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# Exchange rates and export performance: evidence from micro-data

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This article presents a summary of early results from an ongoing Reserve Bank research programme on the impact of exchange rates on firm-level export behaviour. Understanding responses to exchange rate movements at the level of individual firms is key to a deeper understanding of the channels through which economic and policy changes are transmitted through the economy. Results suggest that New Zealand firms have limited ability to respond to exchange rate changes through price-setting. Rather, explicit hedging is common and firms' trade behaviour reflects a desire to avoid the risk associated with exchange rate volatility.

## 1 Introduction

Understanding the relationship between exchange rate movements and firm behaviour is of importance to the Reserve Bank for two primary reasons. First, subject to its primary objective of maintaining price stability, the Reserve Bank is tasked with "avoid(ing) unnecessary instability in output, interest rates and the exchange rate" (Policy Targets Agreement, clause 4b). Understanding the impact of movements in the exchange rate on firms' export and growth potential helps guide how best to consider volatility in the exchange rate alongside the other clause 4b objectives. Second, understanding how the exchange rate impacts on firms' production and trade is useful for deepening our understanding of the transmission mechanism, which is largely derived from macroeconomic theory and evidence.

In this article we summarise recent Reserve Bank research on one aspect of the overall policy environment – the relationship between exchange rates and firm-level trade. This work represents the beginning of a longer term research programme utilising a new prototype database developed by Statistics New Zealand. The Longitudinal Business Database (LBD) draws together a range of existing datasets to create a comprehensive database of financial and other information about New Zealand firms (See Box 1). Such large-scale databases, and the computational power required to make full use of them, have become available to researchers only relatively recently. This data now allows researchers to consider a wide range of possible interactions between firm characteristics, the economic environment and firm performance.

Increasingly, researchers – including the central bank community – have used micro-economic datasets to address macroeconomic questions (see for example, Bils and Klenow 2004, Gopinath and Rigobon 2008, Klenow and Willis 2006, and Altissimo et al. 2006). While the Reserve Bank has developed a substantial body of macroeconomic research around both the immediate impact of interest rates on the exchange rate (see eg, Coleman and Karagedikli, 2008; Karagedikli and Siklos, 2008; and Smyth 2009) and the impact of open economy aspects of New Zealand's transmission mechanism (eg, Munro and Sethi 2007, Drew et al. 2008, Lees 2009, Delbrück, et al. 2008), the microeconomic dimensions of this work have remained relatively underdeveloped.

The LBD work programme seeks to complement and deepen the Reserve Bank's understanding from a microeconomic perspective. For example, while macroeconomic research typically fails to find a strong relationship between exchange rate volatility and trade, micro-economic analysis suggests that this result is due to aggregation. Small exporters select out of volatile markets, leaving only the stronger exporters, pushing up the average export value of remaining firms while having little impact on aggregate export value (Fabling, Sanderson and Taglioni, forthcoming).

Section 2 of this article discusses the theoretical reasons why exchange rates are expected to have an impact on firm-level trade behaviour, and the firm-level factors that might mitigate or exacerbate these effects. Section 3 summarises the results of four recent or forthcoming Reserve Bank discussion papers that consider a range of aspects of

## Box 1

### The Longitudinal Business

#### Database

##### 1 What is it?

The prototype Longitudinal Business Database was developed by Statistics New Zealand (SNZ) and draws together existing sources of firm-level micro-data into a comprehensive longitudinal database. The core data within the LBD covers almost 1 million private-for-profit firms over 8 years (2000-2007), with between 445,000 and 525,000 active firms in any given year. Among active firms, around one-third are employing in any given year.

The fundamental elements of the LBD consist of SNZ's Longitudinal Business Frame (LBF), which provides information on industry, location and ownership; administrative data from the Inland Revenue Department (IRD) including goods and services (GST) returns, financial accounts (IR10), and company tax returns (IR4); information on employers, employees and wages aggregated to the firm level from the Linked Employer-Employee Dataset (LEED); and shipment level merchandise trade data provided by the New Zealand Customs Service (Customs). In addition to the core administrative data, a number of additional data sources have been linked to the LBD, including several surveys administered by SNZ and details of firms' participation in government assistance programmes. More detail on the development and coverage of the LBD is available from Statistics New Zealand (2007) and Fabling et al. (2008).

##### 2 Why Micro-data?

Micro-data not only opens up a range of specifically micro-economic research opportunities, it can also be used to throw new light on macroeconomic questions. Increasing availability of firm-level micro-data over recent years has shown that even within narrowly defined industries, firms differ dramatically on a range of dimensions, including size, productivity and export intensity (see eg, Bartlesman and Doms 2000 for a review of the literature). Firm heterogeneity, and the distribution of firms within the economy are key to understanding the

channels through which economic and policy changes are transmitted. Because changes in economic conditions may impact very differently on different types of firm depending for example on their size, R&D intensity or past experience, the distribution of impacts may be widely skewed across the economy. This has implications for welfare, but also for the estimation of aggregate effects and responses to shocks.

##### 3 Why is the LBD so useful?

The advantages that the LBD provides over past sources of micro-data are due to its three dimensional nature:

- **Length:** with eight years of firm performance data and an additional four years of detailed Customs data, the LBD provides the opportunity for looking at causal relationships, rather than simple cross-sectional associations. This is an essential element for any evaluative or predictive research.
- **Breadth:** as it contains data on all 44 economically significant firms in the New Zealand economy, the LBD can be used to provide representative statistical analysis of any relevant subsample of firms within the economy, or of the economy as a whole.
- **Depth:** the LBD provides a depth of detail on firm performance that has never before been available for New Zealand research. By linking quantitative performance data with quantitative and qualitative data on areas as diverse as innovation outcomes, ICT use and receipt of government assistance, the LBD opens the door to research on the causal impacts of a wide range of government policy areas.

Underlying the current work programme is comprehensive shipment-level data on merchandise trade, provided by the New Zealand Customs Service. Alongside details of product composition, volume, value and destination of merchandise exports, Customs forms also provide information about the currency in which the trade was denominated, whether the transaction was hedged and if so, at what rate. Such detailed data allows a greater emphasis on the actual exchange rate risk firms are undertaking when they trade, as well as permitting analysis of differences in behaviour across firms and products.

New Zealand's merchandise trade performance, including its relationship to exchange rate movements: "Exchange rate uncertainty and firms' trade" (Fabling, Sanderson and Taglioni, forthcoming); "Over the Hedge? Exporters optimal and selective hedging choices" (Fabling and Grimes, 2008b); "The Evolution of Export Unit Values: Some stylised facts" (Fabling, Joyce and Sanderson, forthcoming); and "Export Market Choices of New Zealand Firms" (Fabling, Grimes and Sanderson, 2008). Section 4 outlines the Reserve Bank's ongoing micro-economic research programme in this area.

## 2 How might exchange rate movements affect firm-level trade?

Exporting is a risky business at the best of times. Entering new export markets can impose substantial costs on firms – understanding foreign demand, negotiating country-specific regulations and setting up distribution networks – yet the majority of new export relationships fail to stretch beyond their first year (Fabling and Sanderson 2008). Figure 1 plots the Kaplan-Meier survival functions for entering exporters and for new trade relationships.<sup>1</sup> These survival functions

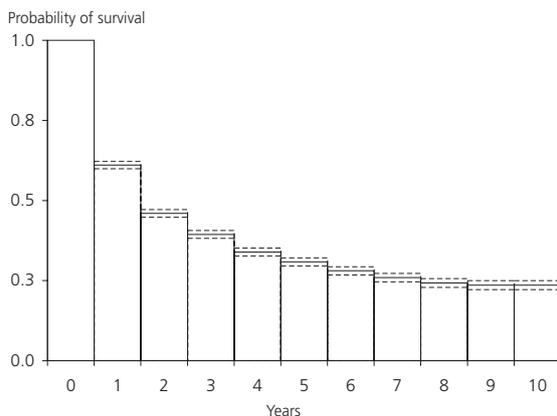
show the probability of a new trade relationship surviving for a given number of years.

In both cases, failure rates in the first year are very high, with only 36 percent of new relationships lasting more than one year. At the firm-level, roughly 60 percent of firms are still exporting after one year.

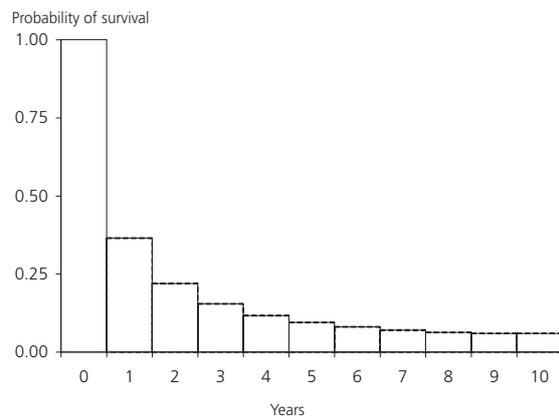
Although learning to manage exchange rate risk is just one of a myriad of skills that new exporters need to come to grips with, exchange rate fluctuations can have substantial impacts on the incentives firms face to engage in international trade. Exchange rates affect both the cost of imported intermediate inputs, and the prices that firms receive for their export goods. For a firm that has entered into a contract to supply or purchase goods at an agreed foreign currency price, exchange rate volatility can create risk since the firm may find that the New Zealand dollar value of the transaction has changed by the time payment is made. In the longer-term, real appreciation of the New Zealand dollar raises the relative price of New Zealand goods for foreign consumers, inhibiting export opportunities, while long-term real depreciation raises the real cost of imported inputs, increasing production costs.

Figure 1  
Export survival functions

### *Firm-level export survival*



### *Relationship-level export survival*



<sup>1</sup> Trade relationships are defined at the firm-country-product level. For example, a firm exporting toasters to Australia for the first time would count as a new trade relationship, and the relationship-level survival function would be based on the number of consecutive years that firm continued to export that product to that country. In contrast, the firm

level survival function refers to the number of consecutive years over which a first-time exporter exports, regardless of the product and destination composition of those exports. We do not consider here the survival of the firm itself, only the longevity of its export status.

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Exporting firms differ in both their degree of trade exposure and their ability to cope with the associated risks.<sup>2</sup> Firms that export a large share of their total sales will, *ceteris paribus*, be more exposed to currency fluctuations as foreign currency denominated sales make up a greater proportion of their overall earnings. However, a wide range of firm-specific factors can act to exacerbate or ameliorate the risks associated with exchange rate volatility. If a firm is already in a fragile economic position, unexpected variation in its export income may be the last straw. On the other hand, firms with a diverse range of international operations may feel little or no effect from exchange rate movements, as decreased profitability in one part of their operations may be offset by higher returns in other areas. Also, firms with substantial market power may have greater ability to pass exchange rate movements through into prices, creating a buffer between exchange rate movements and export receipts. Finally, firms may take direct actions to reduce the extent of exchange rate volatility they face by using forward or options contracts to hedge their foreign exchange exposures.

The extent to which firms can mitigate the effect of exchange rate movements depends also on the magnitude and frequency of currency fluctuation and the length of the contract horizon. In the short run, over which costs of production and market prices can reasonably be assumed to remain stable, firms face transactions risk from the volatility of nominal exchange rates due to the time delay between entering into a contract and settling it. Measures such as hedging or denominating exports in the domestic currency provide a simple, low-cost way to gain certainty about returns in the face of such short-term volatility.

In the longer run, however, firms must make production and investment decisions that take into account changes in relative prices over time, as well as movements in the nominal exchange rate. These risks are much more difficult to manage. While firms could, in principle, use long-term forward contracts to reduce uncertainty about exchange rate movements, locking in a long-term foreign exchange

contract can be expensive, as long-term forward exchange markets are very illiquid or non-existent, and can even increase risk. In particular, where there is some uncertainty about future export revenues (as is likely to be the case beyond the current contractual horizon) firms may find that by committing to sell a certain amount of foreign currency in the future they have unintentionally taken on additional risk if the anticipated foreign sales do not eventuate. Similarly, a firm that locks in a nominal exchange rate contract to cover future foreign currency transactions may find that even if the sales do eventuate, the real value of the hedged nominal rate has been eroded by differential inflation rates. For example, if prices rise more rapidly in New Zealand than elsewhere, exporting firms may find that their hedged export revenue is not enough to cover rising production costs. While hedging has reduced the exchange rate risk the firm faces, it may have increased the degree of inflation risk, by preventing the exporter from benefitting from any compensating depreciation in the local currency (see Brookes et al. 2000 for further discussion).

### 3 What have we learnt so far?

#### New Zealand merchandise exporters appear to be 'currency-takers'

Central to the question of whether short-term exchange rate volatility has a detrimental effect on the profitability of exporting is the issue of whether firms are able to choose the currency in which trades are denominated. If firms are 'currency-setters', the impacts of short-term exchange rate volatility can be eliminated simply through choosing to denominate all exports in New Zealand dollars (though this does not eliminate longer-term economic exposure).

Evidence from micro-data strongly suggests that New Zealand firms are not able to freely choose the currency of denomination for exports. *Prima facie* evidence that firms are currency-takers can be gathered from the large proportion of firms that institute direct forward hedging – between 2005 and 2007 around 65 percent of non-NZD export value and 55 percent of non-NZD transactions were hedged (Fabling and Grimes 2008a). If firms could costlessly set export prices in NZD, there would be no reason for the

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<sup>2</sup> Das, Roberts and Tybout (2007) develop a structural model of export supply which takes into account firm heterogeneity and sunk costs of export market entry to model the effect of exchange rate depreciation using firm-level data from Colombia.

use of financial derivatives.

Further, if firms were able to reduce exchange rate risk by choosing the currency of trade, we would expect to see a negative correlation between the relative exchange rate volatility faced by a firm and the share of exports that that firm denominates in foreign currencies, as firms trading with volatile countries would choose to denominate a greater share of trade in NZD. However, there is in fact a mildly positive correlation (of 0.092), consistent with firms predominantly having the currency of trade imposed upon them (Fabling, Sanderson and Taglioni, forthcoming).

Fabling and Grimes (2008a) find that this result carries over with respect to the level of the exchange rate, as well as exchange rate volatility. They find that the proportion of trade with Australia denominated in AUD does not vary systematically with the bilateral exchange rate. This suggests that, even when exporting to Australia, firms are not able to manipulate the currency choice to take advantage of exchange rate movements.

### A focus on bilateral exchange rates with the destination country fails to reflect the realities of (short-term) exchange rate risk

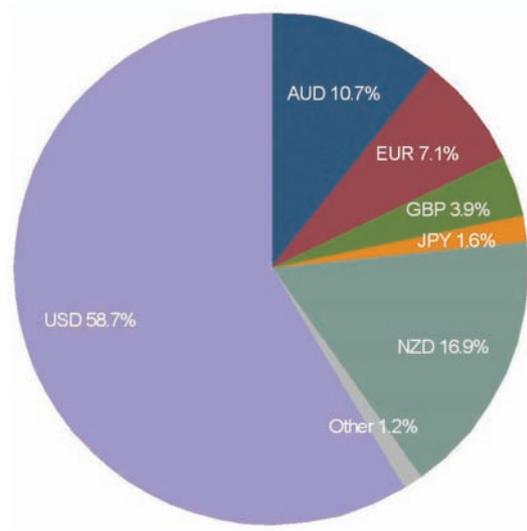
Although we have shown that New Zealand exporting firms are not, in general, currency-setters, this does not imply that trade always takes place in the currency of the importing country. Rather, a substantial proportion of trade takes place in 'vehicle currencies' – major currencies other than those of the importing or exporting countries. The use of vehicle currencies is most pronounced in trade with China, where over 80 percent of New Zealand exports are denominated not in New Zealand dollars or yuan, but in US dollars. Figure 2 compares merchandise trade shares by destination and currency of trade.<sup>3</sup>

<sup>3</sup> Goldberg and Tille (2008) examine the relationship between invoice currency, the degree of product heterogeneity, and various characteristics of the exporting and destination countries. They find that relative country size is an important determinant of the choice of invoicing currency, with the currency of the larger trading partner being the more common choice of invoice currency for trade in either direction, and that homogeneous goods are more likely to be invoiced in a vehicle currency (generally the USD). Given these results, it is unsurprising that New Zealand has a relatively low share of exports invoiced in the domestic currency and a high share of USD denominated exports.

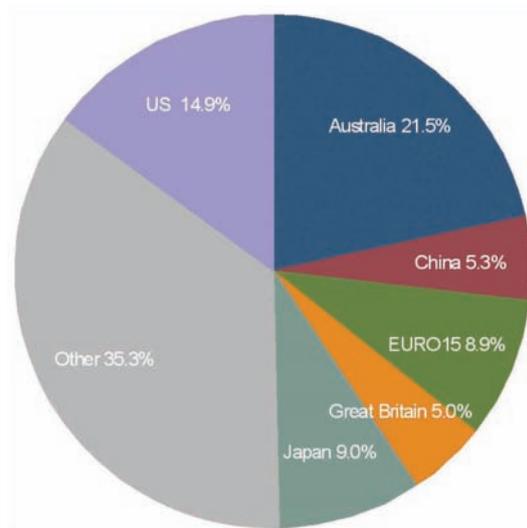
Figure 2

### Aggregate 2007 trade shares by destination and currency of trade

(a) Currency shares of aggregate trade



(b) Destination shares of aggregate trade



When the possibility of exchange rate hedging is also taken into account, it becomes clear that any analysis of the trade impacts of exchange rate volatility must recognise not only the impact of longer-term real appreciations and depreciations in the bilateral exchange rate on relative purchasing power, but also shorter-term volatility in the currency of trade and the prevalence of exchange rate hedging. The relevant measure of exchange rates will depend on the time-frame we are interested in – volatility in the currency of trade will affect the realisation of short-run returns for exports where contractual prices

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are denominated in foreign currencies, while bilateral real exchange rates will influence longer run demand and investment decisions.<sup>4</sup>

### **Firms react to exchange rate volatility both by reducing their trade exposure and hedging the exposure of their trade**

#### *Short-term exchange rate volatility impacts on the extensive and intensive margins of exports...*

One of the clearest benefits of using micro-data to look at exchange rate impacts is that it allows researchers to consider not only the aggregate impacts of exchange rate movements, but also differential effects on firms with different characteristics or in different parts of the economy. This is important in order to understand the distributional impacts of exchange rate movements and also to better predict effects on aggregate export value. For example, the largest one percent of firms account for around 60 percent of merchandise exports, while small firms make up 45 percent of exporters but a mere two percent of export value (Fabling, Sanderson and Taglioni, forthcoming). Because exports are so concentrated, if exchange rate impacts are felt most heavily by small firms increased volatility may have a severe effect on a large number of firms without having a noticeable impact on aggregate export receipts. In contrast, if all firms are affected proportionally by exchange rate movements the impact on aggregate trade will be much stronger.

Perhaps because the effects of volatility may differ across firms, macroeconomic theory and evidence has failed to reach a consensus on the relationship between exchange rate volatility and aggregate trade performance. Early literature found everything from substantially negative to mildly positive impacts of volatility on trade (IMF, 1984; Côté 1994). More recent literature suggests that there may be a negative impact, but this is likely to be small or even insignificant (eg, see Schmidt-Hebbel, 2006).

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<sup>4</sup> Coleman (1988) considers the issue of whether prices of agricultural commodities are not only denominated but also priced in major third-country currencies, and hence whether exchange rate indices based on destination-weighted exports misrepresent the agricultural sectors foreign exchange exposure.

The impact of short-run volatility on aggregate and firm-level exports is examined in Fabling, Sanderson & Taglioni (forthcoming). Using a standard gravity model of trade, we consider the effect that month-on-month volatility has on both the probability that firms will export to a given market, and the value of bilateral exports among remaining exporters. We find that short-run volatility in the trading currency has an adverse effect on both the extensive (number of exporting firms per market) and intensive (value of exports per exporting firm) margins, but find no evidence of a significant impact at the aggregate level.

Further, we show that the aggregate effect on bilateral exports is masked by compositional differences in the pool of firms that export to each market. Small firms self-select out of more volatile markets leaving only the larger, more experienced exporters, pushing up the average level of export receipts per firm.

Turning to a firm-level analysis, however, we find that when using a measure of volatility that accounts for hedging behaviour to more closely replicate the actual level of volatility faced by the firm and controlling for both country- and firm-level characteristics (eg, size, capital intensity), exchange rate volatility does have an effect on bilateral exports at the firm-level. Countries exhibiting a 10 percent higher level of residual exchange rate volatility receive on average six percent less exports by value per exporting firm.<sup>5</sup> Future work will delve more deeply into whether this finding is consistent across firms with different characteristics.

#### *...and on the margins of trading firms, through incomplete pass-through.*

The extent to which firms may be hurt (or helped) by movements in the exchange rate depends in part on their ability to re-set prices in order to neutralise (or benefit from) exchange rate movements. Fabling, Joyce and Sanderson

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<sup>5</sup> Volatility in this instance is based on the standard deviation of the month-on-month changes in nominal exchange rates between the NZD and the currency of trade over the prior 36 months. The currency-level volatility is set to zero for trade denominated in NZD or trade which has been hedged. This is aggregated to the firm level by weighting each export shipment by its share in firm-level trade.

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(forthcoming) provide some initial descriptive analysis of the dispersion and evolution of export unit values across firms and over time.<sup>6</sup> As unit values can be observed for detailed product classification, firm, destination and currency of invoice, it is possible to distinguish with reasonable confidence between real changes in prices and changes due to compositional differences in products and destinations. Such controls are important, since we show that firms often trade the “same” product to multiple countries at very different prices — differences that are only partially explainable by trade costs.

We find that unit values of export goods adjust frequently over time, and that movements in unit values are consistent with New Zealand firms being price-takers in a foreign currency. Unit values do not adjust one-for-one with currency movements ie, exchange rate pass through is incomplete. As a consequence, there is greater volatility in the New Zealand dollar equivalent export receipts of firms denominating in foreign currencies than for firms that denominate their trade in the New Zealand dollar. This implies that firms are not able to fully compensate for exchange rate movements by altering prices, a result which fits well with earlier research showing that New Zealand firms actively manage foreign exchange risk in ways that suggest short-run currency movements have implications for their bottom line (Fabling and Grimes 2008b, discussed below).

#### *Longer term fluctuations also appear to depress trade*

While short-run volatility is clearly a factor in explaining bilateral trade behaviour, the impact of longer run appreciations and depreciations are harder to tie down. However, preliminary evidence suggests a moderate effect of exchange rate appreciations on firm-level trade.

Alongside the focus on exchange rate volatility, we also consider the impact of New Zealand dollar appreciations by looking at the relationship between exports and the deviation of the bilateral exchange rate from its average over the prior

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<sup>6</sup> Unit values are calculated at the monthly level, taking the total value of shipments of a given product during that month and dividing by the number of units (eg kilograms, litres).

36 months (Fabling, Sanderson and Taglioni, forthcoming).<sup>7</sup>

We find that the relative level of the bilateral exchange rate has little or no significance for predicting either aggregate trade or the number of firms in a given market, but that after controlling fully for firm characteristics, there is some evidence that a high New Zealand dollar suppresses the volume of trade in firm-level export relationships. Further work is required to ascertain whether this is due to firms shifting exports between markets or whether exchange rate appreciations actually reduce the total value of exports per firm.

Similar results are found in Fabling, Grimes and Sanderson (2008), which focuses on the determinants of entry into new export relationships. While this paper is focused on the relationship between own-firm international experience, learning from the behaviour of other firms and entry into new markets, preliminary results suggest that the relative level of the exchange rate also plays a part in determining firms’ export market entry choices. This effect appears to be asymmetric across appreciations and depreciations, with a low New Zealand dollar having a greater stimulatory effect on new market entry than the negative effect of an appreciation of similar size. As part of our ongoing work programme we intend to test the robustness of these findings further, and to consider the parallel impacts of exchange rate levels on exit from existing trade relationships.

#### *Firms instigate hedging contracts to directly mitigate short-term risk*

As noted above, the effect of exchange rate movements on firms’ trade behaviour depends not only on the severity of the volatility, but also on the firm’s ability to accept or to mitigate the associated risks. Focusing on trade between New Zealand and Australia, Fabling and Grimes (2008b)

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<sup>7</sup> Although ideally we should use real exchange rate measures to consider exchange rate movements over a longer time horizon, reliable price indices are not available for many of New Zealand’s smaller export destinations. The measure of the relative exchange rate used here is therefore constructed using nominal exchange rates. Empirically, this appears to be a reasonably safe approach, as correlation between monthly real and nominal exchange rates for those countries which have both available are well above 0.95 over the period 1999-2007.

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consider the relationship between firm characteristics and one specific option that firms have for mitigating exchange rate risk - exchange rate hedging. The early theoretical finance literature (eg, Modigliani and Miller, 1958) suggested that (under certain assumptions) if shareholders and debtholders are able to access the same financial products as firms, then alternative financing policies should have no effect on firm value. On that basis, exchange rate hedging by the firm should provide no additional benefit to the firm's owners, and hence if hedging incurs a cost (eg, administrative or transactions costs) then it must be inefficient. However, the empirical literature makes it clear that many firms do hedge at least some of their exchange rate (and other) risks. The theoretical literature has in turn caught up with the observed empirical realities, identifying circumstances in which firms may find it optimal to hedge.

Fabling and Grimes (2008b) explore the determinants of optimal exchange rate hedging, and find that the state of a firm's balance sheet, managerial incentives and investment opportunities are among a range of factors that can affect a firm's willingness to accept exchange rate risks. Firms that are highly leveraged, or which are likely to have need of internal financing for reinvestment are more likely to hedge against exchange rate risks than firms with a less constrained cashflow situation. Similarly, those firms which face a convex tax schedule due to a tax-loss carry-forward also exhibit higher hedging propensities. Meanwhile, hedging propensities are lower among those firms which have certain types of natural hedges in place including those which export in a range of currencies or that import from a range of countries.<sup>8</sup>

Further, Fabling and Grimes (2008b) find that although hedging is more common among large firms than smaller firms, this difference can be fully explained by the greater likelihood of firms having past hedging experience. Thus, the difference in hedging rates between small and large appears to reflect a greater ability of large firms to carry the fixed costs associated with learning to hedge and setting

up systems for managing exchange rate risk, rather than anything specific to the size of the firm.

#### ***But not all hedging behaviour is risk mitigation***

While Fabling and Grimes (2008b) find evidence for optimal hedging strategies which reflect the risk set of the firm, they also find evidence for firms attempting to beat the market. Unless firms believe they have greater knowledge of future exchange rate movements than the rest of the market, optimal hedging theories suggest that after controlling for changes in the firms' characteristics, there should be no reason for firms to hedge more when exchange rates are low than when they are high. Rather, hedging practices should reflect solely the degree of risk aversion of the firm, not beliefs that the exchange rate is too high or too low.

However, Fabling and Grimes (2008b) find evidence that firms do attempt to time the market – specifically, hedging propensities are higher (lower) when the NZD is below (above) its historical average, implying that firms are attempting to lock in favourable exchange rates. Selective hedging is prevalent across a wide range of firms and economic conditions, but is somewhat more prevalent among firms which rely less heavily on exporting as a share of sales – perhaps reflecting a less developed understanding of exchange rate markets.

## **4 What next?**

A fuller understanding on the impact of exchange rate movements on firm trade behaviour can help the Reserve Bank to better predict the impacts of policy changes on aggregate economic conditions and understand the longer run impacts of monetary policy on economic performance. This work is expected to complement, and in some cases clarify, the results of ongoing macroeconomic research. While the research outlined above provides some useful areas for consideration, we do not yet have the complete picture. For example, the finding that exchange rates have an impact on trade behaviour does not necessarily imply a negative impact on firm financial performance or profitability. Ongoing Reserve Bank research using the LBD looks at the question of whether exporting, and entry into new markets in particular, has a positive impact on firm performance,

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<sup>8</sup> **Importing from a range of countries is used as an imperfect proxy for importing in a range of currencies, as currency data on imports is only available for a very limited time period.**

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through increasing size or improved productivity. Future work in this area will also include an examination of the determinants of exit from export markets, including the question of whether firms that begin exporting when exchange rates are favourable tend to drop out if the New Zealand dollar appreciates.

The development of the LBD presents research opportunities well beyond issues of exchange rates and export behaviour. Other issues we might consider include the effect of inward direct investment on firm performance and worker outcomes, the extent of nominal wage rigidity in the New Zealand firms, and the effect of macroeconomic shocks on firm outcomes. In some areas, the LBD provides opportunities to extend the international literature in new directions, due to the depth of information available. At the same time, it allows us to test whether findings in the international literature are applicable to the New Zealand economy. The Reserve Bank anticipates that micro-economic analysis using this data will continue to enhance our understanding of the economy, complementing ongoing macro-economic research.

## References

- Altissimo, F, M Ehrmann and F Smets (2006), Inflation persistence and price-setting behaviour in the euro area – a summary of the IPN evidence, *Occasional Paper Series No. 46*, European Central Bank.
- Bartlesman, E and M Doms (2000) Understanding productivity: Lessons from longitudinal microdata, *Journal of Economic Literature* 38(3), pp.569-94.
- Bils, M and P Klenow (2004) Some evidence on the importance of sticky prices, *Journal of Political Economy* 112, pp 947-985
- Brookes, A, D Hargreaves, C Lucas and B White (2000) Can hedging insulate firms from exchange rate risk? , Reserve Bank of New Zealand *Bulletin* 63(1), pp. 21-34.
- Coleman, A (1988) The Effect of Currency Movements on Agricultural Commodity Prices. 1980-1987, Reserve Bank of New Zealand *Discussion Paper* G88/6.
- Coleman, A and Ö Karagedikli (2008) The relative size of New Zealand exchange rate and interest rate responses to news, *Reserve Bank of New Zealand Discussion Paper* DP2008/12.
- Côté, A (1994) Exchange rate volatility and trade: a survey , Bank of Canada *Working Paper* 94-5.
- Das, S, M Roberts and J Tybout (2007), Market Entry Costs, Producer Heterogeneity and Export Dynamics , *Econometrica* 75(3), pp. 837-873.
- Delbrück, F, A Dunstan, D Hargreaves, A Lienert, H Pepper and C Sleeman (2008) The evolution of the forecasting and policy system (FPS) at the Reserve Bank of New Zealand, *Reserve Bank of New Zealand Discussion Paper* DP2008/19, December 2008.
- Drew, A, Ö Karagedikli, R Sethi and C Smith (2008) Changes in the transmission mechanism of monetary policy in New Zealand , *Reserve Bank of New Zealand Discussion Paper* DP2008/03, February 2008.
- Fabling, R, A Grimes, P Stevens and L Sanderson (2008) Some rise by sin and some by virtue fall: firm dynamics, market structure and performance, Ministry of Economic Development *Occasional Paper* 08/01.
- Fabling, R and A Grimes (2008a) Do exporters cut the hedge? Who hedges and why, Ministry of Economic Development *Occasional Paper* 08/02.
- Fabling, R and A Grimes (2008b) Over the hedge? Exporters optimal and selective hedging choices , Reserve Bank of New Zealand *Discussion Paper* DP2008/14.
- Fabling, R, S Joyce and L Sanderson (forthcoming) The evolution of export unit values: some stylised facts, forthcoming Reserve Bank of New Zealand Discussion Paper.
- Fabling, R and L Sanderson (2008) Entrepreneurship and aggregate merchandise trade growth in New Zealand , paper prepared for the 11th McGill International Entrepreneurship Conference, University of Otago Centre for Entrepreneurship, Dunedin, New Zealand, 5-6 December 2008.

- 
- Fabling, R, A Grimes and L Sanderson (2008), 'Export market choices of New Zealand firms', paper presented at the Comparative Analysis of Enterprise Data Conference, Budapest, Hungary. May 22-24 2008. Revised version forthcoming as a *Reserve Bank Discussion Paper*.
- Fabling, R, L Sanderson and D Taglioni (forthcoming) 'Exchange rate uncertainty and firms trade', *Reserve Bank of New Zealand Discussion Paper*.
- Goldberg, L and C Tille (2008) 'Vehicle Currency Use in International Trade', *Journal of International Economics* 76, pp. 177-192.
- Gopinath, G and R Rigobon (2008) Sticky Borders, *Quarterly Journal of Economics*, 123(2), pp. 531-575, May.
- IMF (1984) – Exchange rate variability and world trade , *International Monetary Fund Occasional Paper* 28.
- Karagedikli, Ö and P Siklos (2008) 'Explaining movement in the NZ dollar: central bank communication and the surprise element in monetary policy?', *Reserve Bank of New Zealand Discussion Paper* DP2008/02.
- Klenow, P and J Willis (2006), 'Sticky information and sticky prices, Federal Reserve Bank of Kansas City', *Research Working Paper* 06-13.
- Lees, K (2009) 'Introducing KITT: the Reserve Bank of New Zealand's new core macroeconomic model', Reserve Bank of New Zealand *Bulletin* 72(2), June 2009.
- Modigliani, F and M Miller (1958) 'The cost of capital, corporation finance and the theory of investment', *American Economic Review*, 48(3), pp. 261-297.
- Munro, A and R Sethi (2007), Understanding the New Zealand current account: a structural approach, *Reserve Bank of New Zealand Discussion Paper* 2007/10
- Schmidt-Hebbel, K (2006) 'New Zealand's monetary and exchange rate policy in international comparison', in Buckle, R. And A. Drew (2006) eds. *Testing Stabilisation Policy Limits in a Small Open Economy: Proceedings from a Macroeconomic Policy Forum*.
- Statistics New Zealand (2007) 'Improved Business Understanding via Longitudinal Database Development (IBULDD): Potential outputs from the Longitudinal Business Database', Statistics New Zealand, Wellington.
- Smyth, N (2009) 'Order flow and exchange rate changes: A Look at the NZD/USD and AUD/USD', *Reserve Bank of New Zealand Discussion Paper* DP 2009/03, April 2009