

The impact of the global crisis in Central European countries and lessons for and from New Zealand

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Abstract

The global crisis that began in 2007 spread itself to almost all countries of the world, but the way it manifested itself varied from country to country, reflecting features of local economic conditions. There are a number of similarities between the economic conditions applying in New Zealand and those applying in a number of the new EU member states in Central and Eastern Europe (particularly those that joined the EU in 2004 and subsequently). These include, in many cases, foreign ownership of banks, rapid expansion of credit, and significant current account imbalances which have been funded by inflows of funds to the banking system. In general, the consequences of the crisis were more severe in the new EU countries than they were in New Zealand, and it is useful therefore to look at the experiences in the different countries to try and understand the reasons for the different outcomes and look to see what lessons may be learned. Some of these are a consequence of New Zealand having had greater experience since deregulation, but there are also lessons that New Zealand can learn from the experience of the new EU members, particularly those such as the Czech and Slovak Republics that were less severely impacted. Another factor having an impact on recovery from the crisis is in currency relationships, with Slovenia and Slovakia being members of the Eurozone, Estonia joining it, and some other countries in fixed exchange rate relationships. This has implications for the discussions that occur from time to time on the possibility of a single currency between New Zealand and Australia, which might potentially include other countries in the Asia-Pacific region.

Keywords: global financial crisis, macroprudential indicators, foreign ownership of banks, Czech Republic, New Zealand

JEL codes: F15, F31, F36, G21

1. Introduction

The global financial crisis that spread from the sub-prime difficulties in the United States has had some severe negative consequences, but it has also had some welcome outcomes. Not the least of these has been the opportunity for academics, policy-makers and practitioners to reacquaint themselves with negative financial and economic events. Although there had been some smaller economic downturns during the period since the end of World War II, the financial crisis of 2007-09 has generally been acknowledged as the most severe since the great depression of the 1930s.

One of the laboratory-type effects of the financial crisis has been in observing the different ways in which the financial crisis has had its effects in different countries and groups of countries. This has generally been a reflection of the different economic and financial policy settings and conditions applying in those countries prior to the crisis, which have meant that comparable shocks have not necessarily led to the same outcomes. The different conditions include different currency arrangements, and useful lessons may be learned relative to both fixed and floating exchange rate regimes. This is important from the New Zealand perspective because of the periodic suggestions that New Zealand should join Australia in a single currency¹, and speculation about the continuing future of the Euro as a multinational currency

This study reports a comparison and contrasting of the effects of the crisis on a small group of countries which display some similarities in their economic and financial structures, despite major differences in their geographies. By investigating and discussing these we generate some insights into the consequences of the special features of the crisis in different environments. We learn something of the risks and benefits associated with different economic and financial structures. This has the potential to inform policy-makers in those and other countries of some of the consequences of economic shocks in a range of different contexts, and thus to guide future policy-making. They may be able to learn something of how they can limit the flow-on effects of financial and economic difficulties in the future.

The countries that we include in the study are the 10 countries of Central and Eastern Europe that have joined the European Union in 2004² and subsequently, plus New Zealand. The common characteristic of the European group of countries is that they were all, at one time, behind the iron curtain that split Europe in the days of the cold war, but they otherwise show significant disparities in terms of income and wealth, and on a range of other measures. These countries generally began a transition to capitalist economic frameworks around 1990, with the relevant processes now generally complete.

It may not be obvious, given that background, as to why or how New Zealand belongs with such a group of countries. New Zealand's inclusion can be justified on the grounds of its having also undergone a transition, in the mid 1980s, from having a relatively controlled economy (Evans et al, 1996), but there are other similarities as well. Like many of our countries of new Europe, New Zealand's financial system is small compared to those of the larger countries that influence it, and it also has a banking system that is predominantly foreign-owned.³ Although New Zealand's levels of income per capita are higher than all our group of European countries (Slovenia is next highest), issues around the structure and composition of financial systems have led to some similar consequences from the global financial crisis. The story in this study arises from the differences in countries' financial systems and in the relationship of those financial systems to the rest of the world, which mean that the financial crisis has had different consequences in different countries. We have also seen different solutions applied, leading to differing outcomes in terms of recovery. It seems that the size of

1 See, for example, Grimes & Holmes (2000).

2 Like Berger (2007), we omit Cyprus and Malta from the set of European countries studied as, although they joined the EU in 2004, their economies are different and they were not "in transition".

3 See Berger (2007).

the current account and budget deficits and the level of inflation are all important features in this regard, and we can see comparisons with some of the longer-standing members of the Eurozone which got into difficulty in 2010.

The paper continues as follows. In the next section we review and report on some of the previous research that has looked at these economies, and which has discussed some of the issues to which they are exposed. A particular issue here is in the benefit or otherwise of having foreign-owned banks. Section 3 looks in more detail at the relevant economic data for the countries involved in our study, which provides a background to the new macro-vulnerability index that we discuss in Section 4. Section 5 looks at some of the lessons that can be learned from the crisis and from responses to it, with a particular focus on New Zealand. Section 6 concludes.

2. Prior research

The issues that underpin this paper, in terms of financial interrelationships being a breeding ground for crises, are not new. Once we started to have globalised financial markets, events in one country could find numerous ways to impact on events in other countries, through a multiplicity of transmission channels.

A key element in the globalisation of financial markets has been in the foreign ownership of banks, prior research on which has focused on a number of different strands. One set of studies has looked at the reasons why banks expand overseas, from home country and host country perspectives. Tripe & Matthews (2003) summarised this by describing six core theories, and noted that, even in looking just at the four major Australian banks, no single theoretical explanation appeared to dominate. To & Tripe (2001) failed to find a single tidy explanation for foreign banks' involvements in the New Zealand market, beyond suggesting that there seemed to be a group of longer established banks with different relationships to their host country market from that which applied to more recent arrivals. Further insights into this were reported by Tripe et al (2009), who found a distinct difference in recognition as foreign between the longer established foreign banks and the more recent arrivals.

This relates to the discussion of Tschoegl (1987) on the international expansion in retail banking, which became much more significant in the 1990s and subsequently. This has generally occurred through the foreign acquisition of locally-owned banks, which has been observed both in New Zealand and the European countries which are the focus of this study. Thus Berger (2007) describes a situation where banks from large developed countries take large market shares in small nations which generally lack private sector banks. Bonin et al (2005) show that foreign-owned banks are generally more efficient in the transition economies of Central and Eastern Europe, particularly where the foreign investor has entered as a strategic investor in an existing bank.

Another problem associated with the international expansion of banks that has been the subject of prior research has been in terms of the organisational form in which the expansion is undertaken. When it comes to full banking operations, the choice is generally between operation in the host country as a branch of the parent bank, or incorporation of a subsidiary through which to conduct business in the host country market. Key considerations here may be in host country market conditions and regulator views of the consequences for bank safety and soundness: branch operations mean that the full capital of the parent bank is available to support host country operations, whereas with a subsidiary, host country regulators believe that they can protect these local subsidiaries from adverse events that may befall the parent banks. In the context of the global financial crisis, the Icelandic banks showed the danger for host country markets of branch operations, whereas the difficulties in Argentina in 2001 showed how operations in host countries could be abandoned by their parents.

This leads us to yet another strand of research and investigation into foreign-owned banks: to what extent do foreign-owned banks help or harm the financial markets of the countries into which they expand? Foreign banks may be perceived as bringing greater stability to the markets into which they expand, with this argument supported by research looking at Argentina and Mexico (Dages et al, 2000). Foreign banks may also facilitate the introduction of new, more efficient technologies (Berger & Udell, 2006), and they may be able to reduce costs through an ability to achieve scale economies. On the other hand, foreign banks may be less effective at directing credit to small firms because of less

extensive networks (although where they have acquired existing firms, this should be less of a problem).

Yet another factor is banks' exposure to international financial markets, in that we have seen how the losses incurred by banks in foreign markets can weaken their capital positions for lending into other markets that were otherwise unaffected. Popov & Udell (2010) outline a process whereby falling house values in the USA weakened the balance sheets of Austrian, Belgian and Italian banks which had invested in securities based on those mortgages. This forced those banks to tighten credit standards in their subsidiaries in Slovakia.

Another side of this is that the higher credit ratings of foreign banks (which are generally shared by their subsidiaries in other countries) give them greater capacity to draw in funds from other sources to boost funds available for lending. Foreign subsidiaries are thus able to increase their lending to levels beyond what would be available through purely domestic bank funding. This may be seen as contributing positively to credit availability, although it is sometimes perceived as having allowed excessive credit expansion.

Trade flows made a contribution to the spread of the crisis, as exporters faced reduced sales and thus incomes. Countries with high levels of exports thus faced significant downturns in income, and this was a major factor in the spread of the GFC into countries in South East Asia. These effects would be expected to differ according to the currency regime – countries with fixed exchange rates would be expected to be impacted more severely than countries with floating exchange rates, as under floating rates some of the shock of reduced export sales should be absorbed through the exchange rate.

3. Local economic conditions of CEE and New Zealand

In this part we discuss local macroeconomic conditions of CEE countries and New Zealand.

3.1 CEE

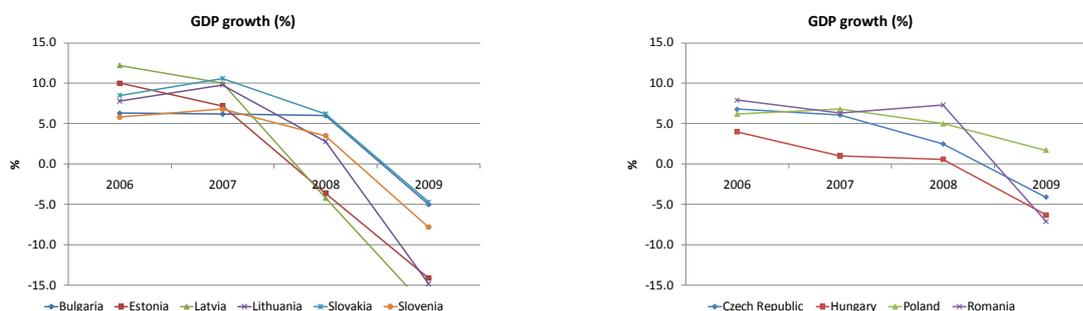
We have divided CEE countries (or new EU-10 countries) into two groups according to their currency regimes:

1. New member states (“NMS Floaters”) - New member states (NMS) using floating exchange rates floaters (Czech Republic, Poland, Hungary and Romania)
2. New member states (“NMS Fixers”) - New member states (NMS) using the Euro (Slovenia and Slovakia) crawling peg (Latvia) or currency boards (Bulgaria, Estonia, and Lithuania). Note that countries joining the Euro have generally been required to adhere to fixed exchange rate regimes (relative to the Euro) to establish their eligibility.

There are a number of similarities between the economic conditions applying in New Zealand and those applying in a number of the so-called new EU member states in Central and Eastern Europe (particularly those that joined the EU in 2004 and subsequently). These include, in many cases, foreign ownership of banks, rapid expansion of credit, and significant current account imbalances which have been funded by inflows of funds to the banking system. However, different CEE countries reported different pre-crisis macroeconomic fundamentals what affected economic and financial performance of these countries during the global crisis. In the following part we discuss main macroeconomic and financial markets' indicators for CEE:

- GDP decline in 2009
- foreign ownership of banks
- rapid credit growth
- current account imbalances
- loan-deposits ratios
- increasing government debt-to-GDP ratio.

Figure 1: Economic performance of CEE countries in the period 2006-2009⁴



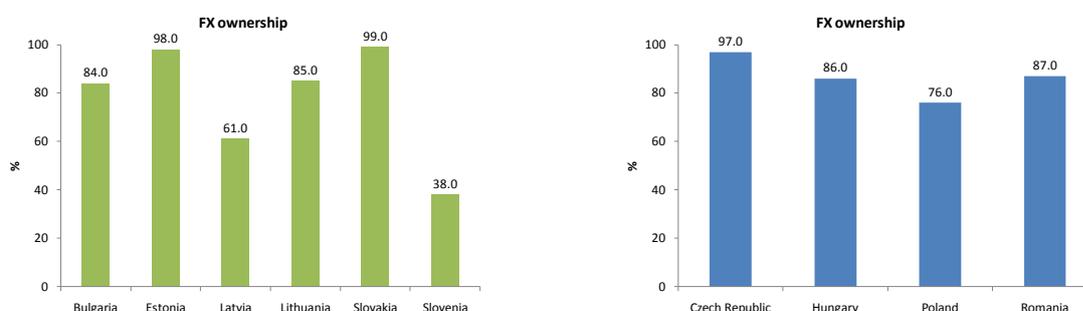
Source: FITCH (2010)

Foreign ownership of banks

In early 2000s privatizations of banks in CEE was finished and all main CEE banks came into foreign ownership. As a result, many European banking groups such as UniCredit, Raiffeisen, Erste, KBC or Société Générale entered this market and enjoyed high dividends from their subsidiaries in the pre-crisis period. However, this parent-subsiary relationship showed to be a double-edge sword during the crisis, when some CEE banks suffered losses and their parent banks had to fund them (e.g. Raiffeisen Bank in Hungary). On the other hand, some CEE banks with strong deposit base helped their Western parent banks with funding during the crisis (e.g. Erste Group, an Austrian bank, was funded by its Czech subsidiary Ceska sporitelna).

Figure 2 shows a high degree of foreign ownership of CEE banks for both Groups A and B; while Estonia, Slovakia and the Czech Republic posted the highest shares reaching almost 100%, Slovenia reported the lowest share around 40%. See Bonin (2010) for a more extensive review of the foreign ownership of banks in these economies. In terms of the theoretical issues canvassed in the previous section of this paper, it should be noted that foreign entry has largely been undertaken by acquisition of existing operations, rather than by greenfields establishment of new ones.

Figure 2: Foreign ownership of CEE banks in 2008



Source: FITCH (2010)

We do not in the end use this factor directly in our assessment of the macroprudential risks to which our countries are exposed. For one thing, the differences between the countries in our study are not great (with the partial exception of Slovenia), which means that it is not a distinguishing factor for the data set. The other major point is that we do not have a clear prior view as to the impact of foreign bank ownership on a country's exposure to macroprudential risks.

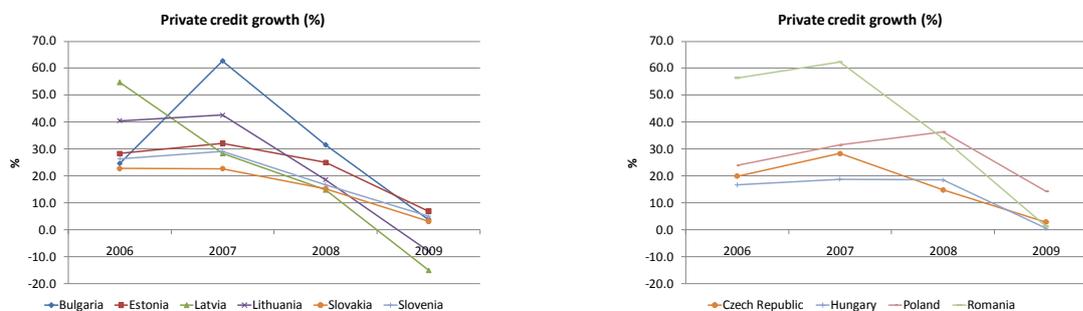
⁴ Note that the two panels in this graph (and many of those following) show countries with a fixed exchange rate regime in the left panel, and those with a floating exchange rate regime in the right panel.

Rapid expansion of credit

Rapid credit growth ranks to one of causes of a crisis typically followed by an asset-price bubble (Teplý, 2011). CEE countries saw a sharp credit growth in the 2006-2008 period (Figure 3), which was caused by several factors. First, financial intermediation in CEE is still well below EU levels and expected convergence in this respect (in terms of bank assets/GDP ratios CEE countries reach approx. 100% vs. 200% in the EU). Secondly, CEE countries experienced rapid GDP growth in the observed, which further fuelled the demand for credit. Finally, foreign-owned banks supported these countries by relatively cheap funding usually in foreign currency. Unhedged foreign-currency borrowing by households remained a key risk for both households and companies in case of currency depreciation, what materialized during the crisis. For example, in 2008 the proportion of foreign currency loans to total households amounted 90% in Estonia, 86% in Lithuania, 60% in Latvia or 57% in Hungary, where Hungarian's forint depreciation against Euro caused an approximately 30% jump in EUR-denominated mortgage instalments for some Hungarian households between August 2008 and December 2009. Not surprisingly, CEE countries saw a rapid decline of private credit dynamics in the year of 2009, when the global crisis negatively affected global economy's performance.

Figure 3 indicates that private credit growth plummeted in 2009 and even two countries (Lithuania and Latvia) reported year-on-year declines in this year.

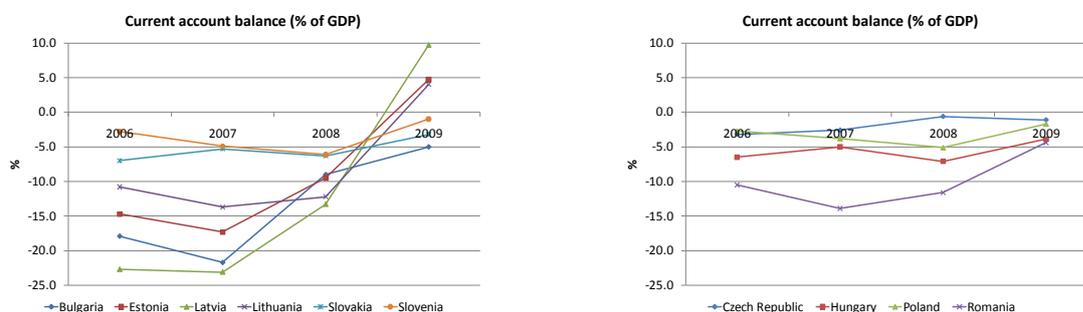
Figure 3: Credit expansion in CEE in the 2006-2009 period



Source: FITCH (2010)

A current account deficit is another measure of an economy's overheating. As CEE countries were growing rapidly, their balance of payments current account showed huge deficits. Our research shows that NMS Fixers posted higher current account deficits than NMS Floaters in the pre-crisis period (Figure 4). For instance, while Baltic states' (Estonia, Lithuania and Latvia) deficits recently exceeded 15% of GDP, the Czech Republic and Poland's current account deficits oscillated up to 5% of GDP.

Figure 4: Current account imbalances in CEE in the 2006-2009 period

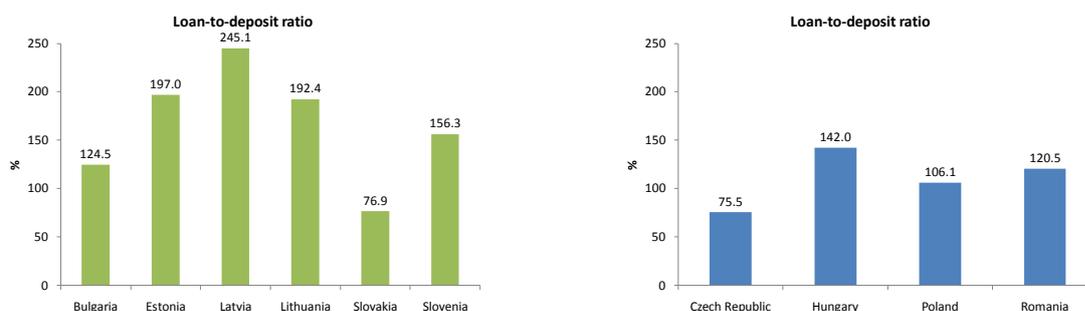


Source: FITCH (2010)

However, besides macroeconomic imbalances, the banking sectors' characteristics had important impacts on the economic performance of CEE countries. The first variable, a loan-to-deposit ratio (LTD) indicates liquidity position of a banking sector (the lower the LTD ratio, the higher

liquidity risk of the sector). If the LTD is greater than 1, loans provided by banks exceed deposits gathered from customers implying the need of financing through interbank markets, which proved to be important during the crisis. If trust among market players is weak, liquidity dries very quickly on the interbank market, putting pressure on balance sheets of banks with low LTD ratios. Figure 5 displaying the LTD ratios around CEE countries shows that on average NMS Fixers report higher LTD ratios than NMS Floaters. On one hand, Baltic states' ratios exceeded 190% in 2008; on the other hand, the Czech and Slovak banking sectors, more lightly impacted by the turmoil, reported LTD ratios under 80%.

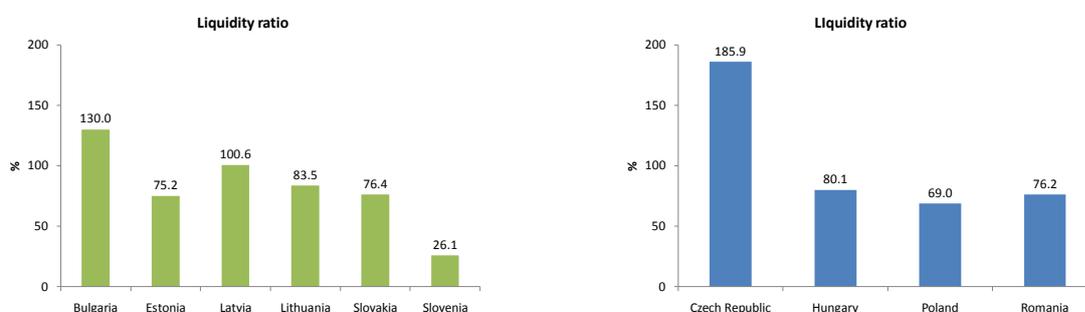
Figure 5: Loan-to-deposit ratios in CEE in 2008



Source: FITCH (2010)

Since liquidity risk materialized during the financial upheaval, we have included a second variable describing this type of risk: a macroeconomic liquidity risk ratio that seeks to assess the risk of an external liquidity crisis by expressing the level of a country's liquid external assets as a percentage of its liquid external liabilities (FITCH, 2010).⁵ A higher liquidity ratio implies a better liquidity position for a country; while the Czech Republic reported the highest ratio (185.9%) among the investigated countries, other countries such as Estonia, Poland and Slovenia posted the lowest values of this indicator.

Figure 6: Liquidity risk ratios in CEE in 2008

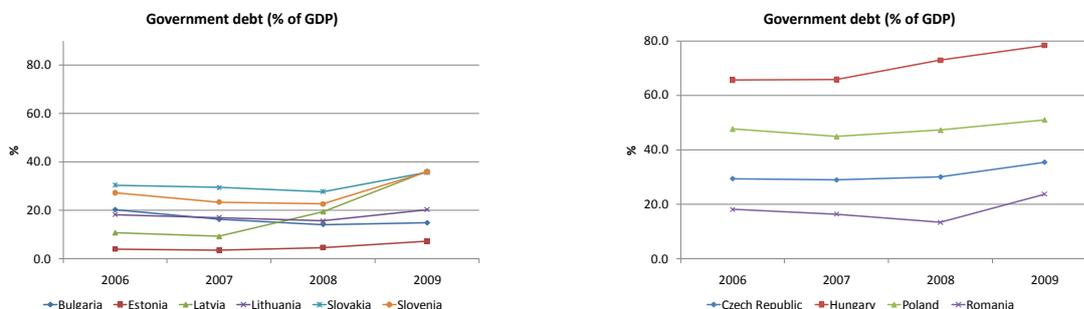


Source: FITCH (2010)

The global crisis resulted in deterioration of public finance around the world. Although a central government debt-to-GDP ratio of CEE countries sits well below the Maastricht treaty's level of 60% (except for Hungary), the dynamics of increasing government debt of these countries is alarming (Figure 7). This fact highlights the importance of public finance reforms in both NMS Fixers and NMS Floaters.

⁵ This is consistent with standard text-book approaches to country risk assessment: see, for example, Saunders & Cornett (2011)

Figure 7: Central government debt/GDP ratios of CEE countries in the 2006-2009 period



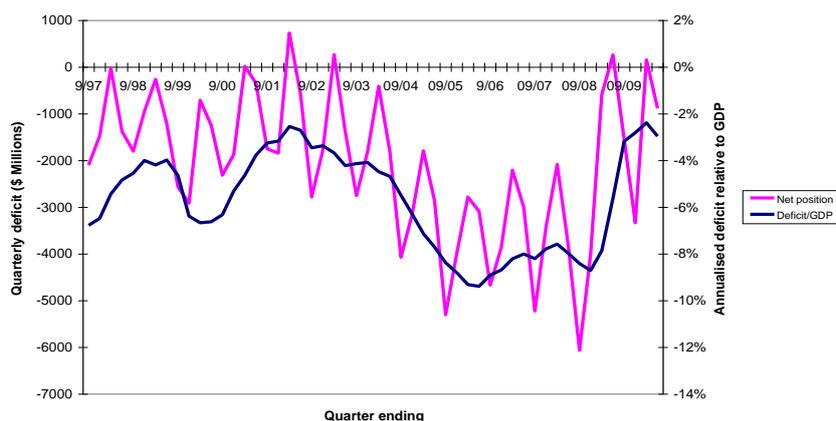
Source: FITCH (2010)

3.2 New Zealand

The New Zealand economy had already been showing the effects of the end of long felicitous period when the global financial crisis started to show its effects in 2007, and was in something of an economic downturn by the time of the Lehmans' failure and consequent negative effects for a number of countries' banking systems in September 2008. There were a number of negative features of the economy which were able to be disregarded during (previous) favourable economic conditions, but which became more important once the downturn began.

A key issue, which remains a problem for New Zealand, is the balance of payments deficit on current account, which has been persistently large, as shown in Figure 9. This has been funded by inflows of funds, much of which have been processed into the banking system, although there have also been direct sales of assets. This has in turn led to a substantial increase in New Zealand's net (negative) international investment position, which has put continuing pressure on the investment account in the balance of payments, compounding the current account problem.

Figure 8: New Zealand's balance of payments trend



Source: Statistics New Zealand, Authors' calculations

Against this there are two ameliorating factors. Firstly, the bank debt is either denominated in or hedged into New Zealand dollars, which means that the banks have very little foreign exchange risk exposure (although they have a very significant exposure to rollover risk in relation to their funding). The second ameliorating factor is that government debt is low, with the government budget having

been in surplus until the crisis started to take effect in 2008. Although there have been two years of significant deficits while the crisis has persisted, overall government debt remains relatively low.⁶

The proportion of the banking system that is foreign-owned has been falling, reflecting growth by the New Zealand-owned banks and increased numbers of these as former non-bank deposit takers achieve banking registration. The New Zealand banking system is nonetheless dominated by Australian banks, with the four major Australian banks accounting for approximately 90% of the assets of the New Zealand system. This is indicative of the overall dominance of the New Zealand financial system, rather as the financial systems of the CEE countries are dominated by their Western neighbours.⁷ Although this is a potential source of risk for New Zealand, the persistent relative strength of the Australian banks has limited the direct impact of bank weakness on the New Zealand economy.

4. The TT index as a new macro vulnerability index

For assessing macroeconomic situations of CEE countries Zealand we have created of a new macro vulnerability index (TT Index⁸) that evaluates each investigated country based on a total score (TT index) comprising seven variables. Firstly, we have selected these seven macroeconomic variables:

1. Liquidity ratio
2. Credit growth
3. Current account balance
4. Loan-deposit ratio
5. Government debt-to-GDP ratio
6. FX loans I (% of total household loans)
7. FX loans II (% of total corporate loans).

Secondly, we set ranges (adjusted to normal distribution of indicators' values) for each variable and assigned scores (1, 2 or 3) for each country. Finally, we simply summed up the scores for each country and set the TT index (Table 1). Detail calculations of the TT index for each variable and country are described in Appendix.

Table 1: Calculations of the TT index for CEE countries and New Zealand

⁶ For a more extensive review of these, issues, see Tripe (2009), Steenkamp (2010).

⁷ See, for example, the discussion of Slovenia by Andritzky (2007). At least in the New Zealand case there are effective markets for interest rate and currency swaps.

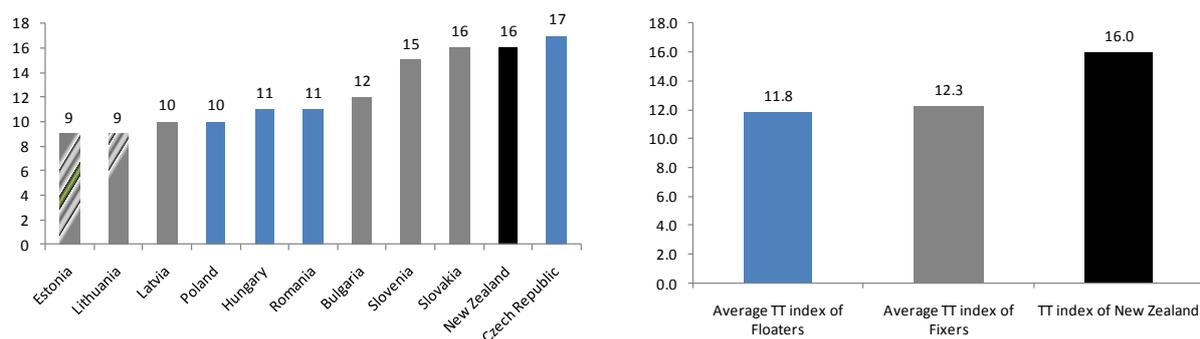
⁸ The TT index is named after the authors of this study.

Country	V01	V02	V03	V04	V05	V06	V07	Total
	Liquidity ratio	Credit growth	CA balance	LTD	Gov.debt	FX loans I	FX loans II	
Bulgaria	3	1	1	2	3	2	2	12
Estonia	2	2	1	1	3	1	1	9
Latvia	3	3	1	1	2	1	1	10
Lithuania	2	2	1	1	2	2	1	9
Slovakia	2	2	2	3	2	3	2	16
Slovenia	1	2	2	2	2	3	3	15
Average TT index for Fixers								12.3
Czech Republic	3	3	3	3	1	3	2	17
Hungary	2	2	2	2	1	1	2	11
Poland	1	1	3	2	1	2	2	10
Romania	2	1	1	2	3	2	2	11
Average TT index for Floaters								11.8
New Zealand	1	3	2	2	2	3	3	16

Source: Authors

The highest TT index was recorded for the Czech Republic and Slovakia (New Zealand was equal second highest), while the lowest values were reported for Estonia, Lithuania and Latvia – the three smallest countries in the study, and which would be expected to suffer from limited development of their financial markets (Figure 9). Surprisingly, Estonia got the lowest score although it was to join the Eurozone in January 2011, which should imply relative fiscal and macroeconomic stability. However, the Maastricht criteria (government deficit, government debt, inflation rate, long-term interest rates and Exchange rate mechanism (ERM) II membership) differ from those applied at the TT index that includes more financial markets' indicators. On the other hand, the Euromoney credit risk rating of Estonia fell sharply in the late 2009 and early 2010, what confirms our result that this country's performance is not based on strong macroeconomic fundamentals. We should highlight Estonia's high loan-to-deposit ratio, low liquidity ratio and a high share of FX loans in both corporate sector and households.

Figure 9: TT index for CEE countries and New Zealand



Source: Authors

When comparing CEE countries in terms of their exchange rate regimes (e.g. Fixers and Floaters), the Fixers post the slightly higher average TT index (12.3) compared to the Floaters (11.8) but lower than New Zealand's TT index (16.0). As the results vary across both Fixers and Floaters, we cannot say which regime is better, however. The reason for the lack of distinction here is that there are both well and poorly performing countries in both groups. Countries which are part of

the Eurozone have generally had to achieve good economic performance as a condition of membership, whereas some other countries with fixed rates struggle in a turbulent economic climate. On the other hand, there are countries such as the Czech Republic which show good economic performance, but which place less focus on membership of the Eurozone. A conclusion that we might look to draw from this is that currency arrangements are not of themselves important for macroprudential stability: what matters is how an economy is managed overall.

Key areas where there would appear to be differences between countries with fixed and floating exchange rate regimes are in respect of the current account balance, loan to deposit ratio and government debt. In the case of the current account balance, the worse performance of the fixed exchange rate countries should be no surprise, as their exchange rates cannot be adjusted in response to imbalances. Higher loan to deposit ratios, again, should not be a surprise as external sourcing of funds does not carry the risk of exchange rate depreciation (and this is arguably facilitated by foreign bank ownership). We also saw in Figure 2 that the fixed exchange rate countries showed worse economic performance during the crisis period.

By contrast, in the case of government debt, the existence of a fixed exchange rate arrangement may limit a government's ability to borrow, while fixed exchange rate countries will also need more in the way of reserves to cover external payments (the liquidity ratio).

5. Key lessons from CEE development for and from New Zealand

5.1 TT index for New Zealand in the CEE context

When we look at our countries together, we see a higher value for New Zealand than for either of the other groups of countries, although its score is lower than for the Czech Republic. Some of this is an accident of timing: for example, if we look at private credit growth, this was relatively low for New Zealand in 2008, whereas it had been significantly higher in earlier years (but it was even lower in 2009 and 2010).

On the other hand, New Zealand's currency account deficit has been much lower since 2008, because of a much smaller deficit in the income account. This is largely a consequence of much lower interest rates applying to banks' offshore borrowings and reduced bank profitability (significantly impacted by tax arrears). We cannot rely on poor bank profitability to keep the current account deficit low indefinitely. It would also require a long period of low deficits (or even surpluses) for there to be sufficient change in the net international investment position to remedy the unattractive value for the liquidity ratio used in constructing the TT Index. On the other hand, with New Zealand running a floating exchange rate regime, the availability of reserves has not been seen as important, with only sparing Reserve Bank of New Zealand intervention in the foreign exchange market (and this predominantly to limit exchange rate increases by buying foreign currency).

One conclusion that we cannot draw as a result of this study is that there will be any necessary advantage to New Zealand in moving to a single currency with Australia (but nor would there necessarily be any cost in not doing so).

5.2 Euromoney country risk ratings

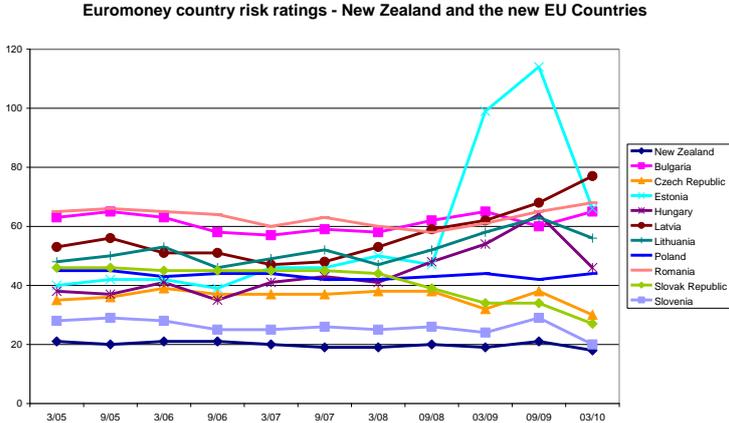
The approach followed in this paper is not the only one that might be applied to identifying macroprudential factors impacting on a country's banking and financial system. Maechler et al (2010) for example, have reviewed a slightly different selection of countries from the period prior to the GFC, and they found issues around credit quality to be of particular importance.

Because country risk issues are closely related to measures of macroprudential risk, we have also sought to look at the Euromoney ratings through time for our selection of countries. We use the Euromoney results rather than the alternative Institutional Investor rankings as Euromoney disclose

more about their methodologies and because they use more specific objective data (whereas the Institutional Investor approach is solely reliant on relative judgmental perceptions).⁹ Relative rankings for the period 2005 to 2010 are shown in Figure 11.

Despite the different focus for the ranking processes, with the TT Index being more directed at macroprudential financial system issues, we can see that the two sets of rankings are broadly consistent with each other. This gives us greater confidence in the reliability of our results.

Figure 11: Euromoney country risk ratings – New Zealand and the new EU countries



Source: Euromoney (2010 and earlier)

6. Conclusion

This paper has sought to review some of the factors that potentially contribute to macroprudential weakness, and thus concerns about macroeconomic and financial system health in a selection of countries in Central and Eastern Europe, and compared these with New Zealand. We have not taken account of every potentially relevant factor (such as, for example, foreign ownership of banks, as discussed above), but we have nonetheless identified a range of factors which are important for assessing macroprudential factors to which countries’ banking systems are exposed. As central banks around the world give increased attention to such issues, we believe that there is value in looking at practical ways by which such issues can be explored.

We also note that we have constructed our index using one year’s data only: it would be interesting to explore the ways in which values of the index might change through time. Over time, with more observations, a set of more robust scoring parameters might be established, which could allow for a more robust set of values for the index. However, even with what we have done, we have created something of a watch-list of countries at risk.

We have also, as part of this paper, highlighted the similarities between the situation of New Zealand and those of the new members of the European Union in the Central and Eastern European region. It sometimes surprises that New Zealand is seen in such a positive light by rating agencies and others relative to such comparators. From the perspective of the New Zealand government and the Reserve Bank of New Zealand, a more appropriate comparison might be with the poorer performing economies of the Eurozone (the Mediterranean countries in particular, and Ireland). These might be included in a subsequent extension of the study.

⁹ See, for example, the discussion of the alternative approaches in Saunders & Cornett (2011)

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Appendices

Table 2: Definitions of variables included in the TT index

Variable	Definition
1. Liquidity ratio	Country's liquid external assets as a % of its liquid external liabilities (2008)
2. Credit growth	Private credit growth in % (2008)
3. Current account balance	Current account balance in % (2008)
4. Loan-deposit ratio	Loan-deposit ratio in % (2008)
5. Government debt-to-GDP ratio	Government debt-to-GDP ratio in % (2008)
6. FX loans I (% of total household loans)	FX loans in % of total household loans (2008)
7. FX loans II (% of total corporate loans).	FX loans in % of total corporate loans (2008)

Source: Authors

Table 3: Input variables for the TT index

Liquidity ratio (%) in 2008

Liquidity ratio (%)	Value	Score
Bulgaria	130.0	3
Estonia	75.2	2
Latvia	100.6	3
Lithuania	83.5	2
Slovakia	76.4	2
Slovenia	26.1	1
Czech Republic	185.9	3
Hungary	80.1	2
Poland	69.0	1
Romania	76.2	2
New Zealand	23.6	1

Private credit growth (%) in 2008

Private credit growth (%)	Value	Score
Bulgaria	31.5	1
Estonia	25.0	2
Latvia	14.8	3
Lithuania	18.6	2
Slovakia	15.3	2
Slovenia	16.8	2
Czech Republic	14.8	3
Hungary	18.5	2
Poland	36.4	1
Romania	34.0	1
New Zealand	8.9	3

Current account/GDP (%) in 2008

LTD ratio (%) in 2008

Current account balance (% of GDP)	Value	Score
Bulgaria	-9.0	1
Estonia	-9.5	1
Latvia	-13.3	1
Lithuania	-12.2	1
Slovakia	-6.3	2
Slovenia	-6.1	2
Czech Republic	-0.6	3
Hungary	-7.1	2
Poland	-5.1	3
Romania	-11.6	1
New Zealand	-8.7	2

Loan-to-deposit ratio (%)	Value	Score
Bulgaria	124.5	2
Estonia	197.0	1
Latvia	245.1	1
Lithuania	192.4	1
Slovakia	76.9	3
Slovenia	156.3	2
Czech Republic	75.5	3
Hungary	142.0	2
Poland	106.1	2
Romania	120.5	2
New Zealand	140.3	2

General Government Debt (% of GDP) in 2008

Gov.debt (% of GDP)	Value	Score
Bulgaria	14.1	3
Estonia	4.6	3
Latvia	19.4	2
Lithuania	15.6	2
Slovakia	27.7	2
Slovenia	22.6	2
Czech Republic	30.0	1
Hungary	72.9	1
Poland	47.2	1
Romania	13.3	3
New Zealand	25.4	2

FX loans/total households loans (%) in 2008

Liquidity ratio (%)	Value	Score
Bulgaria	130.0	3
Estonia	75.2	2
Latvia	100.6	3
Lithuania	83.5	2
Slovakia	76.4	2
Slovenia	26.1	1
Czech Republic	185.9	3
Hungary	80.1	2
Poland	69.0	1
Romania	76.2	2
New Zealand	23.6	1

FX loans/total corporate loans (%) in 2008

FX loans (% of total household loans)	Value	Score
Bulgaria	24.0	2
Estonia	82.0	1
Latvia	87.0	1
Lithuania	50.0	2
Slovakia	3.0	3
Slovenia	17.0	3
Czech Republic	0.0	3
Hungary	59.0	1
Poland	30.0	2
Romania	56.0	2
New Zealand	10.0	3

Source: Authors based on FITCH