

Capital Flows, Crises and Externalities: A Primer*

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Abstract

This paper provides an introduction to the welfare economics of capital flow regulation in emerging market economics, based on the notion that there are externalities associated to financial crises. We describe financial crises as situations when an emerging economy loses access to international financial markets and experiences a feedback loop in which falling aggregate demand, depreciating exchange rates and deteriorating balance sheets mutually reinforce each other – a common phenomenon in recent emerging market crises. We then show that in such a situation, is rational for individual market participants to take aggregate financial conditions as given and to not internalize their contribution to financial instability when they determine their optimal actions. As a result they impose externalities in the form of greater financial instability on the economy, and the private decisions of individuals are distorted towards excessive risk-taking. We discuss how capital market regulations can induce private agents to internalize their externalities and thereby increase macroeconomic stability. This improves economic welfare for everybody in the economy.

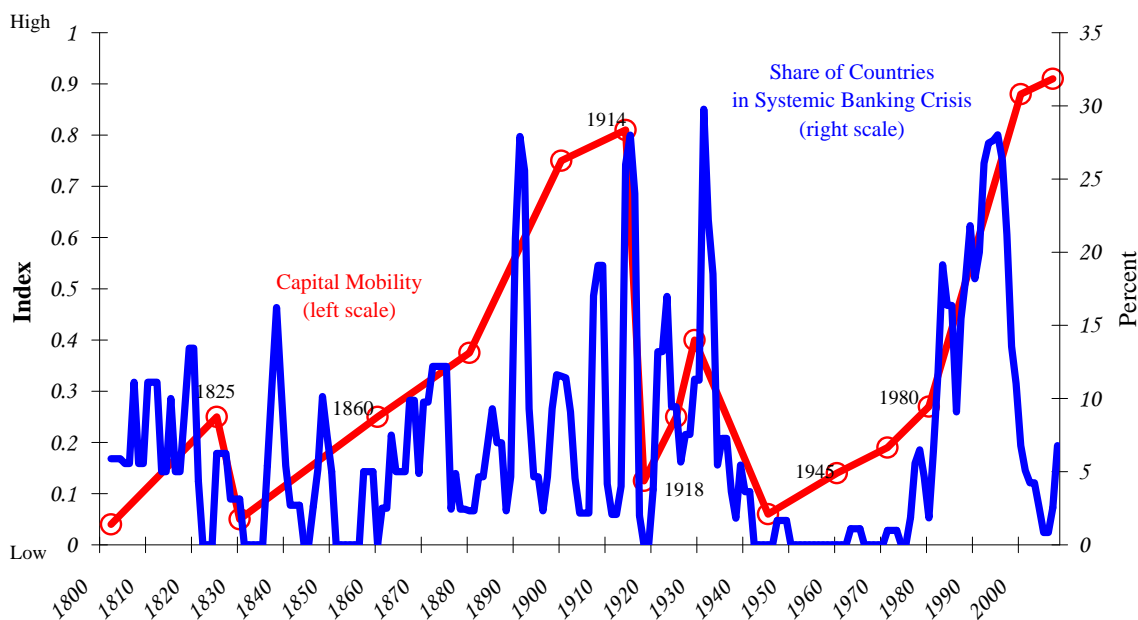
1 Introduction

Emerging market economies that are integrated into global capital markets are prone to boom and bust cycles in international capital flows. During good times, they experience strong capital inflows; in bad times, the flows reverse and often trigger systemic financial

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Figure 1: Capital Mobility and Financial Fragility (Reinhart and Rogoff, 2009)



crises. Empirical evidence on the relationship between capital market liberalization and financial instability is presented e.g. in Reinhart and Rogoff (2009). Figure 1, which is replicated from their work, documents this relationship by plotting an index of capital mobility and the incidence of systemic banking crises over the past two centuries.

The destabilizing patterns of capital flows in economies that have liberalized their capital markets have often been of grave concern for both policymakers and society at large. As a result, a number of emerging market economies have recently imposed controls on international capital flows.

This paper discusses whether free capital flows to emerging economies are desirable from a welfare theoretic perspective. The paper follows a very conventional approach to answer this question: we use a class of models of financial crisis that best capture the dynamics of recent emerging market crises, i.e. models of financial amplification, and we ask whether free capital flows are desirable from an economic welfare point of view in emerging economies that are prone to such effects. In doing so, this paper synthesizes the analytical findings of an active recent literature, including Korinek (2007, 2009a, 2010a) and Jeanne and Korinek (2010a,b).¹

¹More detailed references are provided below in section 4 on externalities. See also Caballero and

Our main finding can be summarized as follows: financial amplification effects arise because exchange rate depreciations deteriorate the balance sheets of private agents in the economy, which reduces their financing capacity and therefore requires them to cut back on spending. This leads to further exchange rate depreciations. However, private market participants take exchange rates and other macroeconomic phenomena as given and do not internalize that their actions jointly determine the degree of financial fragility in the economy. For example, the more exposed private agents are to dollar debt, the greater the degree of financial amplification during a crisis, but private agents do not internalize this when they take on dollar debt (Korinek, 2009a).

Financial fragility is an uninternalized by-product of external financing just as air pollution is an uninternalized by-product of driving. It is privately optimal for the drivers of cars to enjoy the benefits of their mobility while disregarding the pollution that they impose on the rest of society, since each driver knows that her individual contribution to air pollution is minuscule. In aggregate, however, there will be excessive pollution if all drivers act accordingly. In other words, clean air is a public good and will be subject to a “tragedy of the commons” in the free market equilibrium. This presents a textbook policy case: make drivers internalize the pollution that they create, e.g. by imposing Pigouvian taxes or regulations, and the decentralized market equilibrium will be efficient.

In a similar manner, external financing “pollutes” emerging market economies with financial fragility, i.e. it makes such economies more fragile and reinforces the financial amplification effects that arise in response to adverse shocks. Private agents do not internalize this – they take the aggregate level of financial fragility or stability as given, even though they jointly determine the fragility/stability of the economy. Just as in the case of air pollution, Pigouvian taxes or regulations on risk-taking by emerging market agents will restore the efficiency of the decentralized market equilibrium. In the framework we discuss above, we will show that such measures can implement a Pareto improvement, i.e. they make everybody better off.

Krishnamurthy (2003) for an earlier approach to motivate intervention in emerging capital markets from financial imperfections.

Let us also note that the dynamics of financial crises in emerging market economies – and the associated externalities – are closely related to financial amplification effects in closed economies, such as those described by Fisher (1933), Kiyotaki and Moore (1997) or Bernanke et al. (1999). In emerging economies, amplification dynamics are driven by exchange rate depreciations that deteriorate the balance sheets of borrowers; in closed economies that are subject to financial amplification, asset price declines deteriorate the balance sheets of entrepreneurs, which reduces their investment demand, leading to further asset price declines and so forth. A detailed discussion of the resulting externalities and regulatory implications in a closed economy context is given in Korinek (2010b).

Before discussing the nature of the externalities associated with emerging market crises in more detail, the following section briefly reviews the developments in the economic literature on this topic over the past decades.

2 Models of Financial Crises

Traditional models of crises typically laid the blame for financial instability at distorted government policies. In so-called “first-generation” models of crises such as Krugman (1979) and Flood and Garber (1984), a profligate government relied excessively on seigniorage revenues and, at some point, had printed so much money that an existing exchange rate peg was no longer sustainable and devaluation was inevitable. Such models largely captured the dynamics experienced by Latin American countries during the 1970s and 80s. “Second-generation” models of financial crises, such as Obstfeld (1994), were developed after the collapse of the European ERM in 1992/3 and described devaluations as a multiple equilibrium phenomenon: if defending an exchange rate peg carried large social costs in terms of contractionary macroeconomic policies, and if government therefore could not commit to defending a peg, speculation could force a devaluation of the exchange rate. Early “third-generation” models of crises such as McKinnon and Pill (1998) and Krugman (1998) argued that governmental bailout guarantees invited emerging market borrowers to take on excessive risk and therefore

exposed the country to crisis.

In all these models, free capital flows were not at fault for the ensuing crises: instead, the clear implication of these models was that government should fix its distorted policies so that emerging economies would no longer experience crises and could enjoy the full benefits of international financial integration, i.e. access to foreign finance to augment their capital stock and to engage in international risk-sharing.

The East Asian crisis in 1997/98 forced a rethink: Policy distortions did not seem to be at the center stage of the fierce declines in exchange rates, credit and economic activity that characterized these crises. (This is not to say that the countries involved did not have their fair share of policy distortions – crises always have the property of bringing out the weak spots in a country’s governance.) Instead, it seemed that the crucial factor in the East Asian crises were severe financial amplification effects. In the presence of foreign currency-denominated debts, a relatively mild slowdown in productivity led to a self-reinforcing cycle of declining exchange rates, deteriorating balance sheets, and contracting economic activity.

Economists soon developed formal models of these mechanics of financial amplification (see e.g. Krugman, 1999; Aghion et al., 2000; Mendoza, 2002), which in many ways resembled the debt deflation dynamics that had characterized the Great Depression, as described in Fisher (1933). These crisis models were readily accepted by an economics profession eager to make sense of the observed dynamics. However, most mainstream economists continued to believe in the desirability of free capital flows. What was little noticed was that models of financial amplification effects themselves relied on dynamics that implied that free capital flows were generically inefficient.

3 Financial Amplification Effects

This section describes the positive dynamics of financial amplification effects that arise during systemic financial crises and how they differ from the standard functioning of a frictionless market economy.

Stabilizing Role of Exchange Rates

In standard open economy macroeconomics, the exchange rate plays a crucial stabilizing role when a country is affected by adverse shocks. If, for example, an economy experiences an adverse demand or wealth shock, equilibrium is restored through a depreciation in the exchange rate.²

Under normal circumstances, exchange rate depreciations have expansionary (competitiveness-enhancing) effects and therefore play a stabilizing role for the economy. In fact, they are precisely the mechanism by which equilibrium in the demand and supply for domestic goods is restored, i.e. they play the coordinating role of the invisible hand. This effect is what led e.g. Friedman (1953) to advocate flexible exchange rates.

Technically speaking, when the behavior of private agents has effects on prices such as the exchange rate, we call these *pecuniary externalities*, i.e. externalities that affect prices. Such pecuniary externalities are essential for the efficient functioning of market economies because they ensure that prices always move to the level where they correctly reflect the scarcity of resources.

Contractionary Depreciations

In emerging economies, however, depreciations in the exchange rate often have contractionary effects and play a destabilizing role. The most important reason for this are balance sheet effects (see e.g. Frankel, 2005). In figure 2, we have broken the contractionary dynamics that arise in response to exchange rate depreciations into three elements that mutually reinforce each other:

²This observation is robust across a wide range of models of the exchange rate: In real models without money, depreciations switch expenditure from foreign goods towards domestic goods to re-equilibrate the economy. A real depreciation in turn leads to nominal depreciation in a monetary model if policymakers aim to keep inflation stable. In standard monetary models with passive monetary policy (such as Mundell-Fleming), declines in aggregate demand reduce money demand and therefore depreciate the exchange rate. In models of active monetary policy, domestic demand shocks are countered with declines in domestic interest rates so as to soften the demand shock, with the effect of depreciating the currency. See e.g. Korinek (2009b) for a more detailed discussion of such models of exchange rate determination.

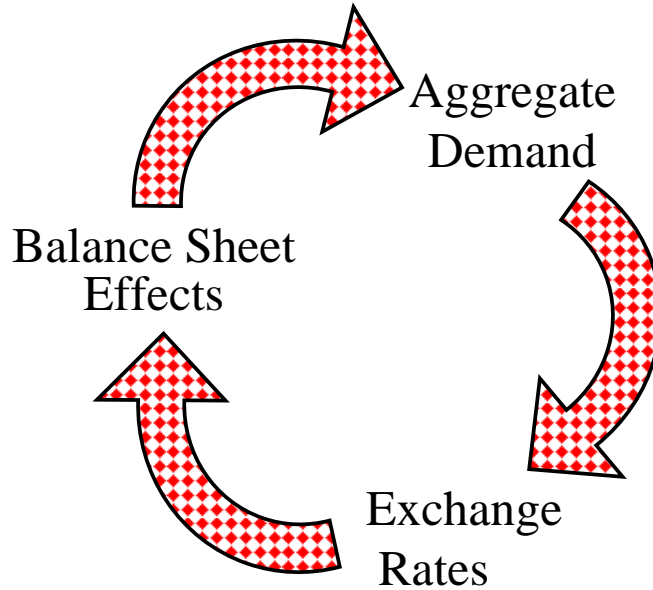


Figure 2: Schematic Figure of Amplification Effects

1. **Exchange Rates** An adverse shock to aggregate demand in the economy leads to a depreciation in the exchange rate through the channels that we discussed in footnote 2. In economies with stretched public finances that are affected by severe crises, an additional factor sometimes plays an important role: falling aggregate demand lowers tax revenue and deteriorates the government budget balances; if governments face binding budgetary constraints, they may resort to the printing press to raise seigniorage revenue, and this inflates the price level and depreciates the exchange rate (see e.g. Burnside et al., 2001).

2. **Credit** Depreciations in emerging market economies typically deteriorate the balance sheets of borrowers, which reduces their creditworthiness. This is particularly important for borrowers that have taken on foreign currency debt, as the domestic currency value of their debts rises in parallel with the exchange rate depreciation, thereby creating losses and lowering their net worth. Furthermore, depreciations reduce the international value of domestic collateral for future loans from international lenders. Both effects reduce the supply of funds to domestic agents, leading to a decline in credit (see e.g. Krugman, 1999) and/or an increase

in borrowing rates (see e.g. Gertler et al., 2007).³

3. Aggregate Demand The reduced access to credit induces domestic agents to cut back on consumption and investment, reducing aggregate demand in the economy and feeding back to point 1. of the feedback loop. In emerging economies, exchange rate depreciations therefore often have *contractionary* effects on output, at least in the short run.⁴

As shown in figure 2, the contractionary effects on aggregate demand lead to further depreciations, declines in credit, and so forth. As a result, exogenous shocks to the system may be amplified and lead to large effects on output, exchange rates, and credit intermediation. For example, a small positive shock in such an environment triggers positive amplification effects, as exchange rate appreciations, relaxing credit constraints and recovering aggregate demand lead to an economic virtuous circle.

An important aspect of this feedback mechanism is that the initial trigger can be a shock to any of the three elements in the feedback loop, i.e. an exogenous shock to aggregate demand, to exchange rates, or to the balance sheets of borrowers. Adverse shocks to aggregate demand may be caused for example by an exogenous decline in exports or a fall in the growth rate. The same feedback effects can be triggered by an exogenous shock to the exchange rate, such as capital outflows or an increase in global risk aversion that put downward pressure on the local exchange rate. Finally, an exogenous shock to the health of domestic balance sheets, such as unexpected losses on the capital stock that is held by agents, or tighter credit conditions, may trigger amplification effects.

³Even though there may be a subset of agents for whom exchange rate depreciations improve the quality of balance sheets, for example exporters that earn hard currency using domestic currency inputs, such positive competitiveness effects are typically outweighed by contractionary effects in the short run.

⁴After exchange rate devaluations, the response of output is best captured by the so-called “J-curve:” the immediate effect is contractionary because of the adverse balance sheet effects that we just described; over time, as capital is reallocated to exporting sectors, the devaluation leads to increased aggregate demand.

When an economy is subject to financial amplification, capital flows become procyclical as constraints on credit are relaxed in good times and tightened in bad times. In other words, countries can least attract finance when they most need it to smooth over temporary negative shocks, and obtain the most credit in good times when they don't need it – capital flows become a destabilizing force, in contrast to the predictions in a frictionless economy. The self-stabilizing forces of the market economy no longer work because exchange rate depreciations – which are supposed to make domestic goods cheaper and shift demand toward the domestic economy – have the perverse side effect of deteriorating balance sheets and reducing the credit worthiness of borrowers.

4 Systemic Externalities

In the following, we will discuss in more detail an aspect of financial amplification effects that has hitherto received little attention: private market participants do not internalize the social costs of systemic amplification effects in their decision-making process and therefore impose systemic externalities on the rest of the economy.

In a well-functioning market economy, the fundamental welfare theorems of economics assert that it is efficient for private market participants to take prices as given and not internalize their pecuniary externalities, as we discussed above. Market economies with flexible prices are generally very effective in allocating scarce resources so as to clear markets. In well-functioning economies, the only role of prices – including of the exchange rate – is to reflect scarcity. In equilibrium, prices equate the relative valuations of all goods for all agents, so that nobody has an incentive to engage in any further transactions. Therefore the decentralized equilibrium is *Pareto efficient* – nobody can be made better off without hurting the welfare of other agents.

For example, in response to an adverse shock to domestic demand, it is efficient for the exchange rate to fall, i.e. for domestic goods to become relatively cheaper and for foreign goods to become relatively more expensive, in order to reflect that people's valuation of domestic goods compared to foreign goods has fallen and in order for the economy to reach its new equilibrium. As we discussed above, the exchange rate

movement that is induced by private agents when they reduce their demand constitutes a pecuniary externality. In standard welfare economics, such pecuniary externalities are necessary to re-equilibrate the market. In particular, they do not interfere with the Pareto efficiency of the market equilibrium.

However, pecuniary externalities involve redistributions of wealth – for example, whenever a relative price in the economy increases, those who disproportionately supply the good involved become richer, and those who disproportionately demand the good become poorer. In the case of depreciations of the exchange rate, domestic consumers who have to pay more to import foreign goods become poorer, and foreigners who import domestic goods more cheaply become richer. In an economy with well-functioning capital markets, these redistributions of wealth do not distort optimal production decisions, since any profitable project can always be financed; therefore the resulting economic allocations are Pareto efficient and the exchange rate adjustment is unambiguously desirable.⁵

In an economy that is subject to amplification effects, this is no longer true. Instead, exchange rate movements have two separate effects: they not only equilibrate demand and supply for domestic versus foreign goods, but also create wealth redistributions that affect the health of balance sheets of agents across the economy. Through this channel, they play an important role in determining the tightness of financial constraints across the economy.

As the exchange rate depreciates, deteriorating balance sheets reduce the financing capacity of domestic agents and decrease their spending on domestic goods. While the direct effect of a depreciating exchange rate is to restore demand for domestic goods, the indirect (balance sheet) effect is to lower demand for domestic goods, thereby partially offsetting the direct effect. As a result, the equilibrating power of the exchange rate is greatly diminished and it has to depreciate more to re-equilibrate the economy in response to a shock of given magnitude. Ultimately, market forces still drive the

⁵The benchmark of Pareto efficiency is to “maximize the size of the pie.” It does not take into account the welfare implications of redistributions, since it implicitly assumes that those who gain can compensate those who lose via transfer payments.

exchange rate to a level where the gap between demand and supply for domestic goods is closed, i.e. where the market clears, but in moving there, the adverse balance sheet effects exert strongly contractionary effects on domestic demand.

It is rational and privately optimal for individual market participants to take exchange rates as given, since the impact of each individual player on the foreign exchange market is small.⁶ However, in aggregate the exchange rate – and by implication the financial health of balance sheets across the economy – is determined by the collective actions of optimizing individual market participants.

Private market participants fail to internalize this effect, and therefore excessively engage in actions that can lead to deteriorating balance sheets, trigger financial amplification and expose the economy to systemic crisis risk. In other words, in a world of imperfect capital markets, the wealth redistributions that are created by pecuniary externalities have real implications: they determine the health of balance sheets throughout the economy and thereby the extent of financial amplification effects. The pecuniary externalities on exchange rates therefore become real externalities.

Since individual market participants do not internalize these externalities, they generally undervalue the social benefits of holding net worth when financial amplification effects are at work. In an economy without financial imperfections, the private and the social valuation of liquid net worth always coincide, as both decentralized agents and a social planner value an additional unit of liquidity and an additional unit of consumption or investment equally.

When balance sheet effects are at work and create financial amplification, decentralized agents only recognize that additional liquidity would relax the private constraints on their balance sheets and allow them to access more finance at the given level of the exchange rate. They fail to account for the social benefits of additional liquidity, which consist of these private benefits plus the fact that an improvement in balance sheets across the economy raises aggregate demand, which appreciates the exchange rate and

⁶Even if some market participants have some market power, they will not fully internalize the social costs of the pecuniary externalities that result from their actions. For example, in a duopoly, each player would find it optimal to internalize only 50% of the pecuniary externalities.

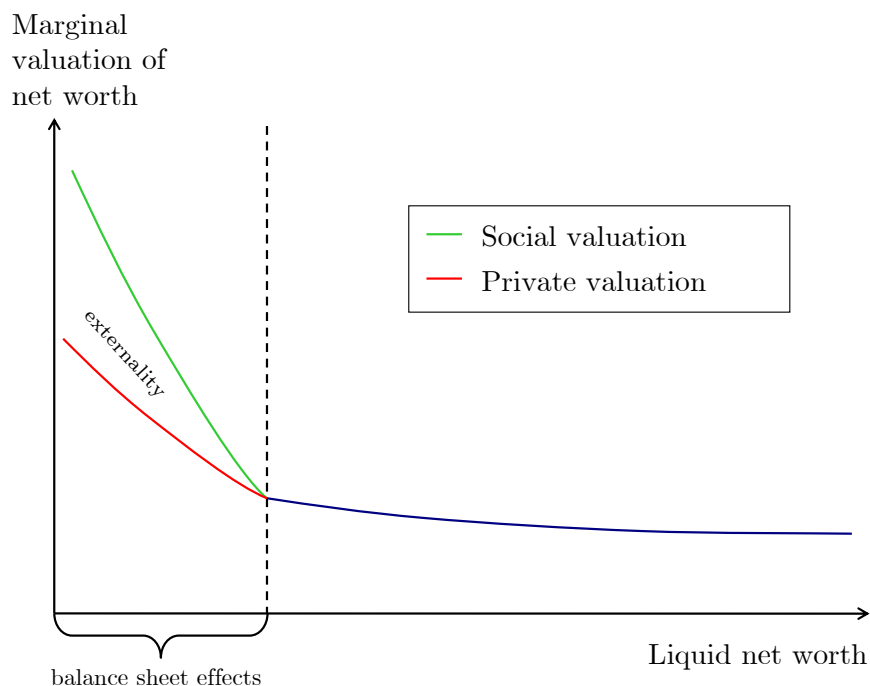


Figure 3: Private and social valuation of net worth

leads to positive financial amplification effects.

A social planner who can coordinate the actions of decentralized agents would internalize the externalities associated with balance sheet effects and would therefore value liquidity holdings more highly than decentralized agents. We have depicted the discrepancy between the two in figure 3: When liquid net worth falls below a certain threshold in the figure, we assume that contractionary balance sheet effects arise that trigger financial amplification. As a result, private agents undervalue the social benefits of liquid net worth.

One way of viewing externalities is as a coordination problem: if decentralized agents could coordinate their actions, they would collectively decide to take on a lower level of systemic risk, limiting the adverse exchange rate movements and the damage to balance sheets in crisis states. All agents would be better off from such action, but there is a free-rider problem: every individual agent has incentives to enjoy the greater macroeconomic stability resulting from the prudent behavior of other agents and – in the meantime – take on more risk himself so as to reach his private optimum.

A similar way of capturing our argument is that healthy balance sheets in the economy have the character of a public good since they lead to greater macroeconomic stability. Regulators who reduce the level of systemic risk in the economy provide a public good.

The state-contingent marginal valuation of liquidity plays a central role in all intertemporal and most intra-temporal allocations of decentralized market participants.⁷ The externalities that we identified therefore create distortions in a wide range of real decisions of decentralized agents. Since the nature of all of them is to increase the risk of systemic financial crises in emerging market economies, we term them in short *systemic externalities*. In the following we focus on a subset of the distortions that result from systemic externalities: overborrowing, excessive risk-taking, and excessive short-term debt.

Over-borrowing

Since individual agents do not internalize the full social cost of repayments in constrained states, they take on an excessive debt level and promise excessive repayments compared to the allocations that a constrained planner would choose (see Bianchi, 2010; Jeanne and Korinek, 2010a). When the economy experiences adverse shocks, the excessive debt level implies that decentralized agents experience more amplification, i.e. sharper declines in the exchange rate and in borrowing capacity than under the allocations chosen by a constrained planner. The free market equilibrium therefore exhibits excessive volatility.

A sample quantification of the externalities of foreign currency debt for the case of Indonesia is taken from Korinek (2010a) and is reported in table 1: in that country a one dollar debt repayment in 1998 imposed a 30.7% externality on the rest of the economy.

Pigouvian taxes or equivalent regulations would induce market participants to internalize the externalities that they impose on the rest of the economy. The idea behind

⁷Other terms for the state-contingent valuation of payoffs are pricing kernel, stochastic discount factor or intertemporal marginal rate of substitution.

Table 1: Externalities imposed by different financial instruments in Indonesia, 1998.

Asset category	Real gross return	Externality in 1998	Optimal tax
Dollar debt	218%	30.7%	1.54%
GDP-indexed dollar debt	190%	26.8%	1.34%
CPI-indexed rupiah debt	100%	14.1%	0.71%
Rupiah debt	63%	8.9%	0.44%
Stock market index	44%	6.2%	0.31%

such a tax is that it should raise the private cost of debt to the social cost, i.e. it forces private agents to account for the expected social loss that they create by exposing the country to greater crisis risk. For the case of Indonesia that is shown in the table, the optimal Pigouvian tax on dollar debt is estimated to be 1.54%.

Some argue that policymakers who decide on the optimal degree of financial regulation face a Pareto frontier along which there is a trade-off between financial stability and allocative efficiency, similar to the tradeoff of risk versus return faced by portfolio investors. According to that view, any form of financial regulation enhances stability at the expense of efficiency. The framework discussed in this paper clearly rejects that view: since there exist externalities in economies that are prone to financial amplification effects, financial regulation simultaneously enhances stability *and* efficiency – in the absence of regulation, an economy is inside the Pareto frontier, and well-designed regulation can make everybody better off.

Excessive risk-taking and underinsurance

Individual market participants take on too much systemic risk in their financing decisions (see Korinek, 2010a). When firms in emerging market economies choose how to finance themselves, they typically face a risk-return trade-off: financial instruments such as dollar debt are cheap, i.e. they are available at low interest rates, but they impose significant risk on borrowers in case the exchange rate depreciates. On the other

hand, financial instruments that involve more risk-sharing, such as local currency debt, or even more so equity, require a higher return that compensates international investors for the additional risk. Private agents choose their liability structure according to their private risk/return trade-off, but fail to internalize that a risky private balance sheet also imposes social costs.

Put differently, emerging market agents do not have proper incentives to take precautions against financial amplification effects, i.e. they will buy too little crisis insurance compared to a constrained planner who internalizes the amplification effects. Again, table 1 shows the magnitude of the externalities created by different financial instruments for the case of Indonesia during the 1998 financial crisis.

In the table, different forms of capital flows are ranked according to a pecking order of decreasing systemic risk and externalities: dollar debt is one of the most dangerous forms of finance, since the local currency typically depreciates during crises, which inflates the value of dollar liabilities just when domestic agents are least able to service their debt. CPI-indexed debt contracts or rupiah debt impose smaller externalities, whereas equity investment allow for a considerable degree of risk-sharing with foreigners, which reduces the externalities even more. These theoretical predictions about the riskiness of different forms of finance closely mirror the empirical findings on the effects of different forms of liabilities on stability and growth (see e.g. Mauro et al., 2007).

The real investment decisions of individual agents will also be distorted towards excessive investment in projects that are pro-cyclical and create socially costly liquidity shortfalls in systemic crisis states, and towards insufficient investment in counter-cyclical projects that deliver socially valuable payoffs in crisis states.

Excessive short-term debt

Another manifestation of risk-taking is that decentralized agents take on too much short-term debt (see Bengui, 2010). Long-term debt insures emerging market economies against rollover risk during systemic crises, i.e. against the risks that interest rates rise sharply or credit is rationed precisely when the country most needs funding. During such rollover crises, financial amplification effects occur and give rise to externalities.

Individual market participants do not internalize this and therefore take on too little long-term debt as insurance against rollover risk.

It is often argued that one of the reasons why short-term debt is prevalent in the financial system is that it provides superior incentives to borrowers compared to long-term debt (Calomiris and Kahn, 1991) – it allows lenders to demand repayment at any time that a borrower mis-behaves. While this makes the short-term debt an optimal private arrangement between borrower and lender, it disregards the social implications when rollover is refused.

5 Interest Rates and Financial Fragility

A global environment of low interest rates is particularly conducive to create financial fragility and the associated externalities. As we emphasize in Jeanne and Korinek (2010b), private market participants choose their liability structure as an optimal trade-off between risk and return. Low interest rates make it cheap to borrow and increase the expected returns from leverage. Greater expected returns make it optimal to take on more risk, implying higher leverage. When the economy experiences a negative shock – no matter if it originates within or outside the country – higher leverage entails more financial instability, greater financial amplification effects and more severe crises.

Low global interest rates and stronger regulation of capital flows to emerging markets are therefore close complements. Such regulations are particularly desirable in times when cheap international capital creates the temptation for domestic borrowers in emerging market economies to take on large leverage or significant financial risks.

There have been two main reasons why emerging market economies experienced low interest rates in recent times, neo-mercantilism and crises in other parts of the world economy. Neo-mercantilism describes policies that aim to encourage exports so as to obtain growth benefits in the domestic economy, for example because exporting is associated with spillover effects from learning-by-doing (Korinek and Serven, 2010). Such policies have been implemented in a number of Asian economies over the past decade and have led to large and persistent current account surpluses there. The resulting

capital outflows increased the global supply of savings and pushed world interest rates down.

A second important reason for low global interest rates are financial crises in other parts of the world. If one part of the world economy experiences a crisis, it suffers capital outflows and is typically constrained in its access to world capital for the following years. This implies that the global supply of savings has to find another place to be invested, and the supply of capital to healthy economies is increased, leading to lower interest rates in that part of the world economy (Korinek et al., 2010). The current wave of capital flows to emerging economies in Asia and Latin America that started in mid-2009 can be interpreted in this light, since growth prospects in the US and Europe remain subdued and there are few promising investment opportunities in the latter economies.

6 Conclusion

The goal of this paper is to provide an introduction to the theory of externalities that arise from emerging market financial crises. Modern financial crises are characterized by strong feedback loops between falling aggregate demand, declining exchange rates and deteriorating balance sheets in the affected economies. As we discussed it is rational for market participants to not internalize these feedback effects and take the aggregate level of financial fragility in the economy as given. This creates externalities that distort the optimizing decisions of individual market participants towards an excessive level of risk-taking, in particular towards over-borrowing, excessive risk in their financing arrangements, and excessive short-term debt.

According to our analysis, policymaker should aim to internalize these externalities and coordinate the actions of market participants toward a lower level of systemic risk. They could do so by inducing private agents to reduce their exposure to risky forms of external finance, in particular to dollar debt and short-term debt. Mitigating these externalities would increase both stability and efficiency in the affected emerging market economies and would make everybody better off.

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