtedness of the corporate sector measured by external debt to GDP jumped by 150% in Indonesia, and by 50% in Thailand and Korea, in Malaysia the jump was more modest at 20%, but over time most countries brought these figures back to pre-crisis levels. All four economies bounced back to positive growth from 1999 and much of the improvement in growth rates was due to the positive impact of the devaluation of currencies on the external sector. All four countries experienced a sharp depreciation of the exchange rate versus the US dollar in the first year after the crisis, most countries (except Indonesia which had political turmoil as well as economic woes) saw a sharp appreciation in 1998 followed by several years

of mild depreciations but even after six years none of the countries returned to their original exchange rates. The current accounts as a percentage of GDP in these countries show that after the initial impact of the crisis there were healthy surpluses for all four countries. Exports were relatively competitive while imports were more expensive and the volume of exports to imports rose favoring those companies that were oriented towards export markets.

3. The Theoretical Model

We build a model with three periods (0, 1, 2). Period 0 is the planning period when all financial contracts are agreed and initial investments are made. Period 1 is an interim period when the returns on short-term technologies are realized and creditors decide on whether to liquidate firms or provide them with new funds. In the final period, the returns of long-term technologies and those on short-term technologies that were extended credit the period before are realized and financial claims are settled. All agents are risk-neutral and they do not discount the future.

There are two countries: a small open economy (domestic economy) and the rest of the world. Let e denote the exchange rate (domestic currency units per unit of foreign currency). We assume that in period 0 the government pegs the exchange rate at e=1 and that all agents expect that the peg will be maintained for the following two periods.

3.1. Firms and Technologies

There is a continuum of firms located in the small open economy. The only difference between firms is their endowment of capital that has period 1 market value k. This endowment captures any fixed assets that firms possess in period 0. The distribution of endowments is represented by the function F and has support on the interval $[\underline{k},\bar{k}]$ and this will be a key determinant of creditworthiness, access to credit and ultimately the ability to produce goods. There are four goods. One is a domestic input that we use as the numeraire. There is a second input that is imported from abroad and each unit costs one unit of foreign currency. The other two are consumption goods; one is consumed domestically and we refer to it as the 'domestic good' and the other is consumed abroad and we refer to it as 'exports'.

It takes one period to complete production of domestic goods. Thus, investments are made in periods 0 and 1 and revenues are realized in periods 1 and 2, respectively. To produce one unit of the domestic good requires one unit of a composite input that consists of a fraction

φ of a unit of the domestic input and a fraction 1-φ of a unit of the imported input.[5] There is demand uncertainty in the domestic market. The price of domestic goods in periods 1 and 2 is equal to p with probability π while with probability 1-π demand vanishes. The demand shocks are independently distributed across firms and time. All period 1 profits are distributed to firm owners. We assume that investment in the domestic technology is efficient; i.e. $\pi p > 1$.[6] We also assume that revenues are observed only by firm owners.[7]

Production of exports takes two periods. Our model captures two observations made in the international trade literature: that large firms are more likely to export, and given that a firm exports its export volume is positively related to its size.[8] To this end we assume that firms that wish to export need an initial investment of θ units of the domestic input. In addition each unit of export requires one unit of the domestic input.[9] We further assume that firms face capacity constraints with respect to exports that are directly related to their size, i.e. their ownership of fixed assets. Without any loss of generality we assume that for each unit of assets that they possess they can supply one unit of exports.[10] Export revenues are deterministic but the export market is still subject to uncertainty since collapse of the domestic market can trigger default to domestic and international lenders by exporters. Let p^* denote the price of a unit of exports. We assume that $\pi p^* > 1$.

3.2. Domestic and International Borrowing

We make the conventional assumption that all firms are financially constrained and they need external funds to finance production. We then make three additional assumptions that are

[5] To keep things simple we assume that the technology is Leontief. It will become clear that allowing for input substitution will only complicate the model without adding any additional insight.
[6]The- right-hand side of this condition corresponds to costs given that the exchange rate is pegged.
[7] We can allow creditors to observe revenues. What we actually need is a weaker assumption that is revenues cannot be verified by third parties.
[8] There is a large international trade literature that makes a positive link between entry to export markets and firm size through sunk costs c.f. Bernard *et al.* (2003), Bernard and Jensen (2004), Campa (2004), Helpman *et al.* (2004), Roberts and Tybout (1997), Roberts *et al.* (1997) and Tybout (2003). Empirical support for this view is cited in Girma *et al*. (2004) and Greenaway *et al.* (2006) for firms from Germany, Italy, Latin America, Spain, the UK and the US. To our knowledge the only studies that use data from East Asia is Aw and Hwang (1995) and Aw *et al.* (2000) that draw the same conclusions from a sample of Taiwanese and South Korean firms and Kraay (1999) on China.
[9] Given that in period 1 there is no purchase of inputs for the production of exports, assuming that only the domestic input is used in the production of exports is inconsequential.
[10] We do this not only to impose a limit on exports but also to relate that limit to firm size. We could instead have introduced a cost function that increases with production but decreases with k but our formulation is simpler.

justified by the data: First, creditors fall into two categories: domestic creditors offering short-term loans and foreign creditors offering long-term loans[11]. Second, the domestic creditors obtain their funds from foreign sources[12]. Third, following Caballero and Krishnamurthy (2001), we assume that firms can pledge to creditors two types of collateral. When a firm is liquidated domestic creditors receive the proceeds from the sales of its assets, k. In contrast, foreign creditors are pledged export revenues[13].

Exporters obtain loans from domestic and international lenders and if domestic creditors liquidate the firm then they cannot fulfil their export obligations and will default on their foreign loans. Clearly, even if there is no uncertainty directly related to the export market, foreign loans are risky. Thus, firms finance domestic sales with domestic loans while they obtain funds from abroad to finance exports. They do so because foreign lenders do not wish to participate in bankruptcy procedures and thus do not accept the domestic collateral while domestic lenders cannot verify export revenues. Nevertheless, we need to make sure that firms have an incentive to use the borrowed funds for their intended purpose; namely, to use foreign loans to finance exports and domestic loans to finance the production of goods sold domestically.

We assume that financial markets are competitive and we set the interest rate equal to zero. We, first, consider the domestic financial contract. The domestic financial environment is very similar to the one considered by Bolton and Scharfstein (1990). Given that in period 2 domestic revenues are not verified and assets are completely depreciated a firm will always choose to default rather than make repayments. However, the firm might have an incentive to make high repayments in period 1 if the creditors always liquidate the firm's assets when the firm defaults. If the firm meets its financial obligations in period 1 then the lenders offer a new

[11] This assumption is verified in BIS-IMF-World Bank statistics on external debt, which indicates the proportion of total external debt in the Asia Pacific region designated long term debt was 83.1% in 1990 and 73.8% in 2003. Data for individual countries reveals similar proportions.

[12] Evidence from the BIS reporting banks' summary of international positions indicates that reporting banks' claims by region/country in 2005Q3 were $110.3bn (Asia Pacific), $9.9bn (Malaysia), $17.0bn (Indonesia), $5.2bn (Thailand) and $11.1bn (Korea) some of which would be to public/public guaranteed bodies including public sector banks as well as private institutions. Domestic money markets are relatively thin in the Asia-Pacific region.

[13] Evidence from Campa and Shaver (2001) suggests liquidity constraints for exporters are less binding, and cash flow is more stable because business cycles in foreign markets are not highly correlated. Chaney (2005) suggests that this allows these firms to access more external finance for entry to export markets; Girma *et al*. (2004) and Greenaway *et al.* (2006) show that it is larger and more liquid firms that tend to enter export markets. Our model uses export revenues as collateral, which ensures the positive effects on competitiveness of a depreciation are not offset by a deterioration in foreign currency value of pledged collateral as in Chaney (2005).

loan of the same size to finance next period's production. A key difference between the Bolton and Scharfstein economy and ours is that they consider the case of a fixed project size while we allow the firm to choose its level of production.

Let R denote the period 1 repayment and q the level of production. These two choice variables must satisfy the incentive compatibility constraint $(pq - R) + \pi pq \geq pq$. Given that demand does not vanish in period 1, the left-hand side shows the firm's profits when it does not default. The first term shows period 1 revenues net of loan repayments and the second term shows the period 2 expected revenues. The right-hand side shows the firm's profits when it defaults (in that case the creditors liquidate the firm). The constraint can be simplified to

$$\pi pq \geq R \qquad (IC_d)$$

where the subscript d stands for domestic. The repayment must also satisfy the creditor's individual rationality constraint $q(1+\pi) = \pi R + (1-\pi)k$. The left hand equals to the expected value of loans and the right hand side shows expected payoffs. The constraint can be written as

$$R = [q(1+\pi) - (1-\pi)k]/\pi \qquad (IR_d)$$

Combining the two constraints we get $q(\pi(\pi p - 1) - 1) > -(1-\pi)k$. Notice that if p is sufficiently high the last constraint will be satisfied for any choice of output. As profits are increasing in output the optimal strategy would be to borrow as much as possible irrespectively of the level of fixed assets (firm size). Therefore we impose the restriction that $\pi(\pi p - 1 <) - 1) < 0$ which together with the above constraint implies that

$$q \leq \frac{1-\pi}{1-\pi(\pi p - 1)} k \qquad (1)$$

Clearly in equilibrium the constraint will be binding. Intuitively, for high values of p the repayment can be set sufficiently high to cover the expected value of the loans: in that case a firm would be able to borrow even if it did not possess any collateral. However, this is not the case for low values of p and as result the value of collateral sets a limit to a firm's borrowing capacity.

Next, we turn our attention to the export market. Let R^* denote the repayment of foreign loans that must satisfy the following individual rationality constraint of the foreign creditor

$$R^* = [\theta + k]/\pi \qquad (IR_f)$$

where $\theta + k$ equals the size of the loan and the subscript f stands for foreign. Note that the creditor is repaid with probability π since with probability 1-π the firm is liquidated and therefore is unable to meet its obligations in the foreign market. For a firm with assets, k, expected profits from exports are equal to $\pi p^* k - \theta - k$. Setting this expression equal to zero and solving for k we find that only those firms with a level of domestic collateral higher than

$$\underset{\sim}{k} \equiv \frac{\theta}{\pi p^* - 1} \qquad (2)$$

can profitably invest in the export market.

As we mentioned above, we also need to make sure that firms have an incentive to use domestic loans to finance domestic sales and foreign loans to finance exports. It is clear that firms do not have an incentive to use domestic funds to finance exports since they already produce at capacity.[14] However, this is not the case with foreign funds which introduces moral hazard. A firm may use foreign loans to finance domestic sales but if it does so it will default in period 1. This is because if it stays active, the absence of export revenues will reveal the misuse of international funds. Misdirection of funds is not in the international lenders' interests since there will not be export revenues to repay them. The following proposition determines which firms will obtain loans from international creditors:

Proposition 1:

a) If $\pi(p^* - p) < 1$ *none of the firms will receive a foreign loan, and*

b) If $\pi(p^* - p) \geq 1$ *only those firms with* $k \geq \underset{\sim}{k} \equiv \frac{\theta(\pi p + 1)}{\pi(p^* - p) - 1}$ *will receive foreign loans.*

Proof: The expected total profits of a firm that uses the foreign funds to finance exports are given by $\pi[(pq - R) + \pi pq] + \pi(p^* k - R^*)$ while the corresponding profits when the firm uses the funds to finance domestic sales and defaults in period 1 are given by $\pi p(q + k + \theta)$. Then the proposition follows by substituting (IR_d), (IR_f) and (1) in the two expressions and then subtracting the second expression from the first one. □

[14] A similar conclusion would be obtained had we assumed that they face an increasing cost function. In that case foreign lenders would be willing to finance the first-best optimum level.

Thus, there are two conditions that must be satisfied in order for foreign creditors to provide loans. The first is that the return on exports must be sufficiently high to ensure the firm can repay foreign creditors in period 2. The second is the incentive compatibility condition

$$k \geq \underset{\sim}{k} \equiv \frac{\theta(\pi p + 1)}{\pi(p^* - p) - 1} \qquad (IC_f)$$

Notice that $\underset{\sim}{k} > \underline{k}$, which implies that the incentive compatibility constraint binds to ensure the firm is not tempted by the moral hazard. Only those firms with high production capacity earn sufficiently high profits from exports to have an incentive to use the funds appropriately.[15]

3.3. Currency Crisis

Suppose that in period 1 the government is forced to abandon the peg. Let the new value of the exchange rate be e=1+x, so that x>0 captures the rate of depreciation. The devaluation of the domestic currency will affect firms through three distinct channels.

We refer to the first channel as the *financial channel*. This raises the distinction between domestic lenders that remain solvent and those that become insolvent. Suppose the devaluation causes a currency mismatch on the balance sheets of domestic creditors – this occurs because domestic banks obtain their funds from foreign investors and these liabilities (foreign loans owed by domestic banks) are denominated in foreign currency, but their assets (loans owed by domestic firms) are in domestic currency. This implies that after the unexpected collapse of the currency the value of their assets might fall short of the value of their liabilities, thus, driving them to insolvency. This has an implication for firms. Suppose a firm borrowed from a bank that turned out to be insolvent after the crisis. Despite the fact that the firm was successful in period 1 it would not receive any new funds in period 1 for production in period 2.

Even those firms that received funds from banks that remained solvent will be affected by the crisis. This is because the devaluation of the currency increases production costs because of the higher cost of imported inputs. Given that the size of the second period loan is

[15] There are a few papers that use a similar moral hazard problem to analyze how the firm's net worth (Hoshi, Kashyap, and Scharfstein (1992), Repullo and Suarez (2000), and Holmstrom and Tirole (1997)) or reputation capital (Diamond (1991)) determines its access to market and bank finance. In these papers firms can misuse funds by investing them in a high-risk technology that also yields some private benefits.

fixed in domestic currency units firms have to cut down production and thus profits.[16] We refer to this second channel as the c*ost of production channel* because it has some similarities with the Barth and Ramey (2001) *cost channel*. In Barth and Ramey (2001) a tightening of monetary policy has supply-side implications for firms, which must borrow at higher interest rates, and consequently produce at higher cost. In our model the currency crisis has a supply-side implication because a devaluation increases the cost of imported inputs and with a fixed loan size reduces production levels.

A third *competitiveness channel* refers to the effects of increased competitiveness as the devaluation makes exports cheaper and improves creditworthiness for firms that have access to export markets. In what follows, we examine in detail the effects of each of these channels.

We first notice that a proportion $1-\pi$ of all firms would have been liquidated with the domestic creditors receiving *k*, whether or not a crisis occurred. These firms would have failed even if the peg had been maintained and from now on we concentrate only on those firms that did not fail. We assume that a proportion *z* of all firms borrowed funds in period 0 from banks that were forced to insolvency by the depreciation. We further assume that the distribution of initial endowments of this set of firms is identical to the distribution for all firms.

We first examine the impact of devaluation on these firms that received loans from solvent banks and, for the moment, we restrict attention to those firms with $k < \tilde{k}$; i.e. firms that do not produce exports and hence are influenced only by the first and second channels. The domestic contract is designed so that, given that the peg is maintained, these firms are indifferent between repaying *R* to domestic creditors and defaulting. The devaluation of the currency implies that the unit cost of the domestic good has risen to $1+(1-\varphi)x$. Given that the size of the second loan is fixed at *q*, period 1 production and hence profits must decline. Indeed, the new production level is equal to $\frac{q}{1+(1-\varphi)x}$ and the corresponding decline of profits is equal to $pq\left(\frac{(1-\varphi)x}{1+(1-\varphi)x}\right)$. The above argument implies that firms will default on their domestic loans unless creditors accept to renegotiate.

[16] Given that banks face a liquidity crisis they are unable to adjust the size of the loan.

Proposition 2: *Consider these firms that received loans from solvent banks with endowments* $k < \underset{\sim}{k}$. *If* $\frac{1-\pi}{1-\pi(\pi p-1)}\left(1-p\pi\frac{(1-\varphi)x}{1+(1-\varphi)x}\right)>1$ *the contract will be renegotiated; otherwise the firm defaults and liquidation follows.*

Proof: When creditors liquidate a firm they receive *k* while if they renegotiate their return will be equal to $R-pq\frac{(1-\varphi)x}{1+(1-\varphi)x}-q$. The first term equals the initial agreed repayment, the second term equals the amount by which the repayment must be reduced (which equals the decline in profits) in order to induce firms to stay in business and the last term is the size of the new loan. The proposition follows by substituting the equilibrium solutions for *R* and *q* in the above expression and rearranging[17].

□ Next, we turn our attention to those firms that produce exports among those firms who received loans from solvent banks, which also benefit from the third channel. We make two observations. First, these firms benefit from the abandoning of the peg because the domestic currency value of exports increases. Second, if export profits are sufficiently high then the threat of default is not credible. We can show the following:

Proposition 3: *Consider these firms that received loans from solvent banks with endowments* $k. \geq \underset{\sim}{k}$. *If* $\underset{\sim}{k} \geq \frac{\theta}{\left[\pi p^*(1+x)-1-p\frac{(1-\varphi)x}{1+(1-\varphi)x}\left(\frac{1-\pi}{1-\pi(\pi p-1)}\right)\right]}$ *loans will not be renegotiated.*

Proof: The fixed cost θ means firms' export profits are increasing at an increasing rate in *k*. Export profits of the smallest firm capable of producing exports are given by $\pi p^*(1+x)\underset{\sim}{k}-\theta-\underset{\sim}{k}$. If these profits are higher than the decline in domestic profits (which are increasing at a constant rate with *k*) then firms will not have an incentive to default. □

For these firms profits might either increase or decrease with the abandoning of the peg because domestic profits decline while profits from exports increase. Nevertheless, overall profits increase with firm size.

[17] Notice that the proposition is automatically satisfied when $x=0$; i.e. under the peg. Also, the higher the import content of production costs, the higher is the likelihood that firms will default.

Now, consider these firms that received loans from insolvent banks. These are firms that will not receive new loans in period 1. It is clear that firms that do not produce exports will default and hence will be liquidated. For firms that produce exports we have the following proposition:

Proposition 4: *Consider these firms that received loans from insolvent banks with endowments* $k \geq \underset{\sim}{k}$. *There exists a cut off level for the value of assets* $\hat{k}$ *such that those firms with* $k \geq \hat{k}$ *repay their loans in period* 1 *and are not liquidated while those firms with* $\underset{\sim}{k} \leq k < \hat{k}$ *default and are liquidated.*

Proof: A firm that defaults avoids making the repayment *R* but sacrifices export profits. Therefore a firm defaults if and only if $\pi p^{*}(1+x)\underset{\sim}{k} - \theta - \underset{\sim}{k} < R$. The proposition follows after substituting for *R* in the above expression and rearranging terms. □

These firms that received loans from insolvent banks will cease supplying the domestic market. The firms that will remain active after the currency crisis are firms that are sufficiently large and profitable and will service only the foreign market.

3.4. Predictions

In our model access to external finance is critical to allow production in the next period. Some firms will not gain access to finance and will not produce output, others will obtain short-term domestic finance to produce domestic goods, while others will obtain domestic and international finance to produce domestic and export goods. The key determinant of the type and scale of finance is the firm's capital. This is strongly correlated with the size of the firm. Following a crisis some firms will default and be liquidated while others will continue to operate.

Had the currency crisis been avoided only a proportion 1-π of all firms would have failed to meet their financial obligations with domestic creditors and consequently would have been liquidated. Assuming that the inequality stated in proposition 2 is satisfied, the abandoning of the peg pushes up this proportion to $1 - \pi + \pi F(\hat{k})$, since among the remaining

firms a proportion z receive loans from eventually insolvent banks and among this subgroup of firms a proportion $F(\hat{k})$ default.

The proportion of non-exporters that survives is equal to $\pi(1-z)F(\underset{\sim}{k})$. These are firms that can renegotiate their loans but the abandoning of the peg forces them to cut down their production level. The proportion of exporters remaining active is equal to $\pi[z(1-F(\hat{k})+(1-z)(1-F(\underset{\sim}{k})]$. These firms are relatively large exporters that received funds from eventually insolvent banks and exporters that received funds from eventually solvent banks.

Thus our model makes the connection between the crisis, the inability of firms to obtain external finance, and increased failure. Firms may fail to obtain external finance either because they are not creditworthy or because their banks are insolvent, but either way, unless they are sufficiently profitable they will default, liquidate and fail. This process might be observed in falling creditworthiness of firms (as measured by balance sheet characteristics) or associated with poorer performance in terms of sales growth for example. This leads us to make three predictions from our model as a result of the crisis:-

P1: *The number of firm failures increases.*

We do not observe failure directly, but our model predicts which types of firms are more likely to fail. These will be relatively small in size, with fewer collateral assets, less liquidity and more debt; their liabilities will tend to be short-term, and their focus is predominantly on the domestic market although some smaller, less profitable exporters that cannot justify repaying their loans will also fail. They will obtain less long-term credit and will have lower sales growth.

P2: *Relatively smaller and less profitable firms that focus on the domestic market face falling demand, worsening balance sheets, and find their external funding is reduced (an implicit accelerator mechanism). The effect on the short term debt-total debt ratio is ambiguous, but since firms obtain less external finance sales growth should fall.*

Small and less profitable firms might be excluded from the debt market altogether, but some will receive a smaller amount of debt, the majority of which is short-term domestic debt. Hence the effect on the ratio of short-term to total debt is ambiguous, but should be sensitive to the creditworthiness of the firm.

P3: *Relatively larger firms experience improved competitiveness, larger profits, stronger balance sheets and greater access to credit and higher sales growth.*

Larger and more profitable firms are more likely to meet the criteria to export (sufficient assets and production capacity) they will also obtain external finance from domestic and international lenders. Where the exchange rate depreciates after the crisis the initial deterioration in domestic conditions may be offset by improved competitiveness. The larger export oriented firms may ride out the impact of the crisis on domestic conditions because exports improve for this reason. The level of total debt will increase and the ratio of short-term to total debt of exporters will decrease; sales will increase.

4. Data and Methodology

4.1 Econometric Methodology

In this study, we use a dynamic panel data framework that allows us to employ firm specific and macroeconomic variables to explain manufacturing firms' behavior concerning evolution of their debt structure – short term vs. long term debt – and their sales growth. We apply the framework to four Asian countries (Indonesia, South Korea, Malaysia and Thailand) that have been affected by the 1997 financial crisis. We make use of interaction terms to investigate the response by firms differing in terms of size and openness etc.

The empirical model used in the estimations is:

$$y_{it} = \sum_{k=1}^{p} \alpha_k y_{i,t-k} + x_{it}\beta_1 + w_{it}\beta_2 + \eta_i + v_{it}\,; \qquad t=q+1,...,T_i; \qquad i=1,...,N,$$

where η_i and v_{it} are individual specific effects, and disturbance terms, respectively. y_{it} and $y_{i,t-k}$ are the up to p lags of the dependent variable, x_{it} is a vector of exogenous macroeconomic variables and w_{it} are endogenous or predetermined explanatory variables other than lags of the dependent variable. We avoid using time dummies as macroeconomic variables capture time varying factors for all firms. We estimate the dynamic panel model described above by employing the differenced Generalized Method of Moments (*GMM)* following Arellano and Bond (1991), Bond (2002). We treat macroeconomic variables and their interaction terms with firm type dummies as exogenous variables while all firm specific variables and their interaction terms as endogenous or predetermined in our estimations. The macroeconomic variables enter as levels since they have no firm-specific effects. Endogenous or predetermined

variables are replaced with suitable instruments i.e. as lagged values, where q is the maximum lag length in the model. The specification of the econometric model is verified on the basis of two tests, i.e. the test of second order serial correlation (m_2) and the Sargan tests of overidentifying restrictions in the *GMM* procedure.

We explain firms' debt structure (short term debt-total debt ratio) of each country using the following equation:

$$MAT_{it} = f(MAT_{,i,t-1}, COL_{it}, COL_{it}*TYPE_j, LIQ_{it}, LIQ_{it}*TYPE_j, SOLVE_{it}, SOLVE_{it}*TYPE_j, PROFITA_{it}, PROFITA_{it}*TYPE_j, DEBTA_{it}, DEBTA_{it}*TYPE_j, GDP_t, GDP_t*TYPE_j, INTR_t, INTR_t*TYPE_j, FXRATE_j, FXRATE_t*TYPE_j)$$

where MAT_{it} is the debt maturity ratio, COL_{it} (collateral) is the ratio of tangible assets to total assets, LIQ_{it} (liquidity) is the ratio of the current assets excluding work in progress and inventories to current liabilities, $SOLVE_{\text{it}}$ (solvency) is the ratio of shareholder's equity to total assets, $PROFITA_{it}$ is the ratio of profit before tax to total assets, $DEBTA_{it}$ is the ratio of total debt to total assets. These ratios are in percentage and change across time and firms; we use three lags of these variables as instrumental variables. In addition the *GDP* growth rate, the Treasury bill rate, $INTR_t$, and exchange rate (domestic currency per dollar), $FXRATE_t$, are treated as exogenous variables. We use $TYPE_j$, firm group dummies, to test whether the small and large firm groups exhibit heterogeneity in their debt maturity behavior as a reaction to explanatory variables.

We explain firms' sales growth (first differenced log of real sales) with the following equation:

$$GSALE_{it} = f(GSALE_{i,t-1}, GSALE_{i,t+1}, GSALE_{i,t+1}*TYPE_j, GSALE_{i,t+2}, GSALE_{i,t+2}*TYPE_j, PROFITA_{it}, PROFITA_{it}*TYPE_j, LIQ_{it}, LIQ_{it}*TYPE_j, COL_{it}, COL_{it}*TYPE_j, CF_{it}, CF_{it}*TYPE_j, DEBTA_{it}, DEBTA_{it}*TYPE_j, GDP_t, GDP_t*TYPE_j, INTR_t, INTR_t*TYPE_j, FXRATE_j, FXRATE_t*TYPE_j)$$

where $GSALE_{it}$, is firm sales growth and CF_{it} is the cash flow ratio, which is the ratio of net income to total assets.

4.2 Data Construction

In this paper we make use of data from the Thomson-Primark database from 1996 – 2004 with reference to four countries that were affected by the Asian crisis – Korea, Malaysia, Indonesia,

Thailand. We have reduced the impact of outliers by trimming 0.5 percent of observations from upper and lower tails of the distribution for profit, debt, solvency, cash flow and the liquidity ratios and sales growth[18]. To ensure that we have accurate yearly data we have adjusted the balance sheet reports for the date of issue during the year. Most of firms report information on their balance sheets and profit (loss) accounts by the end of December (financial year-end) but some report at the end of March or other months. We adjust all our firm-specific variables from financial years to calendar years i.e. if a firm reports in March variables are re-calculated using data from two years in proportions 25:75. Table 1 provides the number of manufacturing firms across years and countries. These firms are classified into categories based on size, indebtedness, profitability etc using lower 25 percent/upper 25 percent of the appropriate distribution for each variable in the period before 1997 for all countries.[19]

5. Empirical Results

5.1 Debt Structure.

We examine the ratio of short-term debt to total debt to isolate supply-side effects following Kashyap, Stein and Wilcox (1993) and Oliner and Rudebusch (1996). The data shows that smaller firms receive a larger proportion of debt in short term loans compared to larger firms for all four countries in every year. On the basis of our earlier predictions we would expect the maturity of the debt to respond to indicators of creditworthiness after the crisis, and for larger more profitable firms we expect the ratio of short-term debt to total debt to fall. For smaller less profitable firms the effect on the ratio is ambiguous since firms may be excluded from obtaining further credit altogether or may obtain less external funds overall but with a larger share in short-term loans. The results for the whole sample of firm observations are reported in column 1 in Table 3, and results for small v. large firms in columns 2 and 3.

We observe that the structure of debt maturity is persistent, so that the lagged dependent variable is a significant explanatory variable for the current short-term debt to total debt ratio. The degree of persistence varies from country to country – with Malaysia showing the greatest persistence and Korea the least, and Thailand and Indonesia in between – but in all

[18] Tangible assets-total asset ratio and maturity take values in the range of zero to one hundred therefore these variables are not trimmed.

[19] Firms which do not have information before 1997 are split using average real assets figures available after 1997.

cases the lagged dependent variable is strongly significant at the one percent level. The degree of significance does not alter for samples selected by firm type in any country.

Although debt maturity is persistent, balance sheet characteristics that indicate creditworthiness also have a significant effect on the maturity structure of firm-level debt in each country as predicted. We observe negative coefficients on liquidity, collateral, and solvency variables. This is consistent with deteriorating conditions (poorer liquidity, collateral, and solvency) causing an increase in the proportion of short-term debt to total debt, and improvements in financial health (higher liquidity, collateral and solvency) causing the maturity to lengthen. All four economies faced temporarily adverse conditions after the crisis but recovered as they benefited from the effects of currency depreciations allowing those firms with improving prospects to obtain longer maturity loans. Smaller, domestically-oriented firms would have been subject to extended depression in domestic markets and were more likely to have been credit constrained while larger firms with export-oriented markets and stronger balance sheets would have been unconstrained. This prediction is supported by Campa and Shaver (2001), Girma *et al.* (2004) and Greenaway *et al.* (2006) who find measures of poor financial health have an adverse effect on access to export markets, as does small firm size for a panel made up of UK firms.

The ratio of total debt to total assets is a further indicator of financial health: the higher the total debt to total asset ratio the worse the financial health of the firm. Here, deterioration in financial health results in a *decrease* in the proportion of shorter term maturity debt as the total debt to total asset ratio falls. Hence the negative sign on this variable indicates that firms with worsening asset-liability positions obtain less external finance even at short maturities. Greenaway *et al.* (2006) found more leveraged firms were less likely to gain access to export markets because they would be more likely to be financially constrained, which is consistent with our finding that indebted firms tend to obtain less credit other things remaining equal. We observe this effect in our sample for Thailand, Indonesia and Korea, where borrowers with higher total debt to asset levels are excluded from short-term credit markets (there is a significant negative coefficient which demonstrates that a higher total debt to total asset ratio reduces the proportion of short-term debt). The impact of the crisis caused the total debt to total asset ratio to increase initially. For many countries this was a temporary phenomenon with some improvement in subsequent years, but only in Korea and Thailand did the ratio fall below

levels seen pre-crisis; for Indonesia and Malaysia the debt to asset ratio increased steadily after the initial jump.

Across countries the significance of individual variables differs, but the signs are consistently negative for all variables. Liquidity impinges on all countries maturity structure, while the ratio of collateralizable assets to total assets affects Korean firms more than other countries. Solvency is more influential over Indonesian firm's recourse to short-term debt, and the level of total debt to total assets is significant in Thailand, Indonesia and Korea but not Malaysia. Noticeably, Malaysia is unaffected by these balance sheet variables, liquidity excepted, possibly due to the fact that capital controls mitigated the effects of currency depreciation. This in itself is a test of our theoretical model since the predictions we derive are driven by depreciation of the currency that provide opportunities for exporting firms but not for non-exporting firms. In Malaysia, exporters did not experience significant balance sheet influences on debt maturity; this is because there was no improvement in competitiveness once capital controls were in place, preventing further depreciation of the currency after the initial impact of the crisis.

There is some evidence of significant macroeconomic effects on the ratio of short-term debt to total debt. The coefficient on GDP growth rate is negative and significant for Thailand and Indonesia and marginally significant at the 10% level for Malaysia; the magnitude of these effects is large. All of the countries concerned experienced large nominal and real GDP growth rates in the period after the crisis as the large depreciation of the currency improved competitiveness of exports and these shifted the maturity structure of debt towards longer debt contracts. Lending rates at all maturities also rose, and these had the opposite effect on maturity structure, but this is significant only for Korea and Thailand.

Comparing the post-crisis performance of firms which are small v. large reveals how these firm types were affected in the aftermath of the crisis. The second and third columns of Table 3 report the comparative effects of small and large firm types; in all cases the signs of the variables do not change, and comparison focuses on the relative magnitudes of coefficients. Our model predicts smaller firms face deteriorating conditions in domestic markets they may hold less debt or their maturity may shorten i.e. they hold less debt but a higher proportion in short term debt. This contrasts with large firms whose maturity lengthens as their export conditions improve. Examining small versus large firms in the four countries we find that

where the coefficients are significant, small firms' have generally smaller negative coefficients than large firms for variables such as liquidity, solvency and collateral (summing the coefficient and the interaction coefficient for firm type). This implies financial firms reduced short-term maturity debt (with improving balance sheets) to a greater extent for large firms than for small firms. For Indonesia small firms have small negative net responses, while for large firms the net effect is more strongly negative. In Korea, the net effect for small firms is positive, indicating that these firms obtained marginally more short-term debt as balance sheets worsened, but again there are negative net effects for larger firms.

Malaysia and Thailand exhibit exceptional circumstances making comparison between small and large firm responses difficult. Malaysia shows very little response to balance sheet effects for small or large firms because exchange controls probably limited any beneficial effects of depreciation after the initial impact of the crisis as mentioned earlier. Thailand experienced exceptionally fragile conditions among financial institutions which were compelled to merge with international banks or consolidate. Thus neither large nor small firms were afforded access to substantial funds from these institutions whatever their creditworthiness or market focus.[20]

The greater sensitivity of lenders to large as opposed to small firms' balance sheets reverses the conventional finding in empirical closed economy credit channel studies (c.f. Gertler and Gilchrist, 1994, Gilchrist and Himmelberg, 1995). But the reversal of the argument is entirely consistent with the theory and evidence on access to export markets reported in Bernard *et al.* (2003), Bernard and Jensen (2004), Campa (2004), Girma *et al*. (2004), Greenaway *et al.* (2006), Helpman *et al.* (2004), Roberts and Tybout (1997), Roberts *et al.* (1997) and Tybout (2003). We would expect a larger firm size and a healthy balance sheet to be key determinants of access to export markets, and therefore improved terms for credit in our model also. The domestic focus of small firms' activities compared to the international export focus of larger firms makes size a key distinction as far as lenders are concerned in open economy credit channel models but this is also closely linked to profitability. Small firms in Asia would have had poor prospects for the use of funds, and since the domestic market was

[20] The Bank of Thailand reports that firms sought alternative sources of external finance. Annual data on private sector securities issues jumped from bhat 213,971m in 1996 to bhat 431,832m in 1998 and bhat 871,453m in 1999 before stabilising around figures closer to the 1998 levels in subsequent years. The majority of these securities issues were shares and medium term debentures issued by larger firms. In other words, successful firms sought non-bank external finance

weakened by the crisis they would have had low profitability and unhealthy balance sheets[21]. The reverse would have been true for large firms with a focus on export markets, and in addition these firms would have had collateral assets acceptable to international lenders i.e. export revenues. Hence there were likely to be few incentives for financial intermediaries to lend long term to small firms but greater incentives to lend to large firms. Also, since large firms borrow from domestic and international lenders, and international lenders are unlikely to be affected by the shortage of funds that affects the domestic lenders, there is less prospect of a supply-side credit crunch for larger firms. Thus, when conditions improve for the exporters, following a devaluation, international lenders are likely to supply longer maturity funds to those firms with healthy balance sheets.

The reversal of the conventional result is not restricted to small and large firms. The results are repeated for low v. high solvency ratio firms, low v. highly indebted firms, low v. high collateral asset firms, and low v. high liquidity firms (unreported) with consistent negative signs on collateral, liquidity, solvency and debt variables. Most importantly, separating firms into relatively more profitable and less profitable categories in Table 4 again reveals strong negative coefficients on collateral, solvency, liquidity and debt ratios. The larger more profitable firms are able to obtain more long term loans on the basis of stronger balance sheets than small firms[22].

5.2. Sales Growth

The theoretical model suggests that the currency crisis will have similar repercussions for the activity of firms as it does for firms' access to external finance. The initial effect of the crisis is likely to cause a deterioration in conditions with an adverse effect on sales growth. This will be seen through the impact of macroeconomic conditions (economic growth, interest rates, and the exchange rate) and through firm-specific characteristics from the balance sheet. All firms are expected to find conditions worsen initially, but for some types of firms – the export-oriented firms – the depreciation of the currency after the crisis is likely to improve real sales growth.

[21] Dollar and Hallward-Driemeier (1998) on a survey of 1200 Thai firms found that it was the weakness of the domestic market that was responsible for reduced borrowing.
[22] Again, only Thailand is the exception for reasons given in footnote 21

The results for the whole sample of firm observations are reported in column 1 in Table 4, and results for small v. large firms in columns 2 and 3. Sales growth is highly cyclical over the post-crisis period as the negative correlation with lags and leads of real sales growth demonstrates. Controlling for the cyclicality, we examine the influence of balance sheet and macroeconomic variables for the four countries that we examined.

Looking at the whole sample of firms for each country including smaller and larger firms the net effect of balance sheet variables and macroeconomic conditions is consistent with results from the previous section. Positive coefficients on profitability confirm that firms with strong balance sheet positions have stronger sales growth. This is a direct prediction of the model, since more profitable firms are generally exporting firms that benefit from the depreciation of the currency post-crisis. The relatively larger firms have greater coefficients on profitability than smaller firms in all four countries except Thailand[23]. A negative coefficient on the total debt to total assets ratio provides a similar indication, since firms with a higher ratio of debt to assets have lower real sales growth. These firms are the most likely to be credit constrained and therefore have restricted access to export markets (c.f. Campa and Shaver, 2001, Greenaway *et al.* 2006). Cash flow appears with marginal significance in three countries. The macroeconomic indicators show a uniform positive impact of GDP growth on sales growth, and a negative effect of interest rates. The exchange rate has a small positive impact in Indonesia and Korea but a negative impact in Thailand. Post-crisis these countries benefited from export-led growth, which would have improved sales and profitability for those firms that were operating in export-facing markets. Firms that benefited from export growth would have been more financially healthy, which may have assisted their access to external finance.

The evidence for sub-samples of small and large firms suggests that the same pattern of responses can be identified with very few exceptions. There are positive signs on profitability and collateral asset variables, and negative signs on cash flow and the total debt to total asset ratio as before. Thus firms with falling profits and collateral asset values or increasing leverage are likely to obtain less external finance and also experience falling sales growth, while firms that have increasing profits have rising sales growth[24]. GDP growth has a positive effect on

[23] Again see footnote 21 for an explanation of the circumstances unique to Thailand.
[24] Endogeneity is an issue here, since causation between growing profitability and sales might run either way. We control for endogeneity in estimation with the use of instruments, and infer the relationship between profitability, collateral assets, leverage etc in previous years (i.e. from lags used as instruments) and sales growth.

sales growth and interest rates a negative effect, with a small and largely identical response to the exchange rate for both types of firms.

Tightening domestic monetary policy is therefore most likely to hit the smallest firms hardest. It will cause domestic banks to ration credit more tightly and small firms will have few alternative sources of funds i.e. no international lenders or capital markets from which to borrow. This will affect access to export markets and will be reflected in lower sales growth.

6. Conclusions

This paper presents a simple theoretical model of an open economy credit channel with transmission channels driven by currency mismatch between assets and liabilities for both firms and financial institutions, and the costs and benefits of depreciation for production costs and revenues. Our model predicts that a crisis will lead to more firm failures, but critically that these will be predominantly among smaller, less profitable firms with less exposure to international markets and finance. We contribute empirically by examining whether the evidence is consistent with these hypotheses. Firm level heterogeneity on the balance sheet is vitally important to the impact of the crisis. Smaller, domestically focused firms are hit hardest by the crisis because their markets are undermined by the crisis and their lenders more likely to withhold funds to less creditworthy firms as their own balance sheets are upset by currency mismatch of assets and liabilities. For some of these firms the insolvency of their lender will cause them to fail. Exporters on the other hand find their markets benefit from an improvement in competitiveness which improves their prospects after the initial impact of the crisis. They can obtain funds from international lenders unaffected by a credit crunch, and even where they suffer from insolvency among domestic lenders the most profitable firms will find that they can continue to produce exports. Our results show that firms' access to external bank finance and sales growth are affected by these considerations and critically longer maturity loans are more readily extended to larger and more profitable firms with greater access to export markets.

Table 1: Number of Manufacturing Firms by Country

	Indonesia	Korea	Malaysia	Thailand
1997	117	223	261	191
1998	118	238	265	181
1999	121	292	278	175
2000	118	319	283	174
2001	118	320	285	175
2002	117	324	283	171
2003	113	320	270	171
2004	0	248	107	37

Note: Few firms had reported their 2004 figures to Thomson Financial Primark database at the time the data were extracted.

Table 2: Basic Macroeconomic Indicators

Export of goods and services as percentage of GDP

	Indonesia	Korea	Malaysia	Philippines	Thailand
1997	27.9	33.0	93.3	49.0	48.0
1998	53.0	33.3	115.7	52.2	58.9
1999	35.5	32.4	121.3	51.5	58.3
2000	41.0	37.7	124.4	55.4	66.8
2001	38.2	35.5	116.4	49.2	65.9
2002	32.0	33.9	114.6	50.2	64.2
2003	30.7	35.6	113.4	49.5	65.6
2004	30.9	39.7	121.2	50.6	70.5
Average	36.1	35.1	115.0	50.9	62.3

External debt as percentage of GDP

	Indonesia	Korea	Malaysia	Philippines	Thailand
1997	60.5	36.3	48.5	52.2	69.4
1998	157.1	51.1	61.9	70.8	93.1
1999	105.2	37.6	53.9	67.0	77.6
2000	85.5	32.2	47.0	67.5	65.0
2001	80.8	30.6	51.9	72.9	58.5
2002	64.2	30.2	51.3	71.3	48.8
2003	64.7	26.6	47.2	73.9	40.3
2004	63.0	26.1	46.0	64.9	32.1
Average	85.1	33.8	51.0	67.5	60.6

Real GDP Growth Rate (Percent)

	Indonesia	Korea	Malaysia	Philippines	Thailand
1997	4.91	5.51	7.70	5.19	-1.34
1998	-13.30	-6.69	-6.70	-0.58	-10.77
1999	0.85	10.89	5.80	3.40	4.22
2000	4.78	8.81	8.63	4.38	4.40
2001	3.44	3.03	0.45	1.76	1.94
2002	3.66	6.35	4.12	3.34	5.22
2003	3.60	3.07	5.64	4.58	6.74
2004	5.13	4.64	7.07	6.07	6.08
Average	1.6	4.5	4.1	3.5	2.1

Inflation Rate (Percent)

	Indonesia	Korea	Malaysia	Philippines	Thailand
1997	6.1	4.4	2.7	5.6	5.6
1998	57.2	7.5	5.3	9.3	8.1
1999	21.7	0.8	2.7	5.9	0.3
2000	3.8	2.3	1.5	4.0	1.5
2001	11.5	4.3	1.4	6.8	1.7
2002	11.9	2.8	1.8	3.0	0.6
2003	6.8	3.6	1.1	3.5	1.8
2004	6.2	3.6	1.5	6.0	2.9
Average	15.6	3.7	2.3	5.5	2.8

Table 2 Macroeconomic Indicators (cont)

Exchange Rate (Per US $)

	Indonesia	Korea	Malaysia	Philippines	Thailand
1997	2909.4	951.29	2.8132	29.4707	31.364
1998	10013.7	1401.44	3.9244	40.8931	41.360
1999	7855.2	1188.82	3.8000	39.0890	37.814
2000	8421.8	1130.96	3.8000	44.1938	40.112
2001	10260.8	1290.99	3.8000	50.9927	44.432
2002	9317.1	1251.09	3.8000	51.6036	42.960
2003	8577.2	1191.88	3.8000	54.2033	41.485
2004	8956.4	1145.49	3.8000	56.0399	40.223
Average	8288.9	1194.0	3.7	45.8	40.0

Gross International Reserves (in million US $)

	Indonesia	Korea	Malaysia	Philippines	Thailand
1997	17396	20405	20899	8799	26968
1998	23517	52041	25675	10842	29536
1999	27257	74054	30645	15064	34781
2000	29268	96198	29576	15063	32661
2001	28018	102821	30526	15692	33041
2002	31577	121414	34277	16365	38924
2003	36253	155355	44576	17063	42148
2004	36304	199069	66448	16228	49831
Average	28698.8	102669.7	35327.8	14389.5	35986.1

Current Account Balance as Percentage of GDP

	Indonesia	Korea	Malaysia	Philippines	Thailand
1997	-2.22	-1.59	-5.18	-5.30	-1.97
1998	4.27	11.54	13.53	2.36	12.66
1999	4.11	5.50	15.92	9.48	10.17
2000	4.82	2.65	9.14	8.36	7.61
2001	4.19	1.83	8.27	1.86	5.41
2002	3.83	1.11	7.82	5.82	5.89
2003	3.04	1.71	12.98	1.80	5.57
2004	1.12	4.05	13.38	2.46	4.44
Average	2.9	3.4	9.5	3.4	6.2

Lending Rates (Percent)

	Indonesia	Korea	Malaysia	Philippines	Thailand
1997	21.82	11.88	9.53	16.22	13.65
1998	32.16	15.25	10.61	18.39	14.42
1999	27.66	9.40	7.29	11.75	8.98
2000	18.46	8.55	6.77	10.86	7.83
2001	18.55	7.71	6.66	12.40	7.25
2002	18.95	6.77	6.39	8.90	6.88
2003	16.94	6.27	6.13	9.48	5.94
2004	14.13	5.90	6.05	10.07	5.50
Average	21.1	9.0	7.4	12.3	8.8

Table 3: Financial Maturity and Size

	Indonesia						Korea					
	Whole Sample		Small		Large		Whole Sample		Small		Large	
MATit-1	0.342	***	0.318	***	0.294	***	0.209	***	0.182	***	0.211	***
	(5.57)		(4.94)		(5.18)		(3.61)		(3.34)		(3.69)	
PROFITA	-0.183	*	-0.107		-0.142		0.043		-0.061		0.038	
	-(1.71)		-(1.06)		-(1.27)		(1.26)		-(0.35)		(1.15)	
PROFITA*TYPE			0.102		-0.046				0.085		-0.030	
			(0.40)		-(0.23)				(0.48)		-(0.18)	
COL	-0.176		-0.102		-0.274	*	-0.358	***	-0.466	***	-0.358	***
	-(1.20)		-(0.61)		-(1.63)		-(3.35)		-(3.92)		-(2.74)	
COL*TYPE			-0.426		0.166				0.160		-0.322	
			-(1.50)		(0.68)				(0.65)		-(1.52)	
SOLVE	-0.162	***	-0.243	***	-0.141	***	-0.081		-0.195	*	-0.098	
	-(2.97)		-(3.47)		-(2.74)		-(1.39)		-(1.86)		-(1.46)	
SOLVE*TYPE			0.207	*	-0.268				0.249	**	0.147	
			(1.72)		-(1.00)				(1.98)		(1.14)	
LIQ	-0.125	***	-0.148	**	-0.169	***	-0.141	***	-0.246	***	-0.133	***
	-(2.75)		-(2.12)		-(3.34)		-(2.94)		-(5.05)		-(2.82)	
LIQ*TYPE			0.119		0.101				0.152	**	-0.325	***
			(1.55)		(1.59)				(2.21)		-(3.64)	
DEBTA	-0.174	**	-0.284	***	-0.163	**	-0.150	*	-0.386	***	-0.182	
	-(2.10)		-(3.35)		-(1.96)		-(1.47)		-(2.81)		-(1.52)	
DEBTA*TYPE			0.508	***	-0.253				0.447	**	0.114	
			(3.12)		-(0.73)				(2.38)		(0.69)	
GDP	-1.187	**	-1.538	***	-1.041	*	-0.335		-0.372	*	-0.277	
	-(2.04)		-(2.60)		-(1.86)		-(1.37)		-(1.48)		-(1.06)	
GDP*TYPE			1.157	**	-0.671				-0.152		-0.334	
			(2.42)		-(1.46)				-(0.34)		-(1.35)	
INTR	-0.671		-0.869		-0.674		-0.399	*	-0.473	**	-0.351	
	-(1.14)		-(1.56)		-(1.19)		-(1.75)		-(2.05)		-(1.51)	
INTR*TYPE			-0.019		0.083				0.435		-0.148	
			-(0.06)		(0.30)				(1.25)		-(1.10)	
FXRATE	0.001		0.000		0.001		0.000		0.000		-0.001	
	(0.81)		(0.25)		(1.05)		-(1.31)		-(1.40)		-(1.57)	
FXRATE*TYPE			0.000		0.000				-0.001		0.000	
			-(0.05)		-(0.22)				-(0.92)		(0.76)	
CONS	9.834		17.537		8.350		14.056	*	15.478	**	14.821	**
	(0.53)		(0.99)		(0.48)		(1.92)		(2.12)		(2.04)	
m2	-0.43		-0.36		-0.34		-0.74		-0.590		-0.610	
	(0.74)		(0.72)		(0.73)		(0.46)		(0.55)		(0.54)	

Note: *** = 1% significance, ** = 5% significance, * = 10% significance.

Table 3: Financial Maturity and Size (cont.)

	Malaysia						Thailand					
	Whole Sample		Small		Large		Whole Sample		Small		Large	
MATit-1	0.573	***	0.543	***	0.545	***	0.325	***	0.288	***	0.304	**
	(8.31)		(7.99)		(9.33)		(5.54)		(5.10)		(4.90)	
PROFITA	-0.011		-0.013		-0.012		-0.109		-0.137		-0.161	
	-(0.87)		-(0.91)		-(0.91)		-(1.03)		-(1.32)		-(1.17)	
PROFITA*TYPE			-0.049		-0.302				-0.041		0.154	
			-(1.17)		-(1.40)				-(0.20)		(0.66)	
COL	-0.173		-0.180		-0.163		-0.085		-0.139		-0.160	
	-(1.53)		-(1.20)		-(1.29)		-(0.51)		-(0.70)		-(0.94)	
COL*TYPE			0.024		-0.128				0.301		-0.012	
			(0.12)		-(0.45)				(0.86)		-(0.03)	
SOLVE	-0.002		-0.003		-0.002		-0.062		-0.103		-0.042	
	-(0.35)		-(0.58)		-(0.40)		-(1.48)		-(1.61)		-(0.78)	
SOLVE*TYPE			0.008		0.063				-0.043		-0.153	
			(0.40)		(0.30)				-(0.36)		-(0.97)	
LIQ	-0.022	***	-0.025	***	-0.017	**	-0.081	***	-0.085	**	-0.116	**
	-(2.64)		-(2.58)		-(2.45)		-(2.59)		-(2.06)		-(4.31)	
LIQ*TYPE			0.050		-0.060	*			0.032		0.088	**
			(1.19)		-(1.66)				(0.63)		(2.18)	
DEBTA	-0.009		-0.018		-0.010		-0.164	**	-0.193	**	-0.147	**
	-(0.95)		-(1.31)		-(1.02)		-(2.46)		-(2.37)		-(2.08)	
DEBTA*TYPE			0.022		-0.027				-0.260		-0.036	
			(0.92)		-(0.09)				-(1.30)		-(0.15)	
GDP	-0.449	*	-0.495	**	-0.445	*	-0.956	***	-1.057	***	-0.929	***
	-1.890		-(2.13)		-(1.78)		-(2.91)		-(3.19)		-(3.12)	
GDP*TYPE			0.176		0.078				0.236		0.528	****
			(0.56)		(0.27)				(0.67)		(1.48)	
INTR	-0.265		-0.282		-0.264		-1.016	***	-1.101	***	-0.893	***
	-(1.17)		-(1.27)		-(1.15)		-(3.02)		-(3.33)		-(3.03)	
INTR*TYPE			-0.046		0.024				0.103		0.431	
			-(0.24)		(0.12)				(0.46)		(1.56)	
FXRATE	0.000		0.000		0.000		-0.001	**	-0.001	*	0.000	
	-0.360		-(0.41)		-(0.31)		-(1.60)		-(1.67)		-(0.67)	
FXRATE*TYPE			0.000		0.000				0.000		-0.001	
			(0.09)		-(0.11)				-(0.31)		-(1.37)	
CONS	7.543		8.241		7.257		29.350	*	31.216	**	22.552	***
	(1.05)		(1.17)		(1.05)		(2.83)		(3.12)		(2.66)	
m2	-0.12		-0.34		-0.19		0.04		-0.26		-0.11	
	(0.90)		(0.74)		(0.85)		(0.97)		(0.80)		(0.91)	

Note: *** = 1% significance, ** = 5% significance, * = 10% significance.

Table 4: Financial Maturity and Profitability

	Indonesia				Korea			
	Low Profitability		High Profitability		Low Profitability		High Profitability	
MATit-1	0.347	***	0.328	***	0.212	***	0.192	***
	(5.36)		(5.10)		(3.64)		(3.46)	
PROFITA	-0.420	*	-0.096		0.031		-0.019	
	-(1.67)		-(1.11)		(1.37)		-(0.13)	
PROFITA*TYPE	0.474	*	0.127		0.086		0.060	
	(1.82)		(0.29)		(0.54)		(0.41)	
COL	-0.239		-0.220		-0.524	***	-0.302	***
	-(1.29)		-(1.28)		-(4.26)		-(2.79)	
COL*TYPE	0.107		0.555		0.328		-0.571	**
	(0.41)		(1.07)		(1.48)		-(2.43)	
SOLVE	-0.027		-0.174	***	-0.039		-0.131	
	-(0.12)		-(3.23)		-(0.41)		-(1.09)	
SOLVE*TYPE	-0.129		0.111		-0.187		0.303	*
	-(0.56)		(0.26)		-(1.10)		(1.65)	
LIQ	-0.105	***	-0.152	**	-0.218	***	-0.133	**
	-(2.65)		-(2.12)		-(5.99)		-(2.44)	
LIQ*TYPE	-0.210	***	0.088		0.117	*	-0.068	
	-(3.85)		(1.02)		(1.68)		-(1.00)	
DEBTA	-0.272		-0.166	**	-0.104		-0.225	**
	-(1.27)		-(1.97)		-(0.61)		-(2.28)	
DEBTA*TYPE	0.127		-0.064		-0.082		0.493	**
	(0.55)		-(0.15)		-(0.40)		(1.97)	
GDP	-1.207	**	-1.238	**	-0.406	*	-0.204	
	-(2.05)		-(2.05)		-(1.67)		-(0.83)	
GDP*TYPE	0.519		-0.330		0.351		-0.401	
	(1.22)		-(0.57)		(1.04)		-(1.23)	
INTR	-0.687		-0.782		-0.351		-0.330	
	-(1.19)		-(1.50)		-(1.53)		-(1.46)	
INTR*TYPE	0.264		-0.286		-0.165		-0.009	
	(1.11)		-(0.87)		-(0.91)		-(0.04)	
FXRATE	0.001		0.000		0.000		0.000	
	(0.97)		(0.01)		-(0.86)		-(1.30)	
FXRATE*TYPE	-0.001		0.001		0.000		0.000	
	-(1.51)		(1.18)		(0.33)		(0.87)	
CONS	9.699		16.653		12.384	*	11.792	*
	(0.57)		(0.93)		(1.71)		(1.64)	
m2	0.13		-0.44		-0.850		-0.790	
	(0.89)		(0.66)		(0.39)		(0.43)	

Table 4: Financial Maturity and Profitability (cont,)

	Malaysia				Thailand			
	Low Profitability		High Profitability		Low Profitability		High Profitability	
MATit-1	0.530	***	0.537	***	0.297	***	0.304	***
	(7.93)		(8.42)		(5.19)		(5.33)	
PROFITA	0.009		-0.010		-0.180		-0.059	
	(0.14)		-(0.83)		-(0.95)		-(0.64)	
PROFITA*TYPE	-0.021		0.033		0.178		0.164	
	-(0.34)		(0.67)		(0.83)		(0.50)	
COL	-0.598	***	-0.169		-0.339	**	-0.064	
	-(3.71)		-(1.45)		-(2.17)		-(0.37)	
COL*TYPE	0.628	***	-0.065		0.486		0.050	
	(3.13)		-(0.15)		(1.57)		(0.16)	
SOLVE	0.123		-0.002		0.411	**	-0.057	
	(0.85)		-(0.41)		(2.34)		-(1.26)	
SOLVE*TYPE	-0.129		0.737		-0.478	***	0.420	
	-(0.89)		(1.52)		-(2.65)		(0.90)	
LIQ	-0.024	***	-0.027	***	-0.144	***	-0.077	**
	-(3.03)		-(3.03)		-(4.42)		-(2.09)	
LIQ*TYPE	-0.219	**	-0.003		0.096	**	-0.030	
	-(2.26)		-(0.10)		(2.14)		-(0.55)	
DEBTA	-0.124		-0.009		-0.010		-0.125	**
	-(0.65)		-(0.93)		-(0.05)		-(1.96)	
DEBTA*TYPE	0.110		-0.449		-0.099		-0.003	
	(0.57)		-(0.88)		-(0.51)		-(0.01)	
GDP	-0.572	**	-0.452	*	-0.775	**	-1.002	***
	-(2.24)		-(1.86)		-(2.54)		-(3.13)	
GDP*TYPE	0.026		0.026		-0.474		0.264	
	(0.11)		(0.11)		-(1.30)		(0.70)	
INTR	-0.357		-0.169		-0.953	***	-1.053	***
	-(1.60)		-(0.75)		-(3.09)		-(3.30)	
INTR*TYPE	-0.325	**	-0.552	***	-0.038		0.059	
	-(2.01)		-(3.38)		-(0.15)		(0.24)	
FXRATE	0.000		0.000		-0.001	***	-0.001	*
	-(1.36)		-(1.03)		-(2.65)		-(1.72)	
FXRATE*TYPE	0.001	*	0.001	***	0.000		0.000	
	(1.75)		(2.99)		-(0.22)		(0.03)	
CONS	12.516	*	7.639		31.349	***	30.472	***
	(1.81)		(1.07)		(3.41)		(2.98)	
m2	-0.12		-0.09		0.03		-0.25	
	(0.90)		(0.93)		(0.97)		(0.80)	

Table 5: Sales Growth, Size and Profitability

	Indonesia						Korea					
	Whole		Small		Large		Whole		Small		Large	
DLRSALEi,t-1	-0.301	***	-0.331	***	-0.298	***	-0.386	***	-0.401	***	-0.391	***
	-(4.84)		-(5.63)		-(5.58)		-(8.85)		-(10.33)		-(9.60)	
DLRSALEi,t+1	-0.114		-0.162		-0.054		-0.600	***	-0.619	***	-0.635	***
	-(1.04)		-(1.33)		-(0.52)		-(10.34)		-(8.41)		-(10.39)	
DLRSALEi,t+1*TYPE			0.233	*	-0.159				0.110		0.234	**
			(1.87)		-(0.99)				(0.91)		(1.97)	
DLRSALEi,t+2	-0.430	***	-0.389	***	-0.398	***	-0.545	***	-0.608	***	-0.560	***
	-(3.65)		-(3.43)		-(2.87)		-(8.06)		-(8.44)		-(6.00)	
DLRSALEi,t+2*TYPE			0.269	*	0.057				0.285	***	0.191	*
			(1.69)		(0.28)				(2.52)		(1.65)	
PROFITAit	0.871	***	0.631	***	0.735	***	3.366	**	4.020	**	4.539	**
	(3.55)		(3.10)		(3.03)		(1.97)		(2.29)		(2.31)	
PROFITAit*TYPE			-0.324		1.756	**			-2.903		-2.491	
			-(0.55)		(2.28)				-(1.17)		-(0.69)	
LIQit	0.013		-0.027		0.034		-0.021		-0.036		-0.031	
	(0.29)		-(0.59)		(0.60)		-(0.88)		-(1.22)		-(1.14)	
LIQit*TYPE			0.057		-0.013				0.017		-0.209	
			(1.04)		-(0.22)				(0.43)		-(0.82)	
COLit	1.679	***	1.894	***	1.868	***	1.536	***	1.595	***	1.024	**
	(2.98)		(3.35)		(3.28)		(4.37)		(4.18)		(2.02)	
COLit*TYPE			-2.166	**	-2.133	***			-0.832		0.355	
			-(2.47)		-(2.80)				-(0.84)		(0.58)	
CF	-0.175		-0.254		-0.216		-3.300	*	-3.406	*	-4.665	**
	-(0.64)		-(1.01)		-(0.94)		-(1.87)		-(1.90)		-(2.36)	
CF*TYPE			0.293		-1.549	*			2.193		3.242	
			(0.52)		-(1.88)				(0.88)		(0.88)	
DEBTA	-0.583	*	-0.854	**	-0.515	**	-0.813	***	-0.761	***	-1.070	***
	-(1.66)		-(2.06)		-(1.98)		-(4.41)		-(3.81)		-(3.94)	
DEBTA*TYPE			0.877	*	0.770	**			0.381		0.517	
			(1.94)		(2.14)				(1.06)		(1.53)	
GDP	21.223	***	19.032	***	19.781	***	1.303	***	0.922	***	1.380	***
	(8.61)		(8.42)		(7.66)		(3.82)		(2.56)		(3.74)	
GDP*TYPE			0.178		-1.629	**			2.418	***	0.168	
			(0.18)		-(2.00)				(2.96)		(0.34)	
INTR	-5.910	***	-5.715	***	-5.158	***	0.498	*	0.593	**	0.390	
	-(4.75)		-(4.77)		-(4.46)		(1.87)		(2.27)		(1.34)	
INTR*TYPE			-0.165		-0.924				-0.220		-0.253	
			-(0.28)		-(1.36)				-(0.28)		-(0.67)	
FXRATE	0.066	***	0.058	***	0.058	***	-0.001		-0.001		-0.001	
	(6.14)		(5.73)		(5.40)		-(0.70)		-(0.87)		-(0.39)	
FXRATE*TYPE			-0.005	**	-0.001				0.001		0.001	
			-(2.16)		-(0.44)				(0.19)		(0.61)	
CONS	-116.75	***	-101.85	***	-102.67	***	-0.855		-0.619		-1.602	
	-(6.12)		-(5.69)		-(5.33)		-(0.44)		-(0.33)		-(0.92)	
m2	0.05		-0.55		-0.35		-0.05		-0.05		-0.66	
	(0.96)		(0.58)		(0.73)		(0.96)		(0.96)		(0.51)	
Sargan Test	97.39		102.07		98.79		220.2		205.17		207.77	
p-value	(0.69)		(1.00)		(1.00)		(0.37)		(0.99)		(0.99)	
No of obs	515		515		515		1009		1009		1009	
No of firms	114		114		114		261		261		261	

Note: *** = 1% significance, ** = 5% significance, * = 10% significance.

Table 5: Sales Growth, Size and Profitability (cont.)

	Malaysia						Thailand					
	Whole		Small		Large		Whole		Small		Large	
$DLRSALE_{i,t-1}$	-0.376	***	-0.395	***	-0.389	***	-0.250	***	-0.266	***	-0.265	***
	-(6.27)		-(7.25)		-(6.94)		-(3.06)		-(2.79)		-(3.68)	
$DLRSALE_{i,t+1}$	-0.521	***	-0.505	***	-0.503	***	-0.117		-0.063		-0.128	
	-(8.98)		-(8.50)		-(7.99)		-(0.77)		-(0.40)		-(0.74)	
$DLRSALE_{i,t+1*}$TYPE			-0.019		-0.045				-0.333		-0.024	
			-(0.18)		-(0.23)				-(1.56)		-(0.06)	
$DLRSALE_{i,t+2}$	-0.464	***	-0.400	***	-0.406	***	-0.204	**	-0.168		-0.205	*
	-(5.38)		-(4.52)		-(5.66)		-(2.03)		-(1.42)		-(1.91)	
$DLRSALE_{i,t+2*}$TYPE			0.111		-0.084				-0.167		0.230	
			(0.94)		-(0.77)				-(1.09)		(1.16)	
$PROFITA_{it}$	0.179		4.131	**	0.644		1.052	**	1.010	*	0.821	
	(0.16)		(1.99)		(0.46)		(2.13)		(1.66)		(0.99)	
$PROFITA_{it*}$TYPE			-6.708	***	-3.255				-0.304		0.083	
			-(3.00)		-(1.40)				-(0.23)		(0.04)	
LIQ_{it}	-0.081		-0.140		0.057		0.018		0.150	**	-0.027	
	-(0.84)		-(0.77)		(0.74)		(0.22)		(1.98)		-(0.26)	
LIQ_{it*}TYPE			0.094		-0.459	***			-0.571	***	0.544	
			(0.52)		-(4.39)				-(4.40)		(1.26)	
COL_{it}	-0.126		-0.824		0.289		-1.401		-0.907		-1.970	
	-(0.25)		-(1.00)		(0.36)		-(1.29)		-(0.77)		-(1.51)	
COL_{it*}TYPE			0.306		-1.596				-2.085		3.143	**
			(0.30)		-(1.49)				-(1.16)		(2.05)	
CF	-0.281		-3.965	**	-0.706		-1.424	***	-1.375	**	-1.193	
	-(0.27)		-(2.04)		-(0.53)		-(2.86)		-(2.23)		-(1.43)	
CF*TYPE			6.482	***	3.858	*			0.561		1.953	
			(3.06)		(1.65)				(0.42)		(1.03)	
DEBTA	-0.331	***	0.817		-0.509	*	-0.785	*	-0.784		-0.886	*
	-(2.88)		(0.94)		-(1.75)		-(1.61)		-(1.26)		-(1.90)	
DEBTA*TYPE			-1.174		0.659				-0.835		2.447	**
			-(1.33)		(0.91)				-(1.10)		(2.30)	
GDP	1.954	***	1.796	***	1.866	***	-1.987		-0.617		-3.857	***
	(3.69)		(3.29)		(3.16)		-(1.39)		-(0.34)		-(3.52)	
GDP*TYPE			-0.117		0.119				-5.027	**	6.837	**
			-(0.25)		(0.24)				-(2.16)		(2.56)	
INTR	-1.628	***	-1.718	***	-1.505	***	0.419		0.305		1.983	
	-(5.55)		-(6.19)		-(4.49)		(0.34)		(0.22)		(1.40)	
INTR*TYPE			-0.475		-0.254				2.735		-0.868	
			-(0.98)		-(0.48)				(1.14)		-(0.35)	
FXRATE	0.004	**	0.004	**	0.003	*	-0.012	**	-0.010		-0.020	***
	(2.12)		(1.99)		(1.63)		-(1.97)		-(1.49)		-(2.92)	
FXRATE*TYPE			0.001		0.002				-0.014		0.022	*
			(0.32)		(1.15)				-(1.35)		(1.90)	
CONS	-1.318		-2.083		-2.031		7.786		7.029		8.862	
	-(0.40)		-(0.65)		-(0.61)		(1.45)		(1.24)		(1.46)	
m2	-0.06		0.05		-0.58		1.44		1.6		0.86	
	(0.96)		(0.96)		(0.56)		(0.15)		(0.11)		(0.39)	
Sargan Test	227.34		215.76		220.94		58.8		47.71		42.93	
p-value	(0.25)		(0.97)		(0.94)		(1.00)		(1.00)		(1.00)	
No of obs	1205		1205		1205		127		127		127	
No of firms	265		265		265		68		68		68	

Note: *** = 1% significance, ** = 5% significance, * = 10% significance.

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