Universität St.Gallen

Clothes for the Emperor
or
Can Graduate Schools Learn From
Undergraduate Macroeconomics?

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Abstract

The current crisis is not only one of financial markets, but also of macroeconomics. Leading scholars call for a paradigm shift away from dynamic general equilibrium models, though some argue that the profession's arsenal already contains the tools and historical lessons needed to deal with such crises. Taking this view to the limit, this note demonstrates that the workhorse models of undergraduate macroeconomics not only permit a refined view and classification of financial crises. These models also identify scenarios under which either policymakers would be ill advised to follow conventional prescriptions, or full-scale depressions loom that cannot be fought by means of fiscal or monetary policy alone.

1. Introduction

In Hans Christian Andersen's short tale, it takes a child's innocence and courage to cry out loud that the emperor is naked. In the real world, it took a crisis with all the ingredients of a perfect storm to sober our appreciation for how macroeconomics has developed, and to encourage well-recognized macroeconomists to state openly and forcefully what most had long dared to whisper under their breath only – for fear of being ridiculed by their peers. As our storyteller explains: "Not only was the material so beautiful, but the clothes made from it had the special power of being invisible to everyone who was stupid." In the same vein, questioning the empirical relevance or usefulness of real business cycle theory and, later on, of dynamic general equilibrium modelling, daring to admit that one was not totally smitten by these approaches' logical coherence and formal elegance, felt tantamount to coming clean that one was simply not smart enough to be a functional macroeconomist.

The crisis served as a wake-up call that triggered some serious soul searching, and the tables could be turning now. Many of the profession's brightest minds, including Acemoglu (2009), Buiter (2009), Eichengreen (2009), de Grauwe (2009), Krugman (2009), Stiglitz (2009) and Wyplosz (2009), are arguing and lobbying for a rethinking. Some call for a radical departure from previous paths, for a new paradigm that discards the log-linearized models of late, with their focus on small, digestible shocks around well-defined, stable equilibria from which the economy only departs during short-lived V-shaped recessions (Buiter (2009)). Other voices sound more moderate. Eichengreen (2009) argues that it was less insufficient knowledge than an inadequate comprehension of existing knowledge that contributed to the dismal picture conveyed by macroeconomics at a time when the public yearned for guidance as to both what was in store after the crisis had erupted, and what should be done to prevent the worst.

A new paradigm for macroeconomics appears years away and uncertain, given that it may take considerable resources to remedy many of the diagnosed defects, and that there may be reluctance to write off a substantial part of acquired human capital as sunk cost. For now, and for some time to come, we will therefore have to make do with the knowledge that exists and can be shown to be useful in making us understand the current crisis. Pushing Eichengreen (2009) to the limit, this note argues that undergraduate macroeconomics, creatively applied and properly enriched with elements that were already introduced in John Maynard Keynes' times – but had faded from our radar along with the historical lessons taught by the Great Depression – can teach us a great deal about the current crisis and offer some preparation for future financial crises.

We begin by introducing the main tools needed for this endeavour. These tools consist of a generalized interpretation of the *IS-LM* model, in which we distinguish between the money market and the capital market, introduce risk premiums, and show how these interact with a possibly dormant liquidity trap. The results derived there are fairly straightforward and need little elaboration. This is not the case when we look at the small open economy, which is done in two steps. First, we explain

that there is no such thing as *a* financial crisis. Such crises come in many different forms. Second, we analyze crisis contagion and policy options in a world where a small open economy, characterized by a Mundell-Fleming model with liquidity traps and risk premiums, interacts with the rest of the world. The results generated in this section are not part of the ruling orthodoxy and are the key contribution of this note.

2. The *IS-LM* model in crisis guise

The *IS-LM* model splits the economy's demand side into a goods market and a money market. Interest rates play a key role in both of them. As long as we let perfect competition keep banks from charging a mark-up over capital costs when they extend credit to firms, and as long as we ignore risk by postulating certainty, there is no need to distinguish between interest rates in the two markets, and the same interest rate determines the demand for money and investment demand. Once we permit the possibility of bankruptcies among banks and firms in times of financial crises, however, distinguishing between interest rates in the money market i_{MM} and in the capital market i_{CM} becomes crucial. We also have to take into account that uncertainty makes money and investment demands depend on expected interest rates $E(i_{MM})$ and $E(i_{CM})$. These are determined by subtracting the risk premiums r_{MM} and r_{CM} that households and banks require as compensation for imperfect trust in banks and firms, respectively, from the agreed nominal interest rates. Thus $E(i_{MM}) = i_{MM} - r_{MM}$ and $E(i_{CM}) = i_{CM} - r_{CM}$. Finally, letting the (risk free) mark up of bank lending rates over capital costs be zero, capital and money market interest rates are related via $i_{MM} = E(i_{CM}) = i_{CM} - r_{CM}$. With these modifications the equilibrium conditions in the money and in the goods market, the *LM* and *IS* curves, are embedded in the functions

(1) $M/P = L(i_{MM} - r_{MM}, Y)$ with $\frac{di_{MM}}{dY} > 0$ and $\lim_{i_{MM} \to r_{MM}} \left[\frac{di_{MM}}{dY}\right] = 0$

and

(2) $Y = C[Y - T(Y)] + I(i_{MM} + r_{CM}) + G$ with $\frac{di_{MM}}{dY} < 0$

where *M* is the supply of and *L* the demand for money, *P* the price level, *Y* real income, *C* consumption, *G* government spending and *T* denotes taxes.

Let the dashed curves in Figure 1 mark the situation before the subprime crisis started, say in the year 2007. The economy is in a full-employment equilibrium in point A at potential income *Y**. Note the horizontal segment of the *LM* curve, already discussed in Hicks' (1937) work. It is a dormant liquidity trap, and once the economy moves onto that segment, monetary policy becomes ineffective.

This is considered an unlikely exception these days, though Krugman (1998, 2000) gave Japan's lost decade in the 1990s a liquidity trap interpretation.

When the storm began in the U.S. housing market in early 2007, one bank after the other collapsed or needed to be rescued, and households did not know which institution would be next, they required a risk premium and, thus, a higher interest rate for keeping their money in the bank. The ensuing upward shift of the *LM* curve would have driven money market rates up and the economy into a recession in point B'. Once it was clear that a major downturn was on its way, banks were unable to tell with sufficient certainty which firms would weather the storm and which ones would not. Banks thus felt compelled to attach a sizable risk premium to the interest rates they offered firms that were seeking loans.[3] This drove capital market rates way above money market rates, which is tantamount to a downward shift of the *IS* curve in a diagram with money market rates on the ordinate. As a partial effect, such a confidence crisis in the capital market would have driven the economy into a recession in point B". Both confidence crises together, in the banking sector and in the corporate sector, reenforced each other and led the economy into a major recession in point B.

Figure 1 near here

The insights to be gained from the *IS-LM* model with risk premiums are fairly standard. During financial crises, fiscal and monetary policy may work as usual. And if a major crisis sidelines monetary policy in a liquidity trap, fiscal policy can step in. The only result not covered in standard undergraduate macroeconomics is that liquidity traps may occur significantly above the zero interest rate bound, and may, thus, emerge more often than conventionally thought. More interesting results that cannot be traced back to Keynes and the subsequent literature, and which are, if not novel, at least not common knowledge, are obtained when we look at how financial crises affect small individual economies.

3. There is no such thing as *a* financial crisis

How a financial crisis affects an individual country and what this country can do to combat its effects may crucially depend on the type of financial crisis it is dealing with. Instead of discussing this in the abstract, consider the classification proposed in Table 1.

Table 1 near here

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[3] This *risk-premium interpretation* is compatible with the notion of a *credit crunch* that was often proposed during the current crisis. In fact, the latter may be considered a special case of the former. In the credit crunch view risk premiums have become so high that loans are virtually unavailable for major segments of the market.

From the perspective of a relatively small country, the two major determinants of how its economy will be affected by a financial crisis are, first, whether it permits flexible or enforces fixed exchange rates versus the rest of the world and, second, whether the crisis is global in the sense that financial markets worldwide are affected, including the small country or not, or domestic in the sense that foreign financial markets remain healthy. These scenarios provide us with six different cases in Table 1. Each case carries two sub-scenarios labelled A and B, depending on whether the crisis originates in the money or in the capital market.

Before we scare readers, we should note that many of these scenarios yield routine results. Rather than grinding through all possible cases, the discussion of which we may leave to undergraduate instructors who aspire to completely cover this topic, or as finger exercises for students – we focus on scenarios that provide the most exciting results[4]; results that are either new or have long been out of the profession's sight and mind. These scenarios are highlighted in Table 1.

4. Traps and new results for fiscal and monetary policy effectiveness in small open economies

We start with a global crisis that affects financial markets in all countries at the same time. Let the world be composed of a small open economy, represented in the left panel in Figures 2-4 by means of a Mundell-Fleming diagram, and a homogenous rest of the world, which the individual country is too small to affect, represented by an *IS-LM* diagram in the panel on the right.

Figure 2 near here

Before we can start to discuss crises, we need to introduce and comment on the international capital market, which now links the individual country to the rest of the world. When capital is fully mobile, equilibrium in the international capital market only obtains when expected returns at home $E(i_{CM})$ equal those abroad $E(i_{CM}^{W})$. Assuming that the exchange rate is not expected to change, we get $i_{CM} - r_{CM} = i_{CM}^{W} - r_{CM}^{W}$. If we want to stick with measuring the two countries' money market interest rates i_{MM} and i_{MM}^{W} on the vertical axes of our diagrams, we may substitute $i_{MM} = i_{CM} - r_{CM}$ and $i_{MM}^{W} = i_{CM}^{W} - r_{CM}^{W}$ into the above arbitrage condition to obtain the equilibrium condition $i_{MM} = i_{MM}^{W}$.[5] This is represented by a horizontal capital market or foreign exchange market equilibrium line, the *FE* curve.[6]

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[4] For a complete coverage of the scenarios suggested by Table 1 and targeted at undergraduate students, see Gärtner and Jung (2009).

[5] If we want to feature the capital market interest rate on the ordinate instead, the horizontal *FE* curve is positioned at: $i_{CM} = i_{CM}^{W} + (r_{CM} - r_{CM}^{W})$. In this case the *FE* curve moves when a financial crisis erupts, while *IS* stays put.

[6] It may seem puzzling that we still have the familiar equilibrium condition $i_{MM} = i_{MM}^{W}$, even though the a financial crisis has generated a host of uncertainty along with risk premiums at home and abroad. The explanation is that this condition refers to

Suppose now that exchange rates are flexible and financial crises erupt in all countries and all financial markets at the same time. This drives the rest of the world not only into recession but also possibly into a liquidity trap, as assumed in the right-hand panel of Figure 2, which simply replicates Figure 1. The increase in global money market rates observed in the rest of the world shifts the small open economy's *FE* curve up. If the loss of confidence in domestic banks matches the loss in the rest of the world, the individual country may end up in a liquidity trap as well ─ but in a very special one. In this case, the interest rate at which the liquidity demand for money becomes perfectly elastic equals the world interest rate, i.e., the horizontal segment of the *LM* curve sits on the *FE* curve.[7]

Now, let falling world income and the emergence of a sizable risk premium in the world capital market shift the small open economy's *IS* curve into IS_B, driving the economy into a liquidity trap at point B. Contrary to policy recipes under normal circumstances, but a well-known property of liquidity traps, monetary policy does not work. Also contrary to standard recipes, and foremost to many recommendations made during the current crisis, fiscal policy does work. And it works big time, showering demand on the domestic economy through a full multiplier effect. The reason is that with the market being drowned in liquidity, added government spending may be financed without driving the interest rate up. There is no inflow of foreign capital and, therefore, no crowding out via exchange rate appreciation.

Thus, fiscal stimulus packages work, but their effect may be limited. In Figure 2, once the economy reaches point B', where income still falls far short of potential income, fiscal policy becomes ineffective. Any further spending hikes would be crowded out by exchange rate appreciation and a reduction in net exports. Since we are at the edge of a liquidity trap and monetary policy is ineffective still, economic policy has run out of options. Such a situation may be called a *perfect trap*.

Luckily, fiscal and monetary policies only fail when used in isolation. A coordinated effort that would do the trick requires the central bank to (ineffectively) increase the money supply, shifting *LM* to the right and, thus, widening the range at which fiscal policy works. Additionally, the government must accompany this increase in money supply with an increase in spending, which is not crowded out any longer. Such a coordinated mix of expansionary monetary and fiscal policy could indeed end the recession.

We now turn to asymmetric scenarios in which confidence crises erupt exclusively in domestic financial markets. Figure 3 looks at flexible exchange rates.

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the money market interest rates i_{MM} and i_{MM}^W. It thus states that capital costs must be the same across borders. Since there is no mark-up over these costs, these interest rates ensure that expected returns in the capital markets at home and abroad are the same. Interest rates in the capital markets may differ, of course, and they may reflect differences in risk premiums in the capital market. Risk premiums in the money market are of no concern for international investors, since these affect and are affected by strictly domestic money holdings only.

[7] When risk premiums in domestic and foreign money markets differ significantly, so that the horizontal segment of the *LM* does not sit on the *FE* curve, the situation is qualitatively the same as if there was only a financial crisis in the small open economy. We will examine this further below.

Suppose emerging risk premiums shift the domestic *LM* curve from the dashed into the solid position. This drives the economy into a recession in point B'. The *IS* curve moves into the solid position as well, independently of where it had been shifted by risk premiums that may have emerged in the capital market because the flexible exchange rate will do the rest. In this situation, monetary policy works to fight the recession.

But if the risk premium in the money market grows so large that the horizontal segment of the *LM* curve moves higher than the *FE* curve (see the dotted position), the situation becomes serious. Now domestic interest rates are permanently too high compared to the world interest rate. Thus, the exchange rate appreciates continuously, moving the *IS* curve and income ever further to the left. Fiscal policy may slow this process or reverse it temporarily, but it is fighting windmills. A lasting escape from the recession can only be accomplished by rebuilding confidence in the domestic money market to lower the risk premium and shift the *LM* curve down.[8]

The same case under fixed exchange rates is shown in Figure 4. When falling confidence shifts the *LM* curve moderately, say into the solid position, familiar mechanisms that force the central bank to purchase foreign currency shift this new *LM* curve to the right until it passes through A. But again, a substantial rise in the money market risk premium that shifts *LM* into the dotted position generates instability on the economy's demand-side. In this case, the central bank must intervene and shift *LM* to the right. This intervention casts the economy into a liquidity trap in point B" which denotes a disequilibrium, though, because home interest rates remain stuck above world interest rates, so that the money supply needs to be increased further. This process will even continue after the stimulus packages ends the recession. Again, a lasting stabilisation can only be achieved after confidence in banks increases to a sufficient extent.

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[8] The overall macroeconomic equilibrium can also disappear when the crisis in the world's money markets is basically symmetric, as sketched in Figure 2. All that is needed to throw the small country's economy into a full-scale depression in that case is an uneven timing that lets the crisis in the domestic money market unfold just a little bit earlier or quicker than in the rest of the world. As soon as the risk premium in the domestic money market exceeds the rest of the world's money market interest rate, the home currency appreciates in leaps and drives aggregate demand and income to very low levels. The really bad news is that this process does not reverse itself when the crisis (i.e., the risk premium) in the rest of the world catches up. Thus a small country may be thrown into an outright depression not only by an asymmetric financial crisis that affects its banking industry more than banks in the rest of the world but also when a crisis that is basically symmetrical evolves at a slightly different pace. Note that in both cases of a macroeconomic disequilibrium the counterintuitive result obtained here is that it is an unfolding crisis in world's money markets that makes the domestic crisis less severe.

5. Summary and conclusions

In Hans Christian Andersen's tale, it is neither the peasants nor other ordinary people who are caught parading in the nude. It is the emperor. In macroeconomics, it is not what is typically taught in the undergraduate curriculum, often with flinching enthusiasm and conviction, that the crisis found lacking. It is the oftentimes narcissistic exercises in applied mathematics, consistency and formal elegance that we sold to more than one generation of bright and aspiring graduate students under the label *macroeconomics*.

The commoners' clothes may be of coarse material and questionable style, patched up, and too shabby to get them admitted to the emperor's ballroom. But they serve a basic purpose, reliably so, as do many of the workhorse models used in undergraduate classrooms. *IS-LM* and Mundell-Fleming models have well-known limitations. And they certainly do not explain what started the crisis in the first place, how bubbles can be prevented, or what regulations the financial industry needs. But they do offer a very useful bird's-eye perspective of the macroeconomic consequences of financial crises, and they help to sort out the main policy issues.

Our discussion emphasized that high calibre financial crises often come in conjunction with a liquidity trap that cannot be easily identified when banks are part of the problem. Such traps lack the characteristic feature of very low interest rates, and households may start to withdraw funds on a massive scale even at strictly positive rates. In addition, conventional wisdom regarding policy choices may not apply. Contrary to what generations of students learned, expansionary fiscal policy may be the only remedy – even for a small open economy with flexible exchange rates – given that there is no more crowding out of additional government spending via exchange rate appreciation. But this is only true up to a point, because we also showed that under certain conditions liquidity traps in small open economies might morph into perfect traps. In such situations, neither monetary nor fiscal policy works when used alone, and a coordinated expansionary effort by the central bank and the government is called for. Finally, when the domestic banking sector is hit disproportionally hard by a confidence crisis, compared to the rest of the world, this may even destabilize the economy and trigger a run into a full scale depression (or L-shaped recession). Then, conventional fiscal and monetary policy measures may only provide temporary relief. Any lasting solution must address the roots of the confidence crisis.

Apart from these specific results, this note has a number of general implications and uses:

It is a defence of macroeconomics. In line with Eichengreen's (2009) appraisal, and pushing his view to the extreme, it shows that even apprentices of macroeconomics have tools at their disposal that enable them to be active and constructive participants in discussions of the current crisis.

It helps and encourages undergraduate instructors to use the 2007 subprime crisis as a case study and, thus, emphasizes that macroeconomics is an applied science which makes real world developments and policy discussions more transparent.

Finally, it may provide guidance as to where macroeconomics should go. Not by claiming that the past is the future. But by pointing to building blocks and properties that a new or renewed paradigm in macroeconomics should include. In this respect, it is also a warning against tendencies to drop the money market from macroeconomic models – a trend that has gained momentum and arrived in the undergraduate curriculum.[9] Such models reduce the money market to an interest rate that is set by the central bank, without explicit consideration of the demand for and the supply of money. Looking at interest rates alone during the current crisis would have conveyed the impression that central banks were merely passive bystanders when, in fact, there was frantic activity that is only revealed in the unprecedented growth of monetary aggregates. Rather than discarding the money market, a more comprehensive treatment of the monetary sector is called for that pays attention to the interaction between the money and capital markets, and that does not lose sight of the things that may go wrong.

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[9] An early example is Romer (2000). More recent ones are Bofinger, Mayer and Wollmershäuser (2009) or Carlin and Soskice (2005).

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Table 1. A classification of financial crises

		Flexible exchange rates		Fixed exchange rates	
		Crisis in money market	Crisis in capital market	Crisis in money market	Crisis in capital market
Global crisis	includes small open economy	**1A**	**1B**	**2A**	**2B**
	does not include small open economy	**3A**	**3B**	**4A**	**4B**
Domestic crisis		**5A**	**5B**	**6A**	**6B**
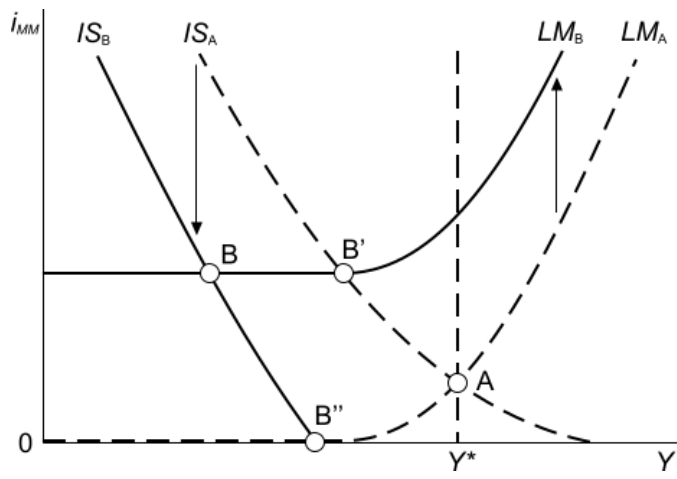
Figure 1
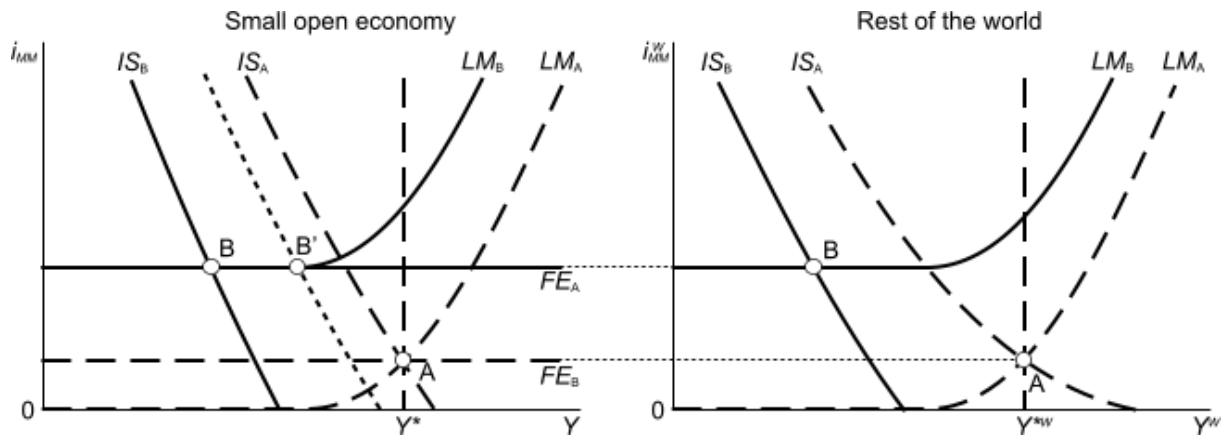
Figure 2

Figure 3

Figure 4