

Productivity Growth and Capital Outflow: The Case of a Small Opening Economy

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1 Introduction

The standard economic theory suggests that capital should flow from rich to poor countries, unless the poor countries have lower overall productivity (Lucas, 1990) or a higher relative cost of investment (Caselli and Feyrer, 2007). Another prediction of the standard theory, arguably less controversial, is that capital should flow into countries undergoing a sustained increase in total factor productivity (TFP). The experiences of developing countries during the last three decades contradict this prediction. Capital tends to flow out of countries with fast-growing productivity, and into those with poorer performance (Prasad et al., 2007; Gourinchas and Jeanne, 2008).

From the time-series data of capital flows and TFP, we observe that many episodes of sustained TFP growths follow large-scale reforms and liberalizations. The periods of increasing net foreign asset positions (capital outflows) coincide with such episodes. A successful explanation of these phenomena requires both a theory of TFP dynamics and a model of international factor reallocation.

In this paper, we present a quantitative framework where economy-wide growth-enhancing reforms and liberalizations lead to a sustained period of productivity growth *and* capital outflows.

We study the transitional dynamics of open economies with heterogeneous production units and imperfect domestic financial markets. In our model, a reform initiates reallocation of resources from previously-subsidized producers to productive entrepreneurs who were not subsidized previously and were hence relatively poor. The reallocation is gradual because of the frictions in the domestic financial market. In the early stages of the post-reform transition, the problem for this economy is misallocation of capital, not under-accumulation. With demand for capital rental restricted by the poorly-functioning domestic financial markets, the surplus capital goes overseas in search of a higher return.

Heterogeneous production units and imperfect financial markets are important elements of endogenous TFP dynamics (Buera and Shin, 2007). We model financial frictions in the form of collateral constraints founded on imperfect enforceability of contracts. We consider economies where,

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in addition to financial frictions, individual entrepreneurs are subject to idiosyncratic distortions, e.g., idiosyncratic taxes/subsidies, and sector-specific or size-dependent policies/regulations. Such distortions help explain low aggregate productivity levels in less developed economies (Restuccia and Rogerson, 2008; Guner et al., 2008; Hsieh and Klenow, 2007).

There are three kinds of reforms that we consider for our model economies: (i) a reform that addresses idiosyncratic distortions; (ii) trade and capital account liberalization; (iii) a reform of domestic financial institutions.

In our numerical exercises, we consider three different sequencing of reforms. All three exercises start with the same initial condition. We construct this initial condition by computing a stationary equilibrium of an economy that (i) has idiosyncratic distortions, (ii) is closed to goods and capital flows, and (iii) has poorly-functioning domestic financial markets.

In our first exercise, starting from this initial condition, we implement a reform that eliminates the idiosyncratic distortions that interfere with efficient allocation of factors across entrepreneurs. At the same time, we liberalize the goods and capital flows in and out of this economy. We assume that domestic financial frictions remain as before. This sequencing of reforms—removing idiosyncratic distortions and opening up to international capital markets, while not reforming the domestic financial institutions—reflects the actual experiences during the 1980s of Chile, India, Israel, Korea, Mauritius, and Taiwan. For these countries, domestic financial markets remained relatively underdeveloped until the late 1990s. In fact, the reform of domestic financial institutions in emerging economies surfaced onto the center stage of international policy debate after the East Asian and Russian financial crises of the late 1990s (Mishkin, 2003; Stulz, 2005; Kaminsky and Schmukler, 2008).

In our model, the elimination of idiosyncratic distortions leads to a sustained growth in productivity. TFP rises because the removal of idiosyncratic distortions leads to efficient reallocation of resources. The rise is gradual and persistent because the underdeveloped domestic financial markets can reallocate capital only slowly over time. Productive-but-poor individuals have to work for wage for a while before they can save up enough collateral and enter into entrepreneurship. In addition, even after they start their business, it takes time for them to overcome the credit constraints and operate at the maximal-profit scale.

More important, capital flows out of this economy. Intuitively, in a closed economy with financial frictions, the equilibrium interest rate is lower than in an economy with well-functioning financial markets: Credit frictions restrict the demand for credit by constrained entrepreneurs, and they also induce constrained entrepreneurs to accumulate more assets for self-financing purposes (more supply of capital). When capital flows are liberalized and this small, now-open economy takes as given the world interest rate, there is an excess supply of capital at the new higher rental rate of capital. The surplus capital gets employed overseas. The removal of idiosyncratic distortions brings in another force in the same direction. Immediately following the reform, the demand for capital from domestic production units falls further, as the previously-subsidized entrepreneurs either exit or curtail their production, while the now-productive individuals cannot enter or operate at an

efficient scale right away because of the financial constraints. As the productive entrepreneurs enter and increase their scales of operation over time, domestic demand for capital goes up. This increased demand is matched by accumulation of assets (supply of capital) by these entrepreneurs for self-financing purposes, and the net foreign asset position remains stable.

In our second exercise, we reform the domestic financial institutions as a part of a broader reform package that also eliminates idiosyncratic distortions and liberalizes capital accounts. This is a reasonable description of an economy that implements an across-the-board reform. The drastic reforms of Estonia in the early 1990s are one example.

In this exercise, TFP increases for two reasons: the removal of idiosyncratic distortions, and the improved financial markets. As in the first exercise, as we eliminate idiosyncratic distortions and open up the economy, capital flows out of this economy initially because the domestic rental rate of capital rises to the world level. However, the financial market in this reformed economy functions better than that in the first exercise. The reallocation of capital among heterogeneous producers are expedited, and the TFP grows much faster than in the first exercise. This TFP growth reflects the fact that productive individuals enter entrepreneurship more quickly, and that their scale of operation grows faster. The initial contraction in domestic capital demand is quickly reversed, and capital eventually flows in from overseas, bringing down the net foreign asset position to the negative territory. It is informative to compare this exercise with one using the standard neoclassical growth model. In our setup, an economy with perfect domestic credit markets is isomorphic to the neoclassical growth model. If the productivity of the aggregate production function goes up because of the removal of idiosyncratic distortions, capital will flow into this small open economy and equalize the return to capital with the world level instantaneously. Although our domestic financial market reform does not take our economy all the way to the perfect credit market benchmark, we obtain results that are qualitatively similar.

Our third and final exercise is identical to the first one, except that we impose a wedge to discourage capital *outflows* after the reform. There are two reasons for considering this particular exercise. First, it reflects the actual policies that many of the reforming countries adopted. In most incidents of capital account liberalizations, the loosening of restrictions on capital outflows were back-loaded (Beim and Calomiris, 2001). Second, the reform in our first and main exercise consists of two elements: eliminating idiosyncratic distortions and opening up capital account. The results obviously convolute the effect of both elements, and this third exercise will help us partly disentangle the two. In this exercise, we implement the same reform as in our first exercise. However, we introduce a wedge on the returns to saving such that the returns to saving do not change following the reform, while the capital rental rate is equalized to the prevailing world rate. The lower returns to saving discourage accumulation of financial assets by domestic residents, and hence capital outflows. Nevertheless, we obtain a result that is similar to that in the first exercise. Capital flows out, as domestic financial frictions slow down the entry and growth of productive entrepreneurs, and there is surplus capital not used domestically. The lower deposit rate discourages accumulation of financial assets, and the magnitude of capital outflows (and hence

the level of net foreign asset positions) is smaller than in the first exercise. However, it is still positive, and the model still generates concurrent TFP growth and capital outflows following the reform.

In all the exercises, the reforms simultaneously implemented the removal of idiosyncratic distortions and the opening up of capital accounts. To understand why we model the reforms this way, consider the following. One possibility is for the country to open up the capital account without removing idiosyncratic distortions. As is discussed above, capital will still flow out of this country, because at the new interest rate there is excess supply of capital in the domestic rental market. However, TFP will remain largely unchanged, and we will not be able to address the observed co-movement of TFP and capital flows. Another possibility is to implement a reform to eliminate idiosyncratic distortions while remaining a closed economy. The TFP will increase over time as resources are reallocated, but by assumption we will not observe any capital flows.

Given the different results we obtain in the first and the second exercises, it is natural to ask which sequencing of reforms are more accurate descriptions of emerging economies' experiences. There is ample documentation showing the prevalence of the sequencing in our first experiment: Reduction of sector-specific or size-dependent taxes and subsidies, along with capital account liberalizations, preceded reforms of domestic financial institutions in the countries that are relevant for our analysis. In fact, the first two are often referred to as “first-generation” reforms, while domestic financial institutions belong to the domain of “second-generation” reforms (Camdessus, 1999).

We draw the following conclusions from our exercises. To assess the effects of the liberalizations of cross-border capital flows, it is important to first understand their interaction with various distortions that interfere with the allocation of production factors within an economy. It is also important to understand the scope and sequencing of reforms that will be undertaken with the capital account liberalization. Domestic financial frictions delay reallocation of resources following the elimination of distortions. This slow reallocation of resources is reflected on the persistent growth of TFP. At the same time, capital flows out of these economies as investment collapses in previously-subsidized producers and industries, and investment in productive producers and industries is slow to materialize because of domestic financial frictions. The rest of this paper is an attempt at a quantitative exploration of this mechanism.

2 Empirical Motivation: Allocation Puzzle

In this section we review the evidence on capital flows and productivity growth. First, we reproduce the findings of Gourinchas and Jeanne (2008) for the 1980–1995 period: countries that exhibit large TFP growth tend to increase their net foreign asset position.¹ We then explore in more detail the time series of TFP and net foreign asset positions of six countries that implemented large-scale economic reforms and liberalizations in this period: Chile, India, Israel, Korea, Mauritius, and Taiwan. As we show below, the large-scale economic reforms in these countries led to a sustained

¹Related evidence is presented by Prasad et al. (2007).

period of TFP growth accompanied by net accumulation of foreign assets.

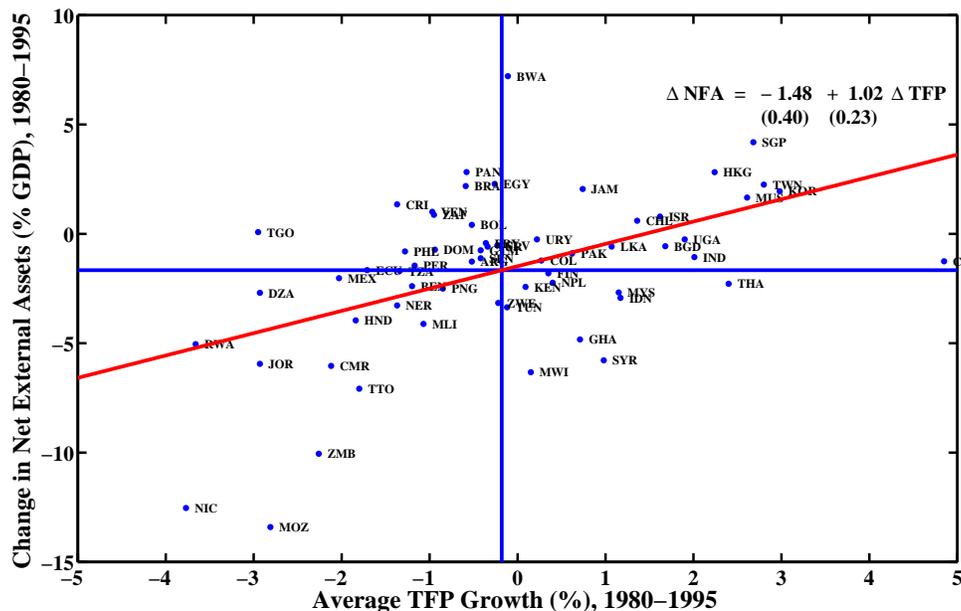


Fig. 1: Allocation Puzzle. The horizontal axis measures the average TFP growth rates over 1980–1995. The vertical axis measures the average rate of change in net foreign asset positions over the same period. The net foreign asset position data is from Lane and Milesi-Ferretti (2006). The cross represents unweighted sample means of the two variables.

Figure 1 illustrates the relationship between the changes in net foreign asset positions and productivity growth. TFP growth is defined as per-capita growth net of the contribution of physical and human capital.² As is clear from the figure, there is a significant positive relationship between the net accumulation of foreign assets (capital outflows) and TFP growth. On average, one percentage point increase in TFP growth rate translates into one percentage point increase in the net foreign asset to GDP.

We focus on the 1980–1995 period for two reasons. Firstly, 1980s saw the first wave of capital account liberalizations in emerging economies. Secondly, many emerging economies adopted an explicit policy of improving their net foreign asset positions in the aftermath of the East Asian and Russian financial crises of the late 1990s. As we focus on the relationship between productivity and capital flows, our framework is not designed for an analysis of crises or such post-crisis behavior.

We take a closer look at the countries in the northeast quadrant (above-average productivity growth and above-average capital outflows), and explore the time-series of their TFP and net foreign asset positions. For six of these countries, we can identify and date large-scale reforms that coincide with the onset of TFP growth. They are: Chile, India, Israel, Korea, Mauritius, and Taiwan. We do not consider Hong Kong and Singapore for two reasons. Firstly, unlike the six countries above, we could not clearly date a large-scale reform episodes for Hong Kong or Singapore. More important, Hong Kong and Singapore were developing into off-shore banking centers during this period, and

²We use the series from Bernanke and Gürkaynak (2001) who assume a 7% return to schooling.

hence interpreting their net foreign asset positions is tricky. See Lane and Milesi-Ferretti (2006) on this issue. Also note that our sample period precedes the massive acquisition of foreign assets by China (far right side in Figure 1).

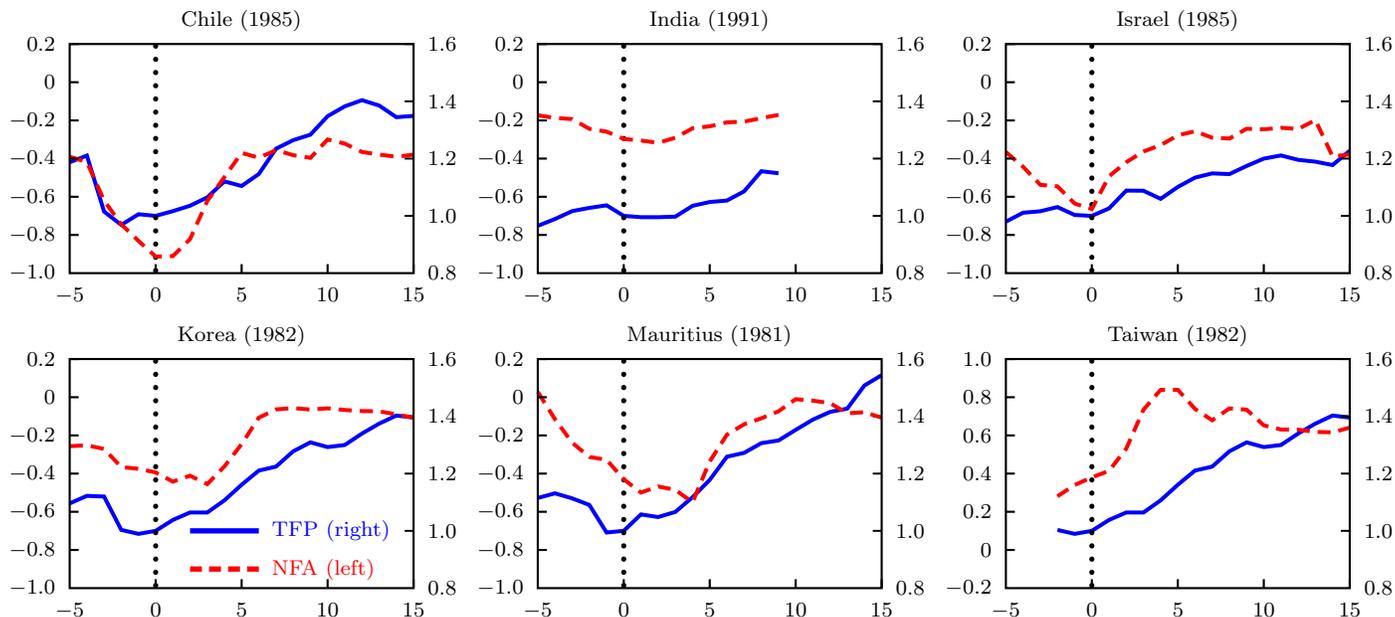


Fig. 2: TFP and Net Foreign Asset Position. Year 0 in the horizontal axis (unit in years) is the year of reform implementation, which is shown in parentheses next to the country name. Net foreign asset position as a fraction of GDP is measured on the left scale, and aggregate TFP can be read off the right scale. TFP is normalized by its value in year 0.

Figure 2 shows the evolution of net foreign asset positions (dashed lines) and productivity (solid lines) before and after major economic reforms. The year of the reform is set to zero, and the two variables are plotted for the surrounding 20 years. Net foreign asset positions are measured relative to GDP (left scale), and TFP is relative to the year zero level (right scale).³ In all six cases, reforms initiated a sustained period of productivity growth. At the same time, in all these episodes, capital flows out of these countries, and their net foreign asset positions increase. Figure 2 shows that the relationship in Figure 1 is not a result of time aggregation.

3 Model

The above empirical observations challenge us to construct a model of TFP dynamics and capital flows. We propose a model with individual-specific technologies and imperfect credit markets. Such a model has been used to study endogenous TFP dynamics (Buera and Shin, 2007).

In each period, individuals choose either to operate an individual-specific technology—i.e. become entrepreneurs, or to work for a wage. This entrepreneur-worker occupation choice allows for

³The dates of the reforms are 1981 for Mauritius, 1982 for Korea and Taiwan, 1985 for Chile and Israel, and 1991 for India. See the appendix for a description of these reform episodes. These dates are consistent with the findings of Sachs and Warner (1995) and Wacziarg and Welch (2003).

endogenous entry and exit in and out of the production sector, which are an important channel of resource reallocation. Imperfection in credit markets is modeled with a collateral constraint on capital rental that is proportional to an individual's wealth.

Individuals are heterogeneous with respect to their entrepreneurial ability and wealth. Our model generates endogenous dynamics for the joint distribution of ability and wealth. This ability-wealth dynamics will prove to be crucial for understanding macroeconomic transitions. In addition, heterogeneity in entrepreneurial ability is essential in modeling how resource misallocation leads to lower output and TFP.

We consider both an economy that is closed to capital flows and a small open economy facing a constant world interest rate. However, in this section, we do not consider idiosyncratic distortions. We show how to introduce idiosyncratic distortions into our model in Section 4.1.2.

Heterogeneity and Demographics Individuals live indefinitely, and are heterogeneous with respect to their wealth a_t and their entrepreneurial ability e_t . An individual's ability follows a stochastic process. In particular, individuals retain their ability from one period to the next with probability ψ . It is assumed that this ability shock is i.i.d. across individuals. With probability $1 - \psi$, an individual draws a new entrepreneurial ability. We denote by $\mu(e)$ the measure of type- e individuals in the invariant distribution. We denote by $G_t(e, a)$ the cumulative density function for the joint distribution of ability and wealth at the beginning of period t .

The population size is normalized to one, and there is no population growth.

Preferences Individuals discount their future utility using the same discount factor β . The preferences over contingent plans for the consumption sequence of a dynasty from the point of view of an individual in period t are represented by the following expected utility function:

$$\mathbb{E}_t \sum_{s=t}^{\infty} \beta^{s-t} u(c_s).$$

Technologies In any given period, individuals can choose either to work for wage or to operate an individual-specific technology. We label the latter option as entrepreneurship. We assume that an entrepreneur with talent e who uses k units of capital and hires l units of labor produces according to the following production function:

$$f(e, k, l),$$

which is assumed to be strictly increasing in all its arguments, and strictly concave in capital and labor, with $f(0, k, l) = 0$ and $\lim_{e \rightarrow \infty} f(e, k, l) = \infty$.

Credit Markets Productive capital is the only financial asset in the economy. There is a perfectly-competitive financial intermediary that receives deposits, and rents capital to entrepreneurs. If the economy is open to capital flows, the intermediary can rent capital to and from

foreigners at the world rental rate of capital $r^* + \delta$, where r^* is the constant world interest rate and δ is the depreciation rate. Alternatively, if the economy is closed to capital flows, the interest rate is r_t , and the rental cost of capital is $r_t + \delta$.

We assume that entrepreneurs' capital rental (k) is limited by a collateral constraint $k \leq \lambda a$, where a is financial wealth and λ measures the degree of credit frictions, with $\lambda = +\infty$ corresponding to perfect credit markets, and $\lambda = 1$ to financial autarky where all capital has to be self-financed by entrepreneurs.

Our specification captures the common prediction from models of limited contract enforcement—that is, the amount of credit is limited by individuals' wealth. At the same time, its parsimoniousness enables us to analyze quantitative effects of financial frictions on aggregate dynamics without losing tractability. This same specification has been widely used in the literature on financial frictions and entrepreneurship (Evans and Jovanovic, 1989), and also in the literature on credit frictions and business cycles (Bernanke et al., 1999).

Our collateral constraint can be derived from the following limited enforcement problem. Consider an individual with financial wealth a (deposited in the financial intermediary) at the beginning of a period. Assume that she rents k units of capital. Then she may choose to abscond with a fraction $(1/\lambda)$ of the rented capital. The only punishment is that she will lose her financial wealth a deposited in the intermediary. In particular, she will not be excluded from any economic activities in the future. Actually she is allowed to instantaneously deposit the stolen capital k/λ and continue being a worker or an entrepreneur. Note that λ in this context measures the degree of capital rental contract enforcement, with $\lambda = +\infty$ corresponding to perfect enforcement and $\lambda = 1$ to zero enforcement. In the equilibrium, the financial intermediary will rent capital only to the extent that no individual will renege on the rental contract, which implies a collateral constraint $k/\lambda \leq a$ or $k \leq \lambda a$.

It should be noted that we focus on within-period borrowing, or capital rental, for production purposes. We do not allow borrowing for intertemporal consumption smoothing in our model, which implies $a \geq 0$.

Individuals' Problem The problem of an agent in period t can be written as:

$$\begin{aligned} \max_{\{c_s, a_{s+1}\}_{s=t}^{\infty}} \mathbb{E}_t \sum_{s=t}^{\infty} \beta^{s-t} u(c_s) \\ \text{s.t. } c_s + a_{s+1} \leq \max\{w_s, \pi(a_s; e_s, w_s, r_s)\} + (1 + r_s)a_s, \quad \forall s \geq t \end{aligned} \quad (1)$$

where e_t , a_t and the sequence of wages and interest rates $\{w_s, r_s\}_{s=t}^{\infty}$ are given, and $\pi(a; e, w, r)$ is the profit from operating an individual technology. This indirect profit function is defined as:

$$\pi(a; e, w, r) = \max_{l, k \leq \lambda a} \{f(e, k, l) - wl - (\delta + r)k\}.$$

The input demand functions are denoted by $l(a; e, w, r)$ and $k(a; e, w, r)$.

A type- e individual with current wealth a will choose to be an entrepreneur if profits as an entrepreneur, $\pi(a; e, w, r)$, exceed income as a wage earner, w . This occupational choice can be represented by a simple policy function. Type- e individuals decide to be entrepreneurs if their current wealth a is higher than the threshold wealth $\underline{a}(e)$, where $\underline{a}(e)$ solves:

$$\pi(\underline{a}(e); e, w, r) = w.$$

For some e , there may not exist such an \underline{a} . In particular, if e is too low, then $\pi(a; e, w, r) < w$ for all a . In this case, this type of individuals will never become entrepreneurs. Intuitively, individuals of a given ability choose to become entrepreneurs if they are wealthy enough to run their businesses at a profitable scale. Similarly, agents of a given wealth choose to become entrepreneurs only if their ability is high enough.

Competitive Equilibrium (Closed Economy) Given $G_0(e, a)$, a competitive equilibrium in this economy consists of sequences of joint distribution of ability and wealth $\{G_t(e, a)\}_{t=1}^{\infty}$, allocations $\{c_s(e_t, a_t), a_{s+1}(e_t, a_t), l_s(e_t, a_t), k_s(e_t, a_t)\}_{s=t}^{\infty}$ for all $t \geq 0$, and prices $\{w_t, r_t\}_{t=0}^{\infty}$ such that:

1. Given $\{w_t, r_t\}_{t=0}^{\infty}$, e_t , and a_t , $\{c_s(e_t, a_t), a_{s+1}(e_t, a_t), l_s(e_t, a_t), k_s(e_t, a_t)\}_{s=t}^{\infty}$ solves the agent's problem in (1) for all $t \geq 0$;
2. The labor and capital markets clear at all $t \geq 0$, which by Walras' law implies goods market clearing as well:

$$\sum_{e \in \mathcal{E}} \left[\int_{\underline{a}(e, w_t, r_t)}^{\infty} l(a; e, w_t, r_t) G_t(e, da) - G_t(e, \underline{a}(e, w_t, r_t)) \right] = 0,$$

$$\sum_{e \in \mathcal{E}} \left[\int_{\underline{a}(e, w_t, r_t)}^{\infty} k(a; e, w_t, r_t) G_t(e, da) - \int_0^{\infty} a G_t(e, da) \right] = 0,$$

3. The joint distribution of ability and wealth $\{G_t(e, a)\}_{t=1}^{\infty}$ evolves according to the equilibrium mapping:

$$G_{t+1}(e, a) = \psi \int_{u \leq a} \int_{a'(e, v)=u} G_t(e, dv) du$$

$$+ (1 - \psi) \sum_{e_-} \mu(e|e_-) \int_{u \leq a} \int_{a'(e_-, v)=u} G_t(e, dv) du.$$

A competitive equilibrium for a small open economy is defined in a similar way, given a world interest rate r^* . In this case, the domestic capital rental market and goods market do not need to clear, and the net foreign asset position (NFA) equals:

$$NFA_t = \sum_{e \in \mathcal{E}} \mu(e) \left[\int_0^{\infty} a G_t(e, da) - \int_{\underline{a}(e, w_t, r^*)}^{\infty} k(a; e, w_t, r^*) G_t(e, da) \right].$$

4 Quantitative Exploration

The central objective of this paper is to construct a quantitative model of TFP dynamics and capital flows during the process of development—the transition of economies from a steady state with low per-capita income to a steady state with high per-capita income. Following a recent literature emphasizing the role of individual distortions (Restuccia and Rogerson, 2008; Guner et al., 2008; Hsieh and Klenow, 2007), we interpret development dynamics as arising from reforms that remove idiosyncratic distortions, while credit market frictions remain. In order to quantify our theory, we need to first choose a set of structural parameters (preferences, technologies, distribution of entrepreneurial ability) that are common across economies. Then we choose a set of structural parameters that are different across economies—parameters governing idiosyncratic distortions and financial frictions. Once all these parameters are chosen, we can use our model to obtain the initial condition for the transitions, $G_0(e, a)$. This initial condition is a stationary equilibrium of an economy that has idiosyncratic distortions, is closed to goods and capital flows, and has a poorly-functioning domestic financial institutions. In constructing this initial condition, we exploit the fact that our model provides a theory of the wealth distribution—one that has proven successful in explaining key features of the wealth inequality in the data (Quadrini, 2000; Cagetti and De Nardi, 2006).

We first calibrate the common parameters so that the stationary equilibrium of the benchmark economy with perfect credit markets matches the US data on standard macroeconomic aggregates, establishment-size distribution and dynamics, and income inequality. We then study how an economy’s stationary equilibrium responds to different degrees of financial frictions. We then use data on idiosyncratic distortions to construct the initial steady state.

4.1 Calibration

4.1.1 Parameters Common across Steady States

We first describe the parametrization of the benchmark model, and then discuss the calibration of the parameters that are common across economies. For the sake of clarity, we choose a parsimonious parametrization that follows as much as possible the standard practices in the literature.

We choose a period utility function of the isoelastic form:

$$u(c) = \frac{c^{1-\sigma} - 1}{1-\sigma}.$$

We assume that an entrepreneur with talent e who hires k units of capital and l units of labor produces according to the following Cobb-Douglas production function:

$$f(e, k, l) = e (k^\alpha l^{1-\alpha})^{1-\nu}, \tag{2}$$

where $1 - \nu$ is known as the span-of-control parameter. Accordingly, $1 - \nu$ represents the share of output going to the variable factors. Out of this, fraction α goes to capital, and $1 - \alpha$ goes to labor.

	US Data	Model	Parameter
Top 10% Employment	0.63	0.63	$\eta = 6.0, \nu = 0.2$
Top 5% Earnings	0.30	0.31	
Exit rate	0.10	0.10	$\psi = 0.9$
Interest rate	0.04	0.04	$\beta = 0.91$

Table 1: Calibration

The entrepreneurial ability e is assumed to be a discretized version of a Pareto distribution whose probability density is $\eta e^{-(\eta+1)}$ for $e \geq 1$. Each period, an individual may retain her previous entrepreneurial ability with probability ψ . With probability $1 - \psi$, she draws a new ability realization from the Pareto distribution given above. Obviously, ψ controls the persistence of ability, while η determines the dispersion of ability in the population.

We now need to specify eight parameter values: two technological parameters α , ν , and the depreciation rate δ ; two parameters describing the process for ability ψ and η ; the subjective discount factor β and the reciprocal of the intertemporal elasticity of substitution σ .

We let $\sigma = 1.5$ following the standard practice. The one-year depreciation rate is set at $\delta = 0.06$. We choose $\alpha = 0.3$ to match the aggregate share of capital.

We are thus left with four parameters (ν , η , ψ , and β). We calibrate them to match four relevant moments in the US data: the employment share of the top decile of employers (establishments); the share of earnings generated by the top five-percentile; the exit rate of establishments; and the real interest rate. We calibrate the perfect-credit benchmark of our model to match the target moments from the US data.

The second column of Table 1 shows the value of these moments in the US data. The largest—measured by employment—decile of establishments in the US account for 63 percent of total employment. We target the earnings share of the top five-percentile (0.3), and an annual job destruction rate of 10 percent. Finally, as the target interest rate, we pick 4 percent per year.

The third column of Table 1 shows the moments simulated from the calibrated model. Even though in the model economy all four moments are jointly determined by the four parameters, each moment is primarily affected by one particular parameter.

We briefly discuss the identification and the interpretation of some of the parameter values. Given the span-of-control parameter $1 - \nu$, the tail parameter of the ability distribution η can be inferred from the tail of the distribution of employment. We can then infer ν from the share of income of the top 5% of earners. Top earners are mostly entrepreneurs, and ν controls the share of income going to the entrepreneurial input. These two parameters are calibrated at $\nu = 0.2$ and $\eta = 6.0$. The parameter $\psi = 0.90$ leads to an exit rate of 10% in the model. Finally, the model requires a discount factor $\beta = 0.91$ to match the interest rate of 4 percent.

4.1.2 Output Distortions and Credit Frictions

We think of our initial condition as the joint ability-wealth distribution of a closed-economy stationary equilibrium under financial *and* non-financial frictions. These frictions can be modeled with idiosyncratic distortions, or individual-specific taxes and subsidies (τ_{yi}, τ_{ki}) , that transform the static profit-maximization problem of an entrepreneur into:

$$(1 - \tau_{yi}) e_i (k_i^\alpha l_i^{1-\alpha})^{1-\nu} - w l_i - (1 + \tau_{ki}) (\delta + r) k_i.$$

Note that τ_{ki} is a reduced-form representation of the financial frictions in our economy. This specification is identical to the framework that Hsieh and Klenow (2007) use to quantify idiosyncratic distortions in Chinese and Indian manufacturing sectors. In particular, they define and measure a geometric average of output and capital distortions for each production unit: $\tau_i \equiv (1 + \tau_{ki})^{(1-\nu)\alpha} / (1 - \tau_{yi})$.⁴ They find that idiosyncratic distortions in these economies are large, with a difference between the 90th and 10th percentiles of 1.73–1.87 log points (compared with 1.04 in the US), and are positively correlated with establishments’ productivity, with a correlation coefficient of 0.66–0.70 (0.46 in the US). In Table 2 we reproduce these moments for China, India and the US. More dispersion of τ and a stronger positive correlation between τ and individual productivity translate into lower aggregate TFP and output. In the perfect-credit benchmark without non-financial distortions (τ_y), measured τ is zero for all production units. There are two reasons for omitting non-financial distortions (τ_y) in our perfect-credit benchmark economy and instead targeting the difference in the dispersion of distortions between the US and China/India. First, parts of the measured distortions may be measurement errors that affect the data from China, India and the US in a similar way. Second, the benchmark calibration (Section 4.1.1) is cleaner without τ_y ’s.

	90 – 10	$corr[\log(e), \log(\tau)]$	TFP	$corr[e, a]$
US	1.04	0.46
China/India	1.73–1.87	0.66–0.70
$\lambda = 1.5, \tau_y \equiv 0$	0.75	0.58	0.83	0.17
$\lambda = 1.5, \tau_y \neq 0$	0.88	0.60	0.73	0.10

Table 2: Measured Distortions. The column ‘90–10’ reports the log difference between the 90th and 10th percentile production unit in terms of τ . The upper panel data on the US and China/India are from Hsieh and Klenow (2007). The lower panel reports corresponding moments from our model. The first row in the lower panel is the case with financial frictions only. The last row is the case with both financial and non-financial frictions. TFP is normalized by its level in the perfect credit benchmark with no distortions ($\tau_y \equiv 0, \tau_k \equiv 0$ for all production units).

We impose a τ_y process and financial frictions ($\lambda = 1.5$, a number consistent with the external

⁴Hsieh and Klenow assume monopolistically-competitive firms that use constant returns to scale technologies and face isoelastic demands. It can be shown that their measured distortions are isomorphic to those in our framework. An important caveat is that the span of control parameter, $1 - \nu$, corresponding to Hsieh and Klenow’s calibration of the elasticity of substitution is on the low side (close to 0.5). In our economy, idiosyncratic distortions will have a substantially smaller effect on TFP, given our more conventional choice of $1 - \nu = 0.8$.

finance to GDP figure for a typical less developed economy) onto our benchmark calibration (Table 1), and use our model to compute the stationary equilibrium.⁵ In particular, we choose the τ_y process in a way that, among the active entrepreneurs in the stationary equilibrium, the log difference between the 90th and 10th percentiles (in terms of τ) is around 0.8 (the difference between China/India and the US), and the correlation coefficient between log productivity and log distortions is around 0.60. We also require that the negative effect on TFP of output distortions alone is of a similar magnitude to that of financial frictions alone.⁶ An additional target moment is the steady state capital stock, which is set to be half the level in the stationary equilibria with $\lambda = 1.5$ and $\tau_y \equiv 0$ (financial frictions only). Note that, to be conservative, we choose a low value for the correlation between distortions and productivity: A higher correlation between distortions and productivity implies more misallocation in the steady state and hence a bigger effect on transition dynamics.⁷

The second-to-last row of Table 2 corresponds to an economy with financial frictions but no τ_y . The difference between the 90th and 10th percentiles (τ) is around 0.75 log points and the correlation coefficient between log ability and log distortions is slightly lower than 0.58. In this economy, TFP is only affected by capital distortions, and TFP is 17 per cent below that of the benchmark economy. The bottom row ($\lambda = 1.5, \tau_y \neq 0$) of Table 2 is the stationary equilibrium that closely matches all targets. In particular, the TFP of the economy subject to both output and capital distortions is almost 30 per cent lower than the benchmark economy (fourth column). Both output and capital distortions have a similar role in lowering TFP: Financial frictions alone reduce TFP by 17 per cent, and the output distortions further reduce TFP by additional 13 per cent. In computing the stationary equilibrium, we also obtain the corresponding distribution of ability and wealth. The implied ability-wealth correlation coefficient is 0.10, lower than those of the economies with $\tau_y = 0$ (0.17). This joint distribution of wealth and ability is the initial condition for our transition exercise in Section 4.3.

4.2 Steady State Results: Financial Frictions and the Return to Savings

We first study the long-run effects of financial frictions. In Figure 3, we consider how allocations and prices of the stationary equilibria respond to changes in the collateral constraint parameter λ . Note that a lower λ means more financial frictions, with $\lambda = 1$ corresponding to zero external financing and $\lambda = +\infty$ to perfect credit markets. For this analysis, the economy is closed, and there is no output distortion ($\tau_y \equiv 0$). There is a monotonic relationship between λ and the equilibrium

⁵We specify a process for distorted entrepreneurial abilities $\tilde{e} = (1 - \tau_y)e$. The process for distorted abilities \tilde{e} is described by a probability distribution $\varphi(\tilde{e}|e)$, summarizing the probability with which an individual with ability $e \in \mathcal{E}$ is assigned a distorted ability $\tilde{e} \in \tilde{\mathcal{E}}$. The support of the distorted abilities is a transformation of that of the true abilities, $\tilde{\mathcal{E}} = \mathcal{T}(\mathcal{E})$. We assume that the distorted ability and the true ability are equally persistent, and have the same support.

⁶It turns out that the effects on TFP of the underlying distribution of distortions are not necessarily well captured by a limited set of moments. We choose to complement the information provided by the moments reported in Hsieh and Klenow (2007) with a conservative lower bound for the effect on TFP, but still be guided as much as possible by the available data.

⁷This is generally true, with the exception of the case with log-normal shocks. See Hsieh and Klenow (2007).

ratio of external finance to GDP: The higher λ , the higher the external finance to GDP ratio. We plot equilibrium output and interest rate against external finance to GDP ratio, instead of λ itself. In the figure, we are considering the range of external finance to GDP that is relevant to developing countries (0.1 to 1.58). Our perfect credit benchmark, for example, has an external finance to GDP ratio of 2.75, which corresponds to the US level.

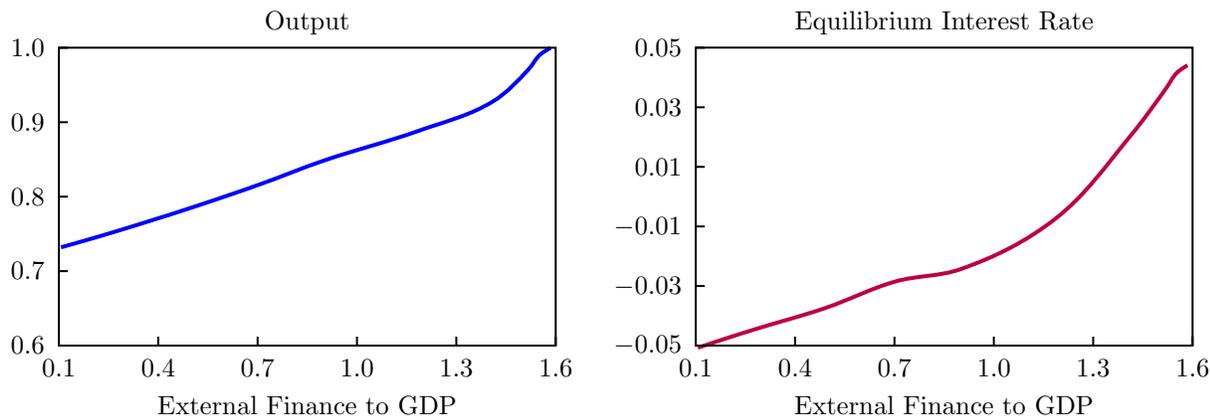


Fig. 3: The Effect of Financial Frictions on Closed-Economy Stationary Equilibria. We generate stationary equilibria corresponding to different degrees of financial frictions (λ). These economies are closed, and there are no non-financial frictions/distortions. The external finance to GDP ratio (horizontal axis) has a monotonic (positive) relationship with λ . Here λ ranges from 1.1 (external finance to GDP of 0.1) to 7.5 (external finance to GDP of 1.58).

The left panel shows the effect of the collateral constraint on aggregate output, which is measured relative to its value in the case with $\lambda = 7.5$ (external finance to GDP ratio of 1.58). Note that financial frictions have sizable effects on output: As we reduce financial intermediation, output drops by 27 percent. Nevertheless, this exercise shows that financial frictions alone are not enough to account for the output gap between developed and less developed economies.

More important, economies with worse credit markets have lower equilibrium interest rates. The lower interest rate in the general equilibrium follows from entrepreneurs’ restricted demand for capital because of tighter collateral constraints, and also from their higher savings rate because of the need for self-financing (a higher supply of capital, all else equal). This prediction of our model is consistent with empirical findings. Figure 4 plots the time-averaged returns to saving of a country against its income level. The regression line has a positive slope, validating our model prediction that returns to saving in less developed countries with poorly-functioning financial markets are lower than those in developed countries.⁸ This is not surprising given the prevalence of “financial repression” in less developed countries.

From this, we can foresee what will happen if capital is allowed to flow across countries. When a less developed country opens up to international capital market, the domestic interest rate will rise and be equalized with the world interest rate, which is pinned down by a large, rich country with

⁸The average return is not adjusted for risk. Given the volatility of the real returns to saving in less developed economies, the regression line will tilt steeper, if we look at risk-adjusted returns. Independently of our work, Ohanian and Wright (private communication) obtained similar results.

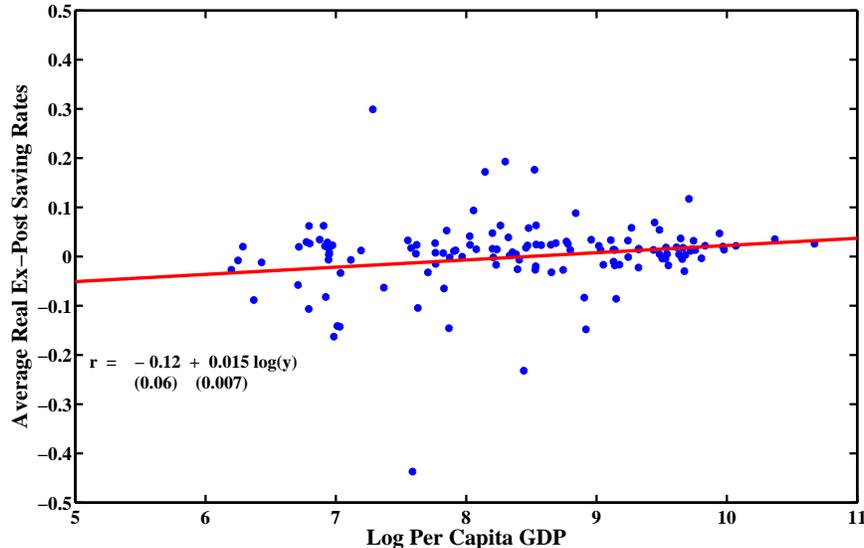


Fig. 4: Returns to Saving across Countries. The data are from the International Financial Statistics (IFS) database. We subtract ex-post inflation rates from nominal deposit rates. When deposit rates are not available, we use returns to government-issued securities.

well-functioning financial markets. At this new interest rate, there is excess supply of domestic capital in the rental market, and this surplus capital will be rented out to overseas production units. This is the main mechanism explored in the literature to explain why capital may flow from less developed to more developed economies. The examples include Gertler and Rogoff (1990), Boyd and Smith (1997), Matsuyama (2005), and Mendoza et al. (2007), among many others. Our contribution is to go beyond this result and explore the joint dynamics of aggregate productivity and capital flows. To the best of our knowledge, we are the first to do so.

4.3 Post-Reform Transition Dynamics

In this section, we study the joint behavior of TFP and capital flows following large-scale economic reforms and liberalizations. We consider three different exercises. All three start with a closed economy that are burdened with idiosyncratic distortions, in addition to financial frictions, and hence resource misallocation. In particular, this closed economy has idiosyncratic distortions, whose magnitude is consistent with the magnitude reported by Hsieh and Klenow (Table 2). The domestic financial market is not functioning well, with $\lambda = 1.5$ to be consistent with data on external credit (Beck et al., 2000).

Before we begin, we consider two simple exercises to illustrate the effect of different reforms. In our main exercises, we open the economy to goods and capital flows, as we implement a reform to eliminate idiosyncratic distortions. Here, starting from the same initial condition, we consider first opening up the economy while leaving idiosyncratic distortions intact. We then look at a different example of eliminating idiosyncratic distortions while leaving the economy closed to goods and capital flows.

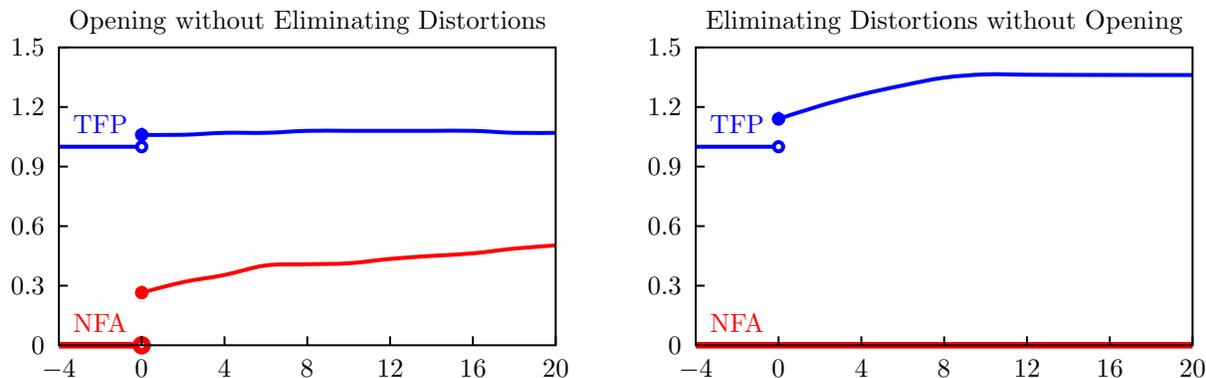


Fig. 5: One Reform at a Time. In the left panel, the economy opens up to the international capital market in year 0, but no reform is implemented to address either idiosyncratic distortions or domestic financial markets. NFA is relative to the pre-reform aggregate capital stock K_0 . TFP is relative to its pre-reform level. In the right panel, a reform is implemented to remove all idiosyncratic distortions. It is assumed that the economy remains closed, and that the domestic financial frictions remain intact. The unit of the horizontal axis is years.

In the left panel of Figure 5, we open up the economy to goods and capital flows in year zero, without doing anything about the idiosyncratic distortions. The domestic financial market is left as it was. Capital flows out of the economy, and the net foreign asset position (NFA) jumps up and increases smoothly over time. This result should have been expected based on our discussion in Section 4.2. However, without any reform on idiosyncratic distortions, the aggregate productivity (TFP) of the economy barely moves. It actually goes up by 6 per cent, as the higher rental rate of capital (world level) shuts down marginal production units, who tends to be incompetent entrepreneurs supported by subsidies.

In the right panel of Figure 5, we consider the opposite: implementing a reform to remove all idiosyncratic distortions, while leaving the economy closed. Again, the domestic financial market is left as it was. Following the reform, TFP jumps up by 14 per cent, and gradually increase over time: over the first ten years following the reform, TFP increases by about 3 per cent per year. This reflects more efficient reallocation of resources over time, as productive entrepreneurs save up and enter, while incompetent ones who lose their subsidy exit. However, obviously by assumption, there is no flow of capital in and out of the economy, and the net foreign asset position stays at zero.

The above examples show that we need to consider an exercise where we eliminate distortions and open up the economy, as our goal is to study the joint dynamics of TFP and NFA.

Exercise 1: Removal of Distortions and Opening Up The economic liberalization occurs in year zero. It is unexpected. Once it happens, everyone understands that it is a once-and-for-all change. In this episode, the liberalization consists of two components. One is the opening up of the economy's capital accounts, and the other is the removal of the idiosyncratic distortions. However, we assume that domestic financial frictions remain unchanged. We are thinking of the financial

frictions as arising from enforcement problem, which is a component of broader institutions, and hence more sluggish. The reform experiences of the countries we study in Section 2 are consistent with this sequencing of reforms. Measured in both de jure and de facto sense, domestic financial market reforms lag behind the removal of size-dependent or industry-specific taxes and subsidies, as well as capital account liberalizations.

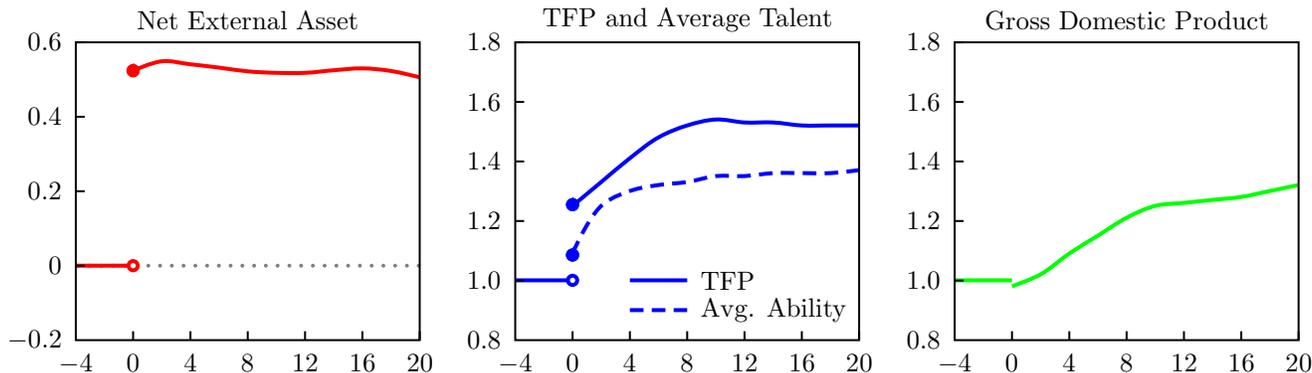


Fig. 6: Transition Dynamics without Domestic Financial Market Reform. In year 0, a reform is implemented to remove all idiosyncratic distortions in the economy. At the same time, the economy opens up to the world capital market. Domestic financial frictions remain intact. In the left panel, net foreign asset positions are measured relative to the pre-reform aggregate capital stock (K_{0-}). An increase in net foreign asset position implies capital outflows. In the center panel, TFP (solid line) and the average ability of active entrepreneurs (dashed line) are shown. Both quantities are relative to their respective pre-reform level. The right panel plots the GDP series, also relative to its pre-reform level. The unit of the horizontal axis is years.

The result of this liberalization episode is shown in Figure 6. From year 0, as the reform is implemented, resources now get reallocated more efficiently. The increasing TFP reflects this reallocation (solid line, center panel). More efficient reallocation of resources occur along two margins. First, capital and labor are reallocated among existing entrepreneurs (intensive margin). In addition, more productive entrepreneurs will enter, while previously-subsidized incompetent entrepreneurs will exit (extensive margin). The dashed line in the middle panel shows the average ability/talent of active entrepreneurs. Note that the efficient reallocation along these two margins occur gradually over time (the unit for the horizontal axis is years), as the reallocation is slowed down by domestic financial frictions. Both TFP and the average entrepreneurial talent are measured relative to their pre-reform levels. The output per capita (right panel) also increases following the reform, largely reflecting the increase in TFP early on (first 10 years) and accumulation of capital later (12 to 20 years after the reform). Output is also measured relative to its pre-reform level.

In the left panel, the net foreign asset position jumps up and remains roughly constant. The increase in the NFA in the beginning is driven by the fall in demand in the domestic capital rental market. Opening up capital accounts implies that the domestic rental rate of capital is equalized to the world level. As the rental rate increases to the world level, less capital is demanded. At the same time, entrepreneurs who lose their subsidy during the reforms will begin to exit, further reducing the demand in the capital rental market. However, they are not immediately replaced

by truly productive individuals who were previously taxed highly and kept out of entrepreneurial activities. These individuals are not rich enough to overcome the collateral constraints and start production immediately. All these factors explain a fall in domestic capital demand, and the surplus capital flows out of the country, increasing the NFA. As the productive entrepreneurs enter and increase their scales of operation over time, domestic demand for capital goes up. This increased demand is matched by accumulation of assets (supply of capital) by these entrepreneurs for self-financing purposes (domestic financial frictions still remain), and the net foreign asset position remain roughly constant. The NFA is measured relative to the pre-reform capital stock (K_{0-}).

Exercise 2: Removal of Distortions, Opening Up, Domestic Financial Sector Reform

The difference here is that the liberalization at year 0 has one additional component. On top of the capital account liberalization and the removal of idiosyncratic distortions, this economy will also reform its domestic financial markets, increasing its λ from 1.5 to 6. The choice of $\lambda = 6.0$ corresponds to the equilibrium external finance to GDP ratio of 1.5, which is a level few, if any, developing country reached before 2000. In this sense, $\lambda = 6.0$ represents a very well-functioning financial market by the developing country standard.

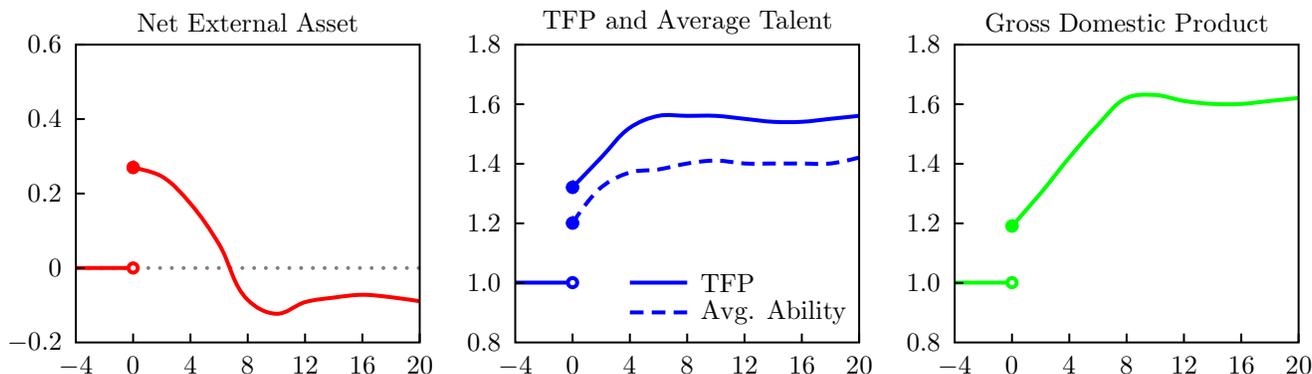


Fig. 7: Transition Dynamics with Domestic Financial Market Reform. In year 0, a reform is implemented to remove all idiosyncratic distortions in the economy. At the same time, the economy opens up to the world capital market. Unlike in Exercise 1, domestic financial frictions are partially eliminated (λ from 1.5 to 6). In the left panel, net foreign asset positions are measured relative to the pre-reform aggregate capital stock (K_{0-}). In the center panel, TFP (solid line) and the average ability of active entrepreneurs (dashed line) are shown. Both quantities are relative to their respective pre-reform level. The right panel plots the GDP series, also relative to its pre-reform level. The unit of the horizontal axis is years.

The result is shown in Figure 7. The TFP figure is qualitatively similar to the previous picture. Removal of the idiosyncratic distortions leads to more efficient reallocation of resources, as is reflected on the TFP series. The TFP increases faster and rises higher than in Figure 6. So do the average entrepreneurial ability and output. In particular, output goes up by 60% over eight years, while in the first exercise the number is only 20%. Note that all three exercises have the same initial condition, and that Figures 6–9 have the same scale, facilitating visual comparison.

The net foreign asset position, on the other hand, looks very different from Figure 6. Ini-

tially, opening up of capital accounts increases the capital rental rate, and previously-subsidized entrepreneurs exit, reducing the demand in the domestic capital rental market. However, as the collateral constraints are much looser following the domestic financial sector reform, truly-productive individuals can enter entrepreneurship and start production immediately. This entry partly offsets the fall in demand, and the initial upward jump in NFA is less than half in magnitude than in Figure 6. Afterwards, given that the higher level of productivity and swift increases in domestic demand for capital (because of the looser collateral constraint), capital flows in and, six years after the reform, NFA becomes negative. Note that the entrepreneurs now have weaker self-financing motives given their ability to raise external financing. Intuitively, if the domestic financial markets are very well-functioning, the economy behaves like a neoclassical model, with the implication that TFP growth is accompanied by capital inflows.

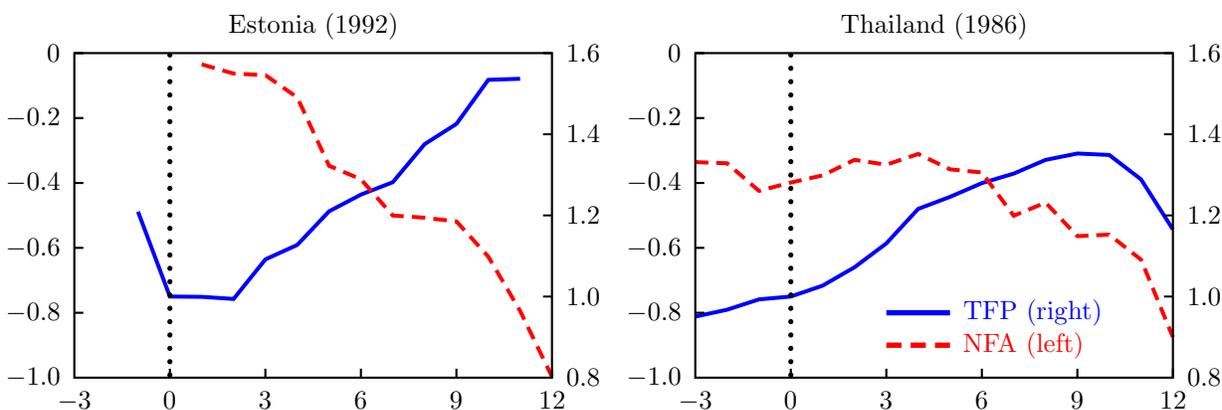


Fig. 8: TFP and Net Foreign Asset Position. Year 0 in the horizontal axis is the year of reform implementation, which is shown in parentheses next to the country name. Net foreign asset position as a fraction of GDP is measured on the left scale, and aggregate TFP can be read off the right scale. TFP is normalized by its value in year 0. The unit of the horizontal axis is years.

Empirically, the experiences of Estonia and Thailand can be interpreted as a version of this exercise. Estonia underwent an economy-wide reform in 1992, addressing industrial policies, capital account liberalization, and *domestic banking sector reforms* (Roland, 2000). In particular, large Swedish banks set up local subsidiaries in Estonia and accounted for the majority of domestic financial intermediation. As can be seen in Figure 8, Estonia’s experience is close to the neoclassical model. To some degree, the Thai reform of 1986 also addressed the domestic financial markets (Townsend, 2006). In particular, the fraction of bank loans going to the government dropped sharply. The ensuing TFP and NFA series are consistent with our results in Figure 7, although the latter phases of the transition are muddled by the 1997 crisis.

Exercise 3: Removal of Distortions, Opening Up with Savings Wedge In the previous 2 exercises, we opened up the capital accounts and removed the idiosyncratic distortions at the same time. We here consider an exercise to partially disentangle the effects of the two.

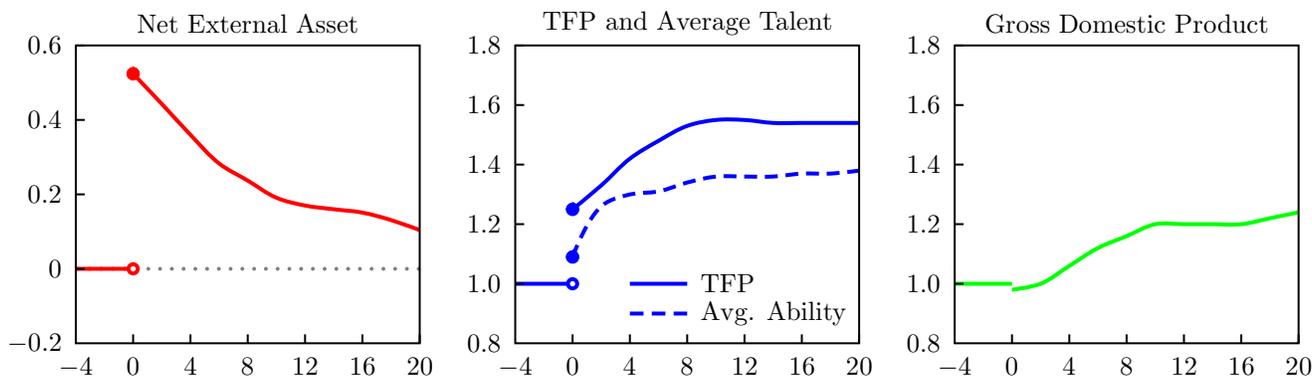


Fig. 9: Transition Dynamics with Financial Repression. In year 0, a reform is implemented to remove all idiosyncratic distortions in the economy. At the same time, the economy opens up to the world capital market. As in Exercise 1, domestic financial frictions remain intact. Unlike in Exercise 1, a savings wedge is introduced and the returns to saving do not increase to the world level. In the left panel, net foreign asset positions are measured relative to the pre-reform aggregate capital stock (K_0). In the center panel, TFP (solid line) and the average ability of active entrepreneurs (dashed line) are shown. Both quantities are relative to their respective pre-reform level. The right panel plots the GDP series, also relative to its pre-reform level. The unit of the horizontal axis is years.

We first proceed as in the first exercise: remove distortions, open up the economy, but leave the domestic financial frictions intact. The difference here is that, we additionally introduce a wedge on the returns to saving such that the returns to saving do not change after the reform. The capital rental rate is equalized to the prevailing rate as in the rest of the world. This can be understood as a form of financial repression. This exercise reflects the actual policies that many of the reforming countries adopted. In most incidents of capital account liberalizations, the loosening of restrictions on capital outflows were back-loaded (Beim and Calomiris, 2001). The lower returns to saving discourage accumulation of financial assets by domestic residents, and hence capital outflows—in terms of national income accounting, capital outflow is equal to saving minus investment. Nevertheless, we obtain a result that is similar to that in the first exercise: Capital flows out initially, as domestic financial frictions slow down the entry and growth of productive entrepreneurs, and there is surplus capital not used domestically. Note that domestic capital demand is still restricted by the low λ . The lower deposit rate discourages accumulation of financial assets, and hence the magnitude of capital outflows (and hence the level of net foreign asset positions) is smaller than in the first exercise. In particular, compared to Figure 6, the net foreign asset position falls over time. This is because the increasing demand for capital for domestic production—driven by rising aggregate productivity—is not offset by saving by domestic residents, which is precisely the effect of the saving wedge or financial repression. However, the net foreign asset position stabilizes at a positive level, and the model still generates concurrent TFP growth and capital outflows on average over the 20 years following the reform.

Appendix: Notes on Economic Reforms

In this Appendix we briefly describe five large reform episodes that took place in the 1980s and the 1990s. We emphasize the three components of reforms we use in our model: reduction of idiosyncratic distortion, capital account liberalization, and domestic financial market reform.

Chile, 1985 In 1985, the government started a second round of privatizations to sell the firms that had been taken over during the 1982 financial collapse. It reversed the tariff increases that had been introduced during the crisis, and rebuilt the financial system, establishing a greater supervisory role for the central bank. Moreover, in 1985, the government started the privatization of the large, core state-owned enterprises created by the state over several decades (Bosworth et al., 1994). This second wave of reforms not only confirmed the broad movement toward a more market-oriented allocation of resources, but it also corrected shortcoming of earlier reforms—e.g., the earlier process of privatization allowed the formation of business conglomerates through the sale of state-owned assets, which were purchased with soft financing provided by the state with funds obtained by abusing the implicit insurance of bank deposits. As confirmed by the subsequent experience, this second wave of reforms proved to be more persistent.

Controls on capital outflows imposed in 1982 were removed in 1985, while restriction on short term capital inflows remained. At the time of the reform, the domestic financial markets were recovering from the financial crisis of 1982. Interest rate controls were removed since 1985. Banks nationalized in 1982 were re-privatized in the mid 1980s.

India, 1991 Following an external payment crisis, in 1991 India embarked on a broad set of reforms. These reforms included (i) the abolition of industrial licensing and the narrowing of the scope of public sector monopolies to a much smaller number of industries; (ii) the liberalization of inward foreign direct and portfolio investment; (iii) the sweeping liberalization of trade which included the elimination of import licensing and the progressive reduction of non-tariff barriers; (iv) financial sector liberalization, including the removal of controls on capital issues, freer entry for domestic, and foreign, private banks and the opening up of the insurance sector; (v) the liberalization of investment in important services, such as telecommunications (Kochhar et al., 2006).

Deregulation of capital flows began in 1991. Exchange rates were unified in 1993, and current account convertibility was achieved by 1994. Gradual banking sector reform started in mid 1990s, but credit control remains throughout the 1990s.

Israel, 1985 In 1985 a successful stabilization plan was put into place. The structure and performance of the Israeli economy changed substantially since the 1985 Economic Stabilization Program. As a consequence of budget adjustments, and subsequent more gradual reforms, the principal markets (capital, foreign exchange, and labor) underwent important changes. Government intervention

in the markets of production factors and finances was significantly reduced, and deregulation made markets more competitive. The share of government expenditure in the GDP was sharply diminished, declining by 20 percentage points in the first 10 years of the reform. Furthermore, the composition of the budget went from an emphasis on subsidies toward factors of priority industries and regions, into broader investment in infrastructure. Earlier protectionist tendencies were slowly reverted. In 1985 a free-trade agreement with the US was signed, and by 1990 all non-tariff barriers on imports from “third countries” were abolished and replaced with relatively high tariffs (20–75 percent), and in 1992 a process of lowering these tariffs started Ben-Bassat (2002).

Capital controls imposed in 1970 were reversed in 1987. Distortions to domestic financial markets were significant until mid 1990s. Directed credit, regulated interest rate, public ownership of major banks lasted until the mid 1990s.

Korea, 1982 In the second half of the 1970s, the Korean government embarked on a program subsidizing heavy and chemical industries. This experiment ceased in 1981. Entry of small and medium sized firms was encouraged in the early 1980s, while the government streamlined its own organization at the same time. This failed experiment led the government to delegate the role of investment planning to the private sector. Control on capital flows was eased first in 1979 (inward), then in 1982 (inward), and then again in 1985 (inward and outward). Significant distortions of the financial markets remained until the mid 1990s. Directed lending and regulated interest rates were phased out beginning in 1995 (to join the OECD) and in 1998 (IMF conditionality).

Mauritius, 1981 Starting with the negotiation of a structural adjustment loan with the World Bank in 1980, a process of reform began that progressively removed various distortions. These reforms include the elimination of price controls, quantity restrictions on imports, export taxes on sugar, and a gradual reduction of tariffs. As part of these reforms, the government eliminate the differential tax treatment for companies under various special regimes, e.g., export promotion zones, import substitution regimes (Gulhati and Nallari, 1990).

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