Hoarding international reserves versus a Pigovian tax-cum-subsidy scheme: Reflections on the deleveraging crisis of 2008–2009, and a cost benefit analysis

Joshua Aizenman

Department of Economics, E2, 1156 High St., Santa Cruz, CA, 95064; UCSC and the NBER, USA

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ABSTRACT

We outline the case for supporting self-insurance by imposing a tax on external borrowing in a model of an emerging market. Entrepreneurs finance tangible investments via bank intermediation of foreign borrowing, exposing the economy to negative fire-sale externalities at times of deleveraging; a risk that increases with the ratio of aggregate external borrowing to international reserves. Price taking economic agents ignore their marginal impact on the expected cost of a deleveraging crisis. The optimal borrowing tax reduces the distorted activity, external borrowing, and induces borrowers to co-finance the precautionary hoarding of international reserves.

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1. Introduction

The global financial crisis is a watershed event that calls for a reexamination of the global financial architecture. In this paper we focus on one aspect of this re-evaluation: the implications of the crisis on emerging markets (EMs) use of precautionary measures aiming at mitigating their exposure to financial crises. The global liquidity-crisis renewed the debate about the desirability of unfettered financial integration of developing countries. It also raises questions about the degree to which hoarding a large stockpile of international reserves (IRs) suffices to deal with the financial exposure of EMs in an efficient way. We overview this debate, and assess possible future options.

In Section 2 we discuss the degree to which IR provided self-insurance to EMs during the deleveraging crisis of 2008–2009, pointing out that the record is mixed. Half of the EMs depleted not more than a 1/3 of their initial stocks of IR, and the other half adjusted mostly by depreciation, with small changes of their IR. Several EMs found that initial large IR war-chests were not enough to prevent runs on IR and large depreciations; runs that were abated in some countries only with the proliferation of deep swaps lines. This raises a concern about the desirability and the efficacy of hoarding a large stock of IR as a mean of self-insurance. In Section 3 we outline the case for supplementing hoarding IR with a tax on external borrowing, and a subsidy for hoarding IR. We describe a model of an emerging market where entrepreneurs finance investment via bank intermediation of foreign borrowing. Such bank intermediation exposes the economy to the risk of a sudden stop and deleveraging crisis that

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E-mail address: jaizen@ucsc.edu

may induce costly premature liquidation of tangible investment. Hoarding IR mitigates this risk. We show that the optimal allocation involves a tax on external borrowing, and a subsidy on hoarding IR.

Our proposed tax scheme is akin to a borrowing tax in the presence of costly sovereign default and moral hazard (see Aizenman and Turnovsky (2002)). That paper studied costly financial intermediation between lenders and emerging markets in the presence of sovereign risk. Moral hazard was modeled on the lender side, due to the 'too-big-to-fail' doctrine—large defaults of major banks are destabilizing, hence agents expect public bailout for large defaults. Aizenman and Turnovsky (2002) showed that moral hazard subsidizes sovereign debt, magnifying considerably the distortions associated with external borrowing. This magnification effect is large enough to imply that, starting with no active reserve requirement policy, both lenders and borrowers would benefit by imposing reserve requirements. Hence, the proliferation of the 'too big to fail' doctrine strengthens considerably the case for prudent regulations of sovereign borrowing.

The contribution of the present paper is to show that a Pigovian tax-cum-subsidy is optimal even in the absence of moral hazard triggered by sovereign risk and expected bailouts. The logic of this Pigovian tax-cum-subsidy scheme follows from the negative externalities associated with large inflows of capital. If reserves are not plentiful, a deleveraging crisis induces a large number of banks to liquidate investments at the same time. This would depress the selling price of tangible capital, increasing the cost of deleveraging—the fire-sale effect. Large deleveraging in emerging markets increases the demand for foreign currency. If foreign currency reserves are limited, the deleveraging pressure would bid up the price of foreign currency, requiring each bank to liquidate more of its investment to fund a given deleveraging pressure. While each bank takes potential fire-sale prices as given, taken together, their actions as a group induce the fire-sale prices. This leads to a fire-sale externality, akin to congestion (see Krugman (2000) on the experience of Korea in the 1997–1998 crisis).

We show in Section 3 that the fire-sale externality *reduces* the marginal social benefit of borrowing below the private benefit, and *increases* the marginal social benefit of hoarding IR above the private one. The optimal tax-cum-subsidy scheme reduces the distorted activity (external borrowing), inducing the borrowers to co-finance the precautionary hoarding of IR by means of the borrowing tax. Such a scheme may mitigate some of the recent concerns dealing with the costs of hoarding and using IR for self-insurance purposes. In Section 4 we close the paper with a discussion.

The contribution of this paper is in identifying the impact of the fire-sale externalities on the external borrowing policies and hoarding reserves enacted by the EMs' central banks.[1] Fire-sale externalities in baking in a closed economy were studied by Bhattacharya and Gale (1987), and Caballero and Krishnamurthy (2004) in international finance. The use of Pigovian schemes to deal with financial externalities has been recognized by the literature propagated by the global crisis of 2008–2009, exemplified by Adrian and Brunnermeier (2009). Korinek (2009) identified the undervaluation by individual agents of the social benefits of liquidity as an externality, inducing investors to take on too much systemic risk in their financing and investment decisions. Bianchi and Mendoza (2010) studied overborrowing and financial crises in business cycles and asset prices with collateral constraints, where private agents do not internalize the effects of their individual borrowing plans on the market price of assets at which collateral is valued, and on the wage costs relevant for working capital financing. They inferred that a state-contingent tax on debt of about 1%, on average, supports optimality. As is exemplified by Benigno et al. (2010) and the references therein, borrowing constraints by themselves have ambiguous implications regarding over or under borrowing, depending on the parameterization and the structure of the economy.[2] Bianchi (2010) and Korinek (2010) studied the way capital flow volatility can trigger feedback cycles that work through the depreciation of the real exchange rate.

Jeanne and Ranciere (2005) and Korinek (2010) studied similar amplifications in an open economy. They found that when financial constraints are binding, financial amplification effects arise as declining collateral values, tightening financial constraints and falling consumption mutually reinforce each other. Such amplification effects are not internalized by individual borrowers and provide a natural rationale for taxation of international borrowing. Our paper shares the spirit of Jeanne and Ranciere (2005) and Korinek (2010), focusing on the adverse welfare effects of fire-sale externalities triggered by a deleveraging crisis. The bourgeoning recent literature implies several mechanisms at work, needing more empirical research to quantify the importance of these factors. The revealed preferences of Emerging Markets' central banks in the aftermath of the 2008–2009 global crisis has been that taxing surges in external borrowing of domestic banks is a discretionary tool supporting prudential supervision. This sentiment is reflected in the recent recommendation of Hyun Song Shin, advising South Korea's government, "… it should tax the wholesale liabilities of the country's banks. Whenever a South Korean bank wants to expand its loan book faster than its retail deposits, it relies on foreign borrowing to fill the gap. So a levy on these extra liabilities would serve to limit banks' borrowing abroad."[3] Our paper provides a cost benefit rationale for this position.

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[1] The estimated 'fire-sale discounts' for equities and real estate are in the range of 10% (equities) and 15% (real estate) (see Coval and Stafford (2007), Pennington-Cross (2006) and Clauretie and Daneshvary (2009)). These studies focused on the US. The fire-sale discounts may be even higher in less liquid markets, as may be the case in Emerging Markets during deleveraging crises.

[2] They show that overborrowing can occur under special circumstances, including large shocks and impatient agents, but this result is model and parameter dependent. They conclude that there is no clear cut rationale to prefer ex-ante or ex-post policies to minimize the likelihood or the severity of financial crises.

[3] See The Economist, November 11, 2010 over-viewing Shin's position in the context of the challenges facing EMs in times of large inflows of foreign capital chasing domestic yields.