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## Financial integration, capital misallocation and global imbalances<sup>☆</sup>

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This paper shows that in a stylized model with two countries, characterized by different levels of financial development, the following facts can be replicated: 1) persistent current account surpluses and 2) high TFP growth in China. Under autarky, entrepreneurs in the emerging country overinvest in short-term projects and underinvest in long-term projects because short-term assets help them secure long-term investments in the presence of credit constraints. This creates an aggregate misallocation of capital. When financial markets integrate, entrepreneurs with long-term projects can have access to cheaper short-term assets abroad, which leaves them with more resources to invest in their projects. This both reduces capital misallocations and generates capital outflows.

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### 1. Introduction

The purpose of this paper is to explain two stylized facts that have attracted economists' attention. The first one is the so-called global imbalances: (1) *China has accumulated a considerable amount of net*

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foreign assets. Fig. 1(a) shows that its net external position, as a share of world GDP, has increased steadily since 1996. Actually, this surge can be dated back to 1990–1993 when the most illiquid assets, FDI, are excluded. This accumulation of net foreign assets in China is the main counterpart of the negative external position of the US, as illustrated in Fig. 1(a). The second fact is illustrated in Fig. 1(b): (2) *growth of total factor productivity (TFP) in China relatively to the US has accelerated*. Fig. 1(b) shows that China's relative TFP increased steadily during the period.<sup>1</sup> Between 1980 and 1989, TFP moved from 10% of the US value to 13%, which corresponds to an average catch-up rate of 2.5% per year. From 1990 to 2007, it moved from 13.5% to 32%, which corresponds to an average catch-up rate of 5%. This relative TFP growth contributed to two thirds of the relative growth of output per worker in China during that last period.

This paper lays down a three-period stylized model to explain this conjunction of TFP growth and capital outflows in the form of liquid assets as the endogenous outcome of financial integration. It focuses on the role of financial integration between US and China. Indeed, despite limited *de jure* financial integration, apparent in Fig. 2 through the stability of the Chinn and Ito (2007) index, China has experienced a significant trend of *de facto* integration during the period. Financial integration increases steadily before 1990, then accelerates after 1990 and stabilizes in the end of the nineties at approximately 50% of the US level.<sup>2</sup> This apparent contradiction between *de jure* and *de facto* integration has to be related to the increasing role of public flows. Fig. 1(a) shows that reserves constitute the bulk of financial outflows. Despite legal restrictions on capital flows, private agents indirectly hold foreign assets thanks to the intermediation role played by the Central Bank.<sup>3</sup>

The key feature of the framework is the interaction between financial integration, financial development and capital misallocation. Under autarky, entrepreneurs in the emerging country overinvest in short-term projects and underinvest in long-term projects because short-term assets help them secure long-term investments in the presence of credit constraints. This creates an aggregate misallocation of capital. When financial markets integrate, entrepreneurs with long-term projects can have access to cheaper short-term assets abroad, which leaves them with more resources to invest in their projects. This both reduces capital misallocations and generates capital outflows.

We model these effects in a three-period model where two types of entrepreneurs invest in technologies with decreasing returns on capital and in a liquid bond. Some entrepreneurs have access to short-term projects while the others have access to long-term projects. Long-term projects, because they take more time to mature, can be subject to liquidity shocks that might threaten the completion of the projects, especially in the presence of credit constraints, as in Holmstrom and Tirole (1998).<sup>4</sup>

Because of liquidity shocks and credit constraints, the investment behavior of entrepreneurs with long-term projects has two features that are key to our results: (i) the demand for bonds is “excessive”, in the sense that it is larger than in the absence of credit constraints; (ii) bonds and long-term investment are complements, in the sense that a decrease in the price of bonds (i.e. an increase in the interest rate) has a positive effect on investment in long-term projects.<sup>5</sup> The first

<sup>1</sup> Capital stocks in EM and U are estimated with the perpetual inventory method, using the procedure of Caselli (2004) and the data from Heston et al. (2009). In order to calculate TFP, we calculate capital stocks using a perpetual inventory method, then we use the following definition of production per worker:  $y = Ak^{\alpha}(1 - \alpha)$ , where  $x$  is the level of capital per worker and  $A$  is TFP. TFP values in China and the US are then estimated as  $y/x^{\alpha}$ , where  $\alpha = 0.3$ .

<sup>2</sup> As another evidence of *de facto* financial integration, see Cheung et al. (2006). They examine the deviations from real interest parity, uncovered interest parity, and relative purchasing power parity, and find that China is surprisingly financially integrated. They also document that the magnitude of deviations from the parity conditions is shrinking over time.

<sup>3</sup> See also Song et al. (2011). They document the parallel trend of bank deposits and reserves, which is consistent with the idea of savings-driven accumulation of reserves by the Central Bank.

<sup>4</sup> Several papers examine the macroeconomic consequences of liquidity risk in similar three-period settings. See, among others: Caballero and Krishnamurthy (2001), Holmstrom and Tirole (2002), Aghion et al. (2010), Chen and Leung (2008), Lorenzoni (2008), Brutti (2010) and Broner et al. (forthcoming).

<sup>5</sup> Bacchetta and Benhima (2010) also highlight this property of bonds in the presence of credit constraint and working capital but they develop a representative agent model that does not allow them to study misallocations.

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