Online Appendix

The Global Financial Resource Curse

Gianluca Benigno, Luca Fornaro and Martin Wolf

A Motivating evidence: Figure 1

To construct Figure 1, we use the same data sources that we use for our empirical analysis in Section 4 - see Appendix F for details. Specifically, we use the External Wealth of Nations database (Lane and Milesi-Ferretti, 2018) to construct the current account-to-GDP ratio, and the Penn World Tables, version 10, to extract real GDP and productivity (Feenstra et al., 2015).

The current-account-to-GDP ratio for the US can be directly computed from the Wealth of Nations database, by dividing the series *current account balance* by the one *nominal GDP*, as both are expressed in current US dollars. We infer the current account ratio for developing countries in the same way, where the group of developing countries we study is detailed in Appendix F. To weight these series to obtain a single measure of the current account-to-GDP ratio in developing countries, we use the following formula

$$\left(\frac{CA}{GDP}\right)_{\text{Developing countries},t} \equiv \sum_{i \in \text{Developing countries}} \frac{GDP_{i,t}^{real}}{\sum_{i \in \text{Developing countries}} GDP_{i,t}^{real}} \left(\frac{CA}{GDP}\right)_{i,t},$$

where the real GDP series is the one *rgdpo*, taken from the Penn World Tables.

To construct Figure 1b, we extract US real GDP, employment and annual hours worked per person engaged from the Penn World Tables, the three series *rgdpna*, *emp* and *avh*. We then construct productivity by dividing the first by the latter two series, to obtain a measure of real GDP per working hour.

B Proofs

This Appendix contains the proofs of all propositions.

B.1 Proof of Proposition 1

Proof. Existence of the steady state has been discussed in the main text. Moreover, in the financial autarky steady state, the terminal condition (25) holds with equality in all countries because $b_{i,t} = 0$ for all t.

We now prove uniqueness. First, consider that (RR_u) and (GG_u), once $c_{u,a}^T$ is substituted out, imply respectively a positive and negative relationship between $L_{u,a}^T$ and g_a. This means that there can be at most one value for $L_{u,a}^T$ and g_a consistent with equilibrium. Likewise, (RR_d) and (GG_d), once $c_{d,a}^T$ is substituted out, imply respectively a positive and negative relationship between $L_{d,a}^T$ and $a_{d,a}$. Again, this means that the equilibrium values of $L_{d,f}^T$ and $a_{d,f}$ are uniquely pinned down.

It is immediate to see that the first part of condition (35) implies $g_a > 1$, since the expression appearing in (35) equals exactly the equation for g_a in (33).

We now show that $\xi < \chi$ implies $a_{d,a} < 1$. Inserting g_a given by (33) into (34) yields

$$a_{d,a}^{\phi} = \frac{\beta\xi\alpha\bar{L}}{\frac{\alpha\beta(\chi\bar{L}+1-\beta)}{1+\Gamma\Psi+\alpha\beta}(1+\Gamma\Psi) + \alpha\beta\left(\frac{\alpha\beta(\chi\bar{L}+1-\beta)}{1+\Gamma\Psi+\alpha\beta} + \beta - 1\right)}.$$

Canceling $\alpha\beta$ and multiplying with $1 + \Gamma\Psi + \alpha\beta$, this can be written as

$$a_{d,a}^{\phi} = \frac{\xi\bar{L}(1+\Gamma\Psi+\alpha\beta)}{(1+\Gamma\Psi)(\chi\bar{L}+1-\beta) + \alpha\beta(\chi\bar{L}+1-\beta) - (1-\beta)(1+\Gamma\Psi+\alpha\beta)}.$$

The denominator can be simplified to $\chi\bar{L}(1 + \Gamma\Psi + \alpha\beta)$. Canceling variables then leads to

$$a_{d,a}^{\phi} = \frac{\xi}{\chi}.$$

Since $\phi > 0$, then $\xi < \chi$ implies $a_{d,a} < 1$.

We are left with determining $R_{u,a}$ and $R_{d,a}$. Since households inside each region are symmetric and financial flows across regions are not allowed, it must be that $b_{i,t} = 0$. Credit market clearing inside each region then requires $\tilde{\mu}_{i,t} = 0$.[67] Using the households' Euler equations evaluated in steady state then gives $R_{u,a} = g_a/\beta$ and $R_{d,a} = g_a/(\beta(1+\tau))$. ■

B.2 Proof of Proposition 2

Proof. We first show that $R_f = g_f/((\beta(1+\tau))$. From the Euler equation in both regions (23), evaluated in steady state

$$\frac{\omega}{c_{u,f}^T} = R_f\left(\frac{\beta\omega}{g_f c_{u,f}^T} + \tilde{\mu}_{u,f}\right)$$
$$\frac{\omega}{c_{d,f}^T} = R_f(1+\tau)\left(\frac{\beta\omega}{g_f c_{d,f}^T} + \tilde{\mu}_{d,f}\right).$$

Since $\tau > 0$, it must be that $\tilde{\mu}_{u,f} > 0$ and $\tilde{\mu}_{d,f} = 0$ to ensure the credit markets clear.[68] U.S. households are therefore borrowing constrained in steady state, and so $b_{u,f} = -\kappa$. Moreover, developing countries' Euler equation implies

$$R_f = \frac{g_f}{\beta(1+\tau)}. \tag{36}$$

[67] Strictly speaking, if $\kappa = 0$ then $\tilde{\mu}_{i,t} = 0$ is not a necessary condition for credit markets to clear. This implies that with $\kappa = 0$ interest rates are not uniquely pinned down in equilibrium. This source of multiplicity, however, disappears as soon as $\kappa > 0$. We therefore impose the equilibrium refinement condition $\tilde{\mu}_{i,t} = 0$ also for the case $\kappa = 0$.

[68] More precisely, if $\kappa = 0$ then $\tilde{\mu}_{d,f} = 0$ is not a necessary condition for credit markets to clear. This implies that with $\kappa = 0$ interest rates are not uniquely pinned down in equilibrium. This source of multiplicity, however, disappears as soon as $\kappa > 0$. We therefore impose the equilibrium refinement condition $\tilde{\mu}_{d,f} = 0$ also for the case $\kappa = 0$.

Since $b_{u,f} = -\kappa = -b_{d,f}$, tradable consumption in both regions is

$$c^T_{u,f} = \Psi L^T_{u,f} - \kappa\left(1 - \frac{g_f}{R_f}\right) = \Psi L^T_{u,f} + \kappa\left(\beta(1+\tau) - 1\right)$$
$$c^T_{d,f} = \Psi a_{d,f} L^T_{d,f} + \kappa\left(1 - \frac{g_f}{R_f}\right) = \Psi a_{d,f} L^T_{u,f} - \kappa\left(\beta(1+\tau) - 1\right),$$

where we have used (36). To complete the proof of existence, note that the terminal conditions (25) are satisfied for all countries in the financial integration steady state described. For households in developing countries, this equation becomes

$$\lim_{k\to\infty} \frac{b_{d,f} g_f^k}{R_f^k (1+\tau)^k} = \lim_{k\to\infty} \beta^k b_{d,f} = 0,$$

where we have used equation (36). For households in the U.S., instead, this equation becomes

$$\lim_{k\to\infty} \frac{b_{u,f} g_f^k}{R_f^k} = \lim_{k\to\infty} \frac{(-\kappa) g_f^k}{R_f^k} = -\infty < 0,$$

where we used that $\beta(1+\tau) > 1$ implying that $R_f < g_f$. In the U.S., the terminal condition is thus satisfied with strict inequality.

We next prove uniqueness. First, consider that (RR_u) and (GG_u), once $c^T_{u,f}$ is substituted out, imply respectively a positive and negative relationship between $L^T_{u,f}$ and g_f. This means that there can be at most one value for $L^T_{u,f}$ and g_f consistent with equilibrium. Likewise, (RR_d) and (GG_d), once $c^T_{d,f}$ is substituted out, imply respectively a positive and negative relationship between $L^T_{d,f}$ and $a_{d,f}$. Again, this means that the equilibrium values of $L^T_{d,f}$ and $a_{d,f}$ are uniquely pinned down.

We now turn to the condition (41) stated in Proposition 2. From combining (GG_u) and (RR_u) the growth rate under financial integration is given by

$$g_f = \beta\left(\frac{\alpha(\chi\bar{L} + 1 - \beta - \chi\Gamma\kappa(\beta(1+\tau) - 1))}{1 + \Psi\Gamma + \alpha\beta} + 1\right),$$

which corresponds to (38) in the main text after inserting (33). Therefore, the first part of condition (41) guarantees that $g_f > 1$. Moreover, it is easy to check that if $g_f > 1$ then it must be that $L^T_{u,f} > 0$.

We are left to prove that $a_{d,f} < 1$. Start by combining (GG_d) and (RR_d) to derive an equation for $a_{d,f}$

$$a^{\phi}_{d,f} = \frac{\alpha\beta\xi\left(\bar{L} + \Gamma\frac{\kappa(\beta(1+\tau)-1)}{a_{d,f}}\right)}{(g_f - \beta)(1 + \Gamma\Psi) + (g_f - 1)\alpha\beta}, \tag{40}$$

which corresponds to (40) from the main text. Inserting g_f using (38) and taking identical steps as in Appendix B.1 this can be written as

$$a^{\phi}_{d,f} = \frac{\xi\left(\bar{L} + \frac{\Gamma\kappa(\beta(1+\tau)-1)}{a_{d,f}}\right)}{\chi(\bar{L} - \Gamma\kappa(\beta(1+\tau) - 1))}.$$

The left-hand side of this expression is increasing in $a_{d,f}$, while the right-hand side is decreasing in it. Hence, $a_{d,f} < 1$ if and only if

$$\frac{\xi\left(\bar{L} + \Gamma\kappa(\beta(1+\tau) - 1)\right)}{\chi(\bar{L} - \Gamma\kappa(\beta(1+\tau) - 1))} < 1,$$

which, after rearranging, corresponds to the second part of condition (41). ■

C Lab equipment model

In this Appendix we consider a lab equipment model, in which investment in R&D requires units of the final tradable good, rather than labor. To anticipate our main result, this version of the model preserves all the insights of the one in the main text.

C.1 Changes to economic environment

The only change, with respect to the model in the main text, is that here investment in innovation requires units of the traded final good. In particular, the law of motion for productivity of a generic U.S. firm j now becomes

$$A^j_{u,t+1} = A^j_{u,t} + \chi I^j_{u,t},$$

where $I^j_{u,t}$ captures investment in research - in terms of the tradable final good - by intermediate goods firm j. This equation replaces (14) of the baseline model. Thus firms' profits net of expenditure in research become

$$\Pi^j_{u,t} = \varpi A^j_{u,t} L^j_{u,t} - I_{j,t}.$$

As in the main text, firms choose investment in innovation to maximize their discounted stream of profits

$$\sum_{t=0}^{\infty} \frac{\omega\beta^t}{C^T_{u,t}} \Pi^j_{u,t}.$$

In an interior optimum ($I^j_{u,t} > 0$), optimal investment requires

$$\frac{1}{\chi} = \frac{\beta C^T_{u,t}}{C^T_{u,t+1}} \left(\varpi L^T_{u,t+1} + \frac{1}{\chi}\right)$$

which replaces (17). Similarly, we replace (16) for developing countries with

$$A^j_{d,t+1} = A^j_{d,t} + \xi \left(\frac{A_{u,t}}{A_{d,t}}\right)^{\phi} I^j_{d,t}.$$

Profit maximization leads to the first order condition

$$\frac{1}{\xi}\left(\frac{A_{u,t}}{A_{d,t}}\right)^{-\phi} = \frac{\beta C^T_{d,t}}{C^T_{d,t+1}} \left(\varpi L^T_{d,t+1} + \frac{1}{\xi}\left(\frac{A_{u,t+1}}{A_{d,t+1}}\right)^{-\phi}\right).$$

Aggregation and market clearing works as follows. First, value added in the tradable sector is still given by (18). Market clearing for the non-tradable good is still given by (19). However, the market clearing condition for tradable goods is now given by

$$C_{i,t} + I_{i,t} + \frac{B_{i,t+1}}{R_{i,t}} = \Psi A_{i,t} L^T_{i,t} + B_{i,t},$$

where $I_{i,t} = \int_0^1 I^j_{i,t} dj$ is the total amount of tradable goods devoted to investment in region i. This equation replaces (20) in the main text. Finally, asset market clearing is still given by (21), whereas labor market clearing (22) is replaced by

$$\bar{L} = L^N_{i,t} + L^T_{i,t}.$$

C.2 Equilibrium

As it was the case for the baseline model, the model can be cast in terms of three "blocks" . These blocks capture, in turn, the paths of tradable consumption and capital flows, the behavior of productivity, and the resource constraint.

First, the households' Euler equation becomes

$$\frac{\omega}{c^T_{i,t}} = R_{i,t}(1+\tau_{i,t}) \left(\frac{\beta \omega}{g_{t+1} c^T_{i,t+1}} + \tilde{\mu}_{i,t} \right),$$

where the borrowing limit is given by

$$b_{i,t+1} \geq -\kappa_t a_{i,t+1} \quad \text{with equality if} \quad \tilde{\mu}_{i,t} > 0.$$

and where the market clearing conditions for the tradable good and for bonds are

$$c^T_{i,t} + i_{i,t} + \frac{g_{t+1} b_{i,t+1}}{R_{i,t}} = \Psi a_{i,t} L^T_{i,t} + b_{i,t}$$

$$b_{u,t} = -b_{d,t}.$$

Second, optimal investment in innovation by U.S. firms implies

$$g_{t+1} = \frac{\beta c^T_{u,t}}{c^T_{u,t+1}} \left(\chi \varpi L^T_{u,t+1} + 1 \right),$$

while optimal investment in technology adoption by firms in developing countries requires

$$a^\phi_{d,t} = \frac{\beta c^T_{d,t}}{g_{t+1} c^T_{d,t+1}} \left(\xi \varpi L^T_{d,t+1} + a^\phi_{d,t+1} \right).$$

The law of motion for productivity can be written as

$$g_{t+1} = 1 + \chi i_{u,t},$$

in the U.S., and as

$$g_{t+1} a_{d,t+1} = a_{d,t} + \xi a_{d,t}^{-\phi} i_{d,t},$$

in the developing countries.

Third and last, the labor market clearing condition can be written as

$$L_{u,t}^T = \bar{L} - \Gamma c_{u,t}^T$$

for the U.S., as well as

$$L_{d,t}^T = \bar{L} - \Gamma \frac{c_{d,t}^T}{a_{d,t}}$$

for the developing countries.

C.3 Results

We now provide a brief comparison of the steady states under financial autarky and financial integration. To do so, we next derive the analogues of the (GG_u), (RR_u) as well as (GG_d) and (RR_d) curves. Starting with the U.S., note that the (GG_u) curve is now given by

$$g = \beta(\chi \varpi L_u^T + 1), \qquad (GG_u)$$

and is thus almost identical as in the baseline model (the only difference being that α is replaced by the composite parameter ϖ).

In turn, the (RR_u) curve is now given by

$$L_u^T = \bar{L} - \Gamma \left(\Psi L_u^T + b_u \left(1 - \frac{g}{R} \right) \right) + \Gamma \frac{g-1}{\chi}, \qquad (RR_u)$$

the term $b_u(1 - g/R)$ capturing capital flows. Notice that $b_u = 0$ under financial autarky, but $b_u = -\kappa$ under international financial integration. Moreover, in the latter case $1 - g/R = \beta(1+\tau) - 1$.

Relative to the baseline model, a key difference of the current environment is that (RR_u) posits another positive relationship between L_u^T and g, i.e. both (GG_u) and (RR_u) are upward sloping lines in (L_u^T, g) space. However, the slope of (RR_u) is necessarily larger than the slope of (GG_u), since

$$\chi \frac{(1+\Gamma\Psi)}{\Gamma} = \chi \left(\Psi + \frac{1}{\Gamma} \right) = \chi \left(\frac{1+\alpha}{\alpha} \varpi + \frac{1}{\Gamma} \right) > \chi \beta \varpi,$$

which follows from $0 < \alpha < 1$, $\beta < 1$, $\chi > 0$, $\varpi > 0$ and $\Gamma > 0$.[69]

Therefore, the impact of financial integration is as in the baseline model: a shift of the (RR_u)

[69]Recall the definitions of $\Psi \equiv \alpha^{\frac{2\alpha}{1-\alpha}}(1-\alpha^2)$ and $\varpi \equiv \alpha^{\frac{2}{1-\alpha}}(1/\alpha - 1)$. Hence $\Psi/\varpi = (1+\alpha)/\alpha$.

curve to the left triggered by capital inflows reduces g and L_u^T. Formally,

$$g_a = \beta\left(\frac{\varpi(\chi\bar{L} - (1-\beta)\Gamma)}{1+\Gamma(\Psi - \beta\varpi)} + 1\right)$$

under financial autarky (compare (33) from the main text), but

$$g_f = g_a - \frac{\varpi\beta\chi\Gamma}{1+\Gamma(\Psi - \beta\varpi)}\kappa(\beta(1+\tau) - 1) < g_a$$

under international financial integration (compare (38) from the main text). The last inequality follows again from $\Psi > \varpi$ (as argued above) and all parameters being positive.

The impact of financial integration on developing countries is also the same as in the baseline model. In fact, the (GG_d) curve is now given by

$$a_d^\phi = \frac{\beta\xi\varpi L_d^T}{g - \beta}, \tag{GG_d}$$

and is therefore almost identical as in the baseline model. In turn, the (RR_d) curve is given by

$$L_d = \bar{L} - \Gamma\left(\Psi L_d^T + \frac{b_d}{a_d}\left(1 - \frac{g}{R}\right)\right) + \Gamma\frac{(g-1)a_d^\phi}{\xi}. \tag{RR_d}$$

Compared with the baseline model, the difference is (again) that (RR_d) in the current model posits a positive relationship between a_d^ϕ and L_d^T, with a slope coefficient strictly larger than that of (GG_d). Therefore, capital outflows which shift (RR_d) to the right necessarily raise both a_d and L_d^T - as in the baseline model. Formally,

$$a_{d,a}^\phi = \frac{\varpi\beta\xi\bar{L}}{(g_a - \beta)(1+\Gamma\Psi) - (g_a - 1)\varpi\beta\Gamma}$$

under financial autarky (compare (34) from the main text), but

$$a_{d,f}^\phi = \frac{\varpi\beta\xi\left(\bar{L} + \Gamma\frac{\kappa(\beta(1+\tau)-1)}{a_{d,f}}\right)}{(g_f - \beta)(1+\Gamma\Psi) - (g_f - 1)\varpi\beta\Gamma} > a_{d,a}$$

under financial integration (compare (40) from the main text). Hence, our qualitative results on the impact of financial integration on steady state productivity growth are robust to the assumption that investment in innovation is done in terms of the traded final good.

D The case $R_f > g_f$

In the main text, we had assumed that developing countries' propensity to save, captured by $\tau > 0$, is large enough to guarantee that the return on U.S. bonds is below the growth rate of the economy in the financial integration steady state ($R_f < g_f$). As we argued in the main text, this is the empirically relevant case at least in the last decades. Nonetheless, there remains

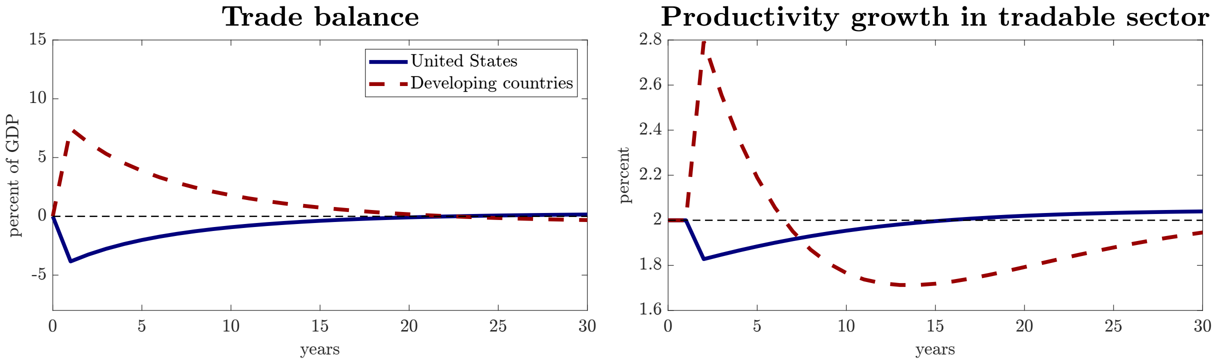


Figure 1: Transition from autarky to financial integration when $\beta(1+\tau) < 1$. Notes: the process of financial integration is captured by a gradual rise in κ_t, which is governed by (42). Financial integration is not anticipated by agents in periods $t < 1$. From period $t = 1$ on agents have perfect foresight.

substantial uncertainty about whether interest rates will remain persistently low in the future. In this Appendix, we therefore ask how our results would change if we instead assume that $R_f > g_f$ in the long run following financial integration.

As it is easy to see, in the financial integration steady state our results would flip, as growth would accelerate in the U.S. (and therefore globally) due to persistent capital outflows giving rise to a larger U.S. tradable sector. This happens because, being a net debtor, the U.S. is forced to run trade balance surpluses in order to maintain a constant net-liabilities position in steady state. In the long run, financial integration therefore leads to a regime of higher productivity growth.

However, this does not imply that the global financial resource curse does not play a role in this case, as it still arises in the medium run. To illustrate this, we repeat the numerical exercise from Section 3.3, but we now assume that the U.S. runs a trade balance *surplus* equal to 0.25% of GDP in the financial integration steady state. From equation (37), a U.S. trade balance surplus requires that $\beta(1 + \tau) < 1$ or, equivalently, that $R_f > g_f$.[70]

Figure 1 shows the result. We find that, in the medium run, the model exhibits the same dynamics as in our baseline parametrization. As the two regions integrate financially, capital starts flowing toward the U.S. which generates a fall in the growth rate of U.S. productivity. Again as in the baseline model, developing countries experience an initial productivity growth acceleration.

Overall, this exercise suggests that the emergence of a global financial resource curse does not depend on whether the U.S. trade balance is in deficit or surplus in the final steady state. In fact, even if financial integration generates U.S. trade balance surpluses and faster global productivity growth in the long run, the transition might still be characterized by a long-lasting global productivity growth slowdown.

[70]Targeting a trade balance surplus of 0.25% to GDP leads to $\tau = 0.033$, rather than $\tau = 0.11$ as in our baseline (see footnote 39). As it turns out, because developing countries' households are more patient under this alternative calibration, the adjustment after financial liberalization is somewhat slowed down relative to our baseline. We therefore plot results until 30 years (rather than 25 years) after the start of financial integration.

E Technological leapfrogging by developing countries

Our baseline model focuses on a scenario in which the United States permanently retains its technological leadership, so that $A_{u,t} > A_{d,t}$ for all t. In this Appendix, we consider an alternative scenario in which developing countries may technologically leapfrog the U.S. in the long run. Our formalization follows closely Barro and Sala-i Martin (1997).

Let us start by allowing innovation activities to take place in developing countries as well. If firms in developing countries choose to innovate, their productivity evolves according to

$$A^j_{d,t+1} = A^j_{d,t} + \xi A_{d,t} L^j_{d,t}. \tag{E.1}$$

If instead firms in developing countries choose to adopt technologies originating from the U.S. their productivity evolves according to equation (16). Clearly, it is profitable for firms in developing countries to innovate rather than imitate if and only if $A_{d,t} > A^{\phi}_{u,t} A^{1-\phi}_{d,t}$, or equivalently, if $A_{d,t} > A_{u,t}$.[71] Symmetrically, we assume that U.S. firms can imitate technological discoveries made in developing countries, in which case their technology evolves as

$$A^j_{u,t+1} = A^j_{u,t} + \chi A^{1-\phi}_{u,t} A^{\phi}_{d,t} L^j_{u,t}. \tag{E.2}$$

Comparing this with equation (14) reveals that imitation is cheaper than innovation for U.S. firms if and only if $A_{u,t} < A^{1-\phi}_{u,t} A^{\phi}_{d,t}$, or $A_{u,t} < A_{d,t}$. In sum, if $A_{d,t} > A_{u,t}$ the world technological leadership passes from the U.S. to developing countries, and investment in innovation by developing countries becomes the driver of improvements in the world technological frontier.

Under what conditions does technological leapfrog occur in equilibrium? Using equation (40), one can see that under financial integration developing countries eventually become the technological leaders if

$$\kappa(\beta(1+\tau) - 1) > \frac{\bar{L}}{\Gamma} \frac{\chi - \xi}{\chi + \xi}. \tag{E.3}$$

There are two reasons why developing countries may become the technological leaders in the long run. First, independently of the size of capital flows, this occurs if firms in developing countries are intrinsically better at innovation activities than firms in the United States (i.e. if $\xi > \chi$). In this case, developing countries would eventually leapfrog the U.S. even under financial autarky. The second, and perhaps more interesting, case is one in which leapfrogging occurs due to financial integration. That is, if capital flows are sufficiently large (i.e. if $\kappa(\beta(1+\tau) - 1)$ is big enough), developing countries may eventually become the global technological leaders even if investment in innovation is more productive in the United States (i.e. if $\xi < \chi$). As we argued before, this happens because capital outflows increase the profitability of investing in innovation for firms in developing countries. If this effect is strong enough, financial integration can be the trigger of a

[71] For simplicity, we assume that ξ captures the efficiency of both innovation and imitation activities in developing countries. By allowing different efficiencies of innovation and imitation, one could capture a scenario in which developing countries start innovating before or after they reach the level of productivity in the U.S. (Barro and Sala-i Martin, 1997).

change in the world's technological leadership.

Let us now revisit the impact of financial integration on global growth. There are two cases to consider. First, imagine that $\xi > \chi$, so that developing countries are more productive in performing research than the United States. In this case, regardless of the financial regime, in the balanced growth path developing countries are the technological leaders and global productivity growth is equal to

$$g = \beta(\xi \alpha L_d^T + 1).$$

Now recall that, in developing countries, financial integration is associated with capital outflows and a larger size of the tradable sector (i.e. higher L_d^T). Hence, in this scenario financial integration boosts global growth.

But now imagine that $\xi < \chi$, so that the U.S. have an advantage in performing research compared to developing countries. Under financial autarky, it is the United States who retain the global technological leadership, so that global growth is given by expression (33), which we rewrite here for convenience

$$g_a = \beta \left(\frac{\alpha \left(\chi \bar{L} + 1 - \beta \right)}{1 + \Gamma \Psi + \alpha \beta} + 1 \right).$$

Now consider a case in which condition (E.3) holds, so that upon financial integration developing countries leapfrog the United States in the new balanced growth path. It is then easy to show that under financial integration global growth is equal to

$$g_f = g_a - \alpha \beta \frac{(\chi - \xi)\bar{L} - \xi \Gamma \kappa \left(\beta(1 + \tau) - 1 \right)}{1 + \Gamma \Psi + \alpha \beta}. \tag{E.4}$$

This expression reveals that now financial integration may lead to a drop in global growth. The reason is that developing countries are less efficient at performing research compared to the United States. So now the global financial resource curse takes a new form, in the sense that financial integration may push developing countries to become the world technological leaders, even if they have a disadvantage in performing research compared to the United States.

F Suggestive evidence

In this Appendix, we detail the data sources used for our empirical analysis in Section 4, and also show some robustness of our main results.

F.1 Data sources and sample

Productivity. We take data on TFP and labor productivity from the Penn World Tables, version 10 (Feenstra et al., 2015). For TFP, we use the two series *rtfpna* and *ctfp*, the former to compute TFP growth across time within countries, the latter to make comparisons across countries within years (to compute initial conditions, as in Table 1). For labor productivity, we use the two series *rgdpo* and *emp*, the former measuring real GDP, the latter measuring the level of employment. We then compute labor productivity as the ratio of the two series. To compute labor productivity in the manufacturing sector, we extract value added and employment data from UNIDO INDSTAT2 (see "Economic activity in the tradable sector" below). We then divide value added by employment. Because the value added series is measured in current U.S. dollars, it needs to be deflated to obtain a real series. We do so by using the U.S. GDP deflator, to express productivity in manufacturing in 1980s U.S. dollars (see "Capital inflows" below).

Real GDP per capita. For real GDP per capita, we again turn to the Penn World Tables. We extract the two series *rgdpo* and *pop*. Real GDP per capita is the ratio of the two series.

Capital inflows. Our datasource for capital inflows is the External Wealth of Nations database (Lane and Milesi-Ferretti, 2018). From this database we use the *current account balance* and the *nominal GDP* series, both expressed in current U.S. dollars. To express both series in 1980s dollars, we extract the time series *pl_gdpo* for the U.S. from Penn World Tables. This time series corresponds to the U.S. GDP deflator. We then deflate, for each country, the current account and nominal GDP series by using the U.S. GDP deflator. Our capital inflow measure in Figure 5 and Tables 1-2 is then constructed as cumulated current account deficits divided by initial GDP.

Economic activity in the tradable sector. Our datasource for measuring economic activity in the tradable sector is the UNIDO INDSTAT2 database (UNIDO, 2024). From this database we extract employment and value added in current U.S. dollars for total manufacturing. Our headline measure is employment in manufacturing relative to total employment (recall we take total employment from the Penn World Tables, see "Productivity" above). To compute economic activity in value added terms, we take the ratio between the value added series and total nominal GDP in current U.S. dollars (recall we take total nominal GDP in current U.S. dollars from the EWN database, see "Capital inflows" above).

Developing countries. Our starting point is the same set of developing countries considered by Gourinchas and Jeanne (2013), a total of 68 countries. The countries are AGO, ARG, BGD, BEN, BOL, BWA, BRA, CMR, CHL, CHN, TWN, COL, COG, CRI, CYP, CIV, DOM, ECU, EGY, SLV, ETH, FJI, GAB, GHA, GTM, HTI, HND, HKG, IND, IDN, IRN, ISR, JAM, JOR, KEN, MDG, MWI, KOR, MYS, MUS, MEX, MAR, MOZ, NPL, NER, NGA, PAK, PAN, PNG, PRY, PER, PHL, RWA, SEN, SGP, ZAF, LKA, SYR, TZA, THA, TTO, TUN, TUR, UGA, URY, VEN, MLI and TGO. From this list of countries, we exclude PNG (no PWT data available), SGP (outlier, 90% capital inflows relative to initial GDP during our sample period), and VEN (outlier due to hyperinflation, on average -3% TFP growth during our sample period).

Advanced economies. Our sample of advanced economies is composed of AUS, AUT, BEL, CAN, DNK, FIN, FRA, DEU, GRC, ISL, ITA, JPN, MLT, NLD, NZL, PRT, ESP, SWE, GBR and USA.

Unbalanced panel. Our panel is unbalanced. For instance, manufacturing employment data is not available for all countries in all years. To deal with this, in all the regressions and figures we keep only countries for which at least 15 (out of a maximum 40) years of data are available.

F.2 Robustness for the cross-sectional analysis

In this Appendix, we redo the analysis underlying Table 1 using two alternative measures of productivity, and using an alternative measure of economic activity in the tradable sector: value added in manufacturing relative to total GDP. Table 4 shows the results.

First, we replace TFP growth with labor productivity growth, and show that our main conclusions still hold. Second, we use value added in manufacturing relative to total GDP as a measure of economic activity in the tradable sector, rather than the share of employment in manufacturing. The results are essentially unaffected.

Last, we also experimented with labor productivity growth in manufacturing. Once again, our main conclusions are not affected by the use of this alternative measure. Moreover, when using manufacturing productivity as dependent variable the coefficients capturing convergence effects are highly significant, even without controlling for economic activity in the tradable sector. This is in line with Rodrik (2012), who provides evidence in favor of unconditional convergence in the manufacturing sector. It is also consistent with our model, as we assume knowledge spillovers across countries in the tradable sector.

F.3 Robustness for the time-series analysis

In this Appendix, we complement the analysis in Section 4.2 by looking at the behavior of real GDP per capita growth, labor productivity growth, labor productivity growth in manufacturing and the value added share of manufacturing in total GDP.[72] Table 5 shows that the results hold also for this alternative set of variables.

We also perform an event analysis by considering episodes of large capital inflows. Specifically, we estimate the regression equation

$$y_{i,t+h} = \alpha_i^h + \beta_h \times \mathbb{1}_{i,t} + \varepsilon_{i,t+h}, \tag{F.1}$$

where $\mathbb{1}_{i,t}$ is an indicator variable which equals 1 when our capital inflow measure is at least one standard deviation above its trend. The trend is defined by HP-filtering the original series with a smoothing coefficient of 100. With this specification, we therefore study the dynamic evolution of our variables of interest during periods of *large* capital inflows. Benigno et al. (2015) and Müller and Verner (2023) perform similar analyses.

Figure 2 shows what a period of large capital inflows looks like. The left panel shows that the current account is persistently in deficit, initially by more than 4% of GDP.[73] The other two panels show a significant and persistent decline in productivity growth and the employment share in manufacturing. These results are in line with our dynamic correlation analysis.

[72]Specifically, we run the panel regression (43), but replacing $\Delta_3 tfp_{i,t+h}$ with $\Delta_3 gdp_{i,t+h}$, $\Delta_3 labprod_{i,t+h}$ and $\Delta_3 labprodman_{i,t+h}$, denoting respectively the change in log real GDP per capita, log labor productivity, and log labor productivity in manufacturing (all annualized). In turn, for the share of manufacturing value added in total GDP, we again replace $\Delta_3 tfp_{i,t+h}$ by $share_{i,t+h} - share_{i,t-4}$, where $share_{i,t}$ now refers to the value added share of manufacturing in total GDP.

[73]We obtain this figure by replacing $y_{i,t+h}$ in equation (F.1) with our capital inflow measure.

Table 4: Robustness for cross-sectional analysis.

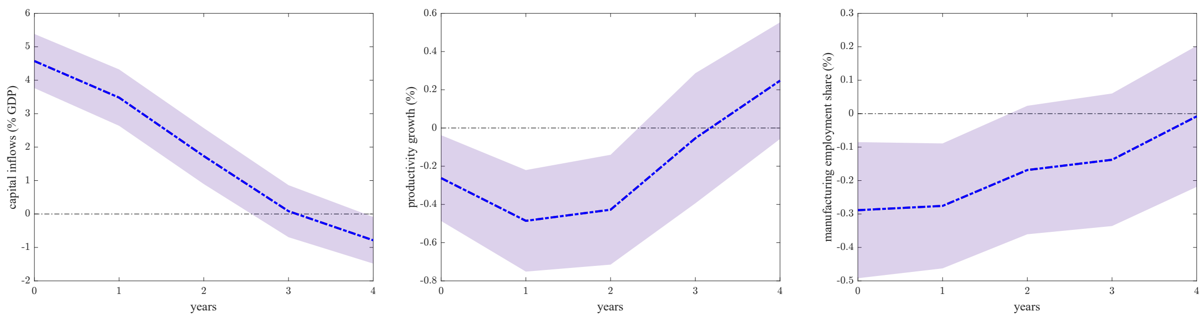
Panel A. Dependent variable: Labor productivity growth				
	(1)	(2)	(3)	(4)
capital inflows	-0.0458	-0.0551	-0.0518	-0.0370
	(0.0184)	(0.0181)	(0.0194)	(0.0172)
employment share manufacturing			0.0071	0.1210
			(0.0256)	(0.0328)
initial productivity		-0.0106		-0.0648
		(0.0176)		(0.0216)
initial productivity squared		-0.0000		0.0004
		(0.0002)		(0.0002)
# observations	85	85	69	69
R^2	0.0696	0.1472	0.1147	0.3655
Panel B. Dependent variable: Total factor productivity growth				
	(1)	(2)	(3)	(4)
capital inflows	-0.0253	-0.0253	-0.0184	-0.0178
	(0.0103)	(0.0104)	(0.0130)	(0.0127)
value added manufacturing			0.0332	0.0352
			(0.0161)	(0.0158)
initial productivity		-0.0027		-0.0355
		(0.0152)		(0.0155)
initial productivity squared		-0.0000		0.0002
		(0.0001)		(0.0001)
# observations	72	72	62	62
R^2	0.0791	0.1110	0.1597	0.2322
Panel C. Dependent variable: Labor productivity growth in manufacturing				
	(1)	(2)	(3)	(4)
capital inflows	-0.0341	-0.0413	-0.0267	-0.0229
	(0.0292)	(0.0267)	(0.0308)	(0.0268)
employment share manufacturing			0.0319	0.0945
			(0.0401)	(0.0390)
initial productivity		-0.1103		-0.1244
		(0.0294)		(0.0289)
initial productivity squared		0.0010		0.0011
		(0.0003)		(0.0003)
# observations	65	65	65	65
R^2	0.0212	0.2216	0.0311	0.2910

Notes: Standard errors in parentheses. All variables are expressed in percent.

Table 5: Robustness for time-series analysis.

	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$
Panel A. Dependent variable: Real GDP per capita growth					
capital inflows	-0.173	-0.154	-0.120	-0.081	-0.072
	(0.059)	(0.056)	(0.050)	(0.042)	(0.036)
# observations	3348	3264	3180	3096	3012
R^2	0.10	0.10	0.09	0.09	0.08
Panel B. Dependent variable: Labor productivity growth					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$
capital inflows	-0.160	-0.127	-0.084	-0.045	-0.042
	(0.058)	(0.057)	(0.051)	(0.042)	(0.034)
# observations	3336	3256	3176	3096	3012
R^2	0.09	0.09	0.08	0.07	0.07
Panel C. Dependent variable: Labor productivity growth in manufacturing					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$
capital inflows	-0.070	-0.256	-0.353	-0.357	-0.305
	(0.091)	(0.080)	(0.076)	(0.078)	(0.087)
# observations	2283	2228	2172	2114	2057
R^2	0.03	0.04	0.05	0.05	0.05
Panel D. Dependent variable: Value added share manufacturing					
	$h=0$	$h=1$	$h=2$	$h=3$	$h=4$
capital inflows	-0.064	-0.064	-0.072	-0.068	-0.051
	(0.023)	(0.021)	(0.021)	(0.025)	(0.026)
# observations	2579	2496	2412	2329	2248
R^2	0.10	0.12	0.15	0.18	0.21

Notes: Regression analysis according to equation (43). Driscoll and Kraay (1998) standard errors in parentheses with lag-length $ceil(1.5(3+h))$. All variables are in expressed in percent.



(a) Capital inflows **(b) Productivity growth** **(c) Manufacturing employment**

Figure 2: Episodes of large capital inflows. Notes: Regression outcome based on equation (F.1). Shaded areas represent 90% confidence bounds from standard errors computed as in Driscoll and Kraay (1998), with lag length $ceil(1.5(3+h))$.

G Extended model and quantitative implications

In this Appendix, we detail the analysis sketched out in Section 4.3, and consider several extensions to our baseline model.

G.1 Innovation in the tradable sector only

The production structure of the tradable sector is unchanged relative to the baseline model presented in Section 2. Value added in this sector is therefore $\Psi A^T_{u,t} L^T_{u,t}$, and firms' monopoly rents are $\varpi A^{j,T}_{u,t} L^T_{u,t}$. The law of motion for productivity is now given by

$$A^{j,T}_{u,t+1} = A^{j,T}_{u,t} + \chi^T (A^{j,T}_{u,t})^\lambda (A^T_{u,t})^{1-\lambda} L^{j,T}_{u,t}. \tag{G.1}$$

Hence, when innovating firms build on their internal stock of knowledge $A^{j,T}_{u,t}$ and on the aggregate sectoral one $A^T_{u,t}$. Recall that firms' problem is to maximize $\sum_{t=0}^{\infty} \frac{\beta^t C^T_{u,0}}{C^T_{u,t}} \Pi^{j,T}_{u,t}$, where $\Pi^{j,T}_{u,t} \equiv \varpi A^{j,T}_{u,t} L^T_{u,t} - W_{u,t} L^{j,T}_{u,t}$, subject to (G.1). Ignoring corner solutions, optimal investment implies

$$\begin{aligned} &\frac{W_{u,t}}{\chi^T (A^{j,T}_{u,t})^\lambda (A^T_{u,t})^{1-\lambda}} \\ &\qquad = \beta \frac{C^T_{u,t}}{C^T_{u,t+1}} \left(\varpi L^T_{u,t+1} + \frac{W_{u,t+1}}{\chi^T (A^{j,T}_{u,t+1})^\lambda (A^T_{u,t+1})^{1-\lambda}} \left(1 + \chi^T \lambda \left(\frac{A^{j,T}_{u,t+1}}{A^T_{u,t+1}} \right)^{\lambda-1} L^{j,T}_{u,t+1} \right) \right). \end{aligned}$$

In a symmetric equilibrium with $A^{j,T}_{u,t} = A^T_{u,t}$ this expression simplifies to

$$\frac{W_{u,t}}{\chi^T A^T_{u,t}} = \beta \frac{C^T_{u,t}}{C^T_{u,t+1}} \left(\varpi L^T_{u,t+1} + \frac{W_{u,t+1}}{\chi^T A^T_{u,t+1}} \left(1 + \lambda \frac{A^T_{u,t+2} - A^T_{u,t+1}}{A^T_{u,t+1}} \right) \right),$$

where we used (G.1) to replace $L^{j,T}_{u,t+1}$. From firms' labor demand, we know that

$$W_{u,t} = (1-\alpha)\alpha^{\frac{2\alpha}{1-\alpha}} A^T_{u,t} = \frac{\varpi}{\alpha} A^T_{u,t}.$$

Defining $g^T_{u,t+1} \equiv A^T_{u,t+1}/A^T_{u,t}$, we obtain equation (44)

$$g^T_{u.t+1} = \beta \frac{c^T_{u,t}}{c^T_{u,t+1}} \left(\chi^T \alpha L^T_{u,t+1} + 1 + \lambda (g_{u,t+2} - 1) \right). \tag{44}$$

With respect to the non-tradable sector, we slightly deviate from the baseline model by assuming the same production structure as in the traded sector. Value added in the non-tradable sector is thus $P^N_{u,t} \Psi A^N_{u,t} L^N_{u,t}$, while firms' labor demand implies $W_{u,t} = P^N_{u,t}(1-\alpha)\alpha^{\frac{2\alpha}{1-\alpha}} A^N_{u,t}$. Due to wage equalization between the two sectors, the relative price of the non-traded good is then pinned down by $P^N_{u,t} = A^T_{u,t}/A^N_{u,t}$. Productivity growth in the non-tradable sector is constant and equal to g^N_u.

Households' optimal allocation of expenditure between the two goods implies

$$C_{u,t}^{N}=\frac{1-\omega}{\omega}\frac{C_{u,t}^{T}}{P_{u,t}^{N}}=\frac{1-\omega}{\omega}c_{u,t}^{T}A_{u,t}^{N}. \tag{G.2}$$

Using $C_{u,t}^{N}=\Psi A_{u,t}^{N}L_{u,t}^{N}$, we thus obtain

$$L_{u,t}^{N}=\frac{1-\omega}{\omega\Psi}c_{u,t}^{T}, \tag{48}$$

which is (48) in the main text.

From now on, let's focus on the approximation $L_{u,t}^{R}\approx 0$. First, notice that GDP in terms of tradable goods is given by

$$GDP_{u,t}=\Psi A_{u,t}^{T}L_{u,t}^{T}+P_{u,t}^{N}\Psi A_{u,t}^{N}L_{u,t}^{N}=\Psi A_{u,t}^{T}\bar{L}.$$

Tradable consumption in the U.S. is

$$c_{u,t}^{T}=\Psi L_{u,t}^{T}+\Psi\bar{L}T_{t},$$

where T_t denotes the trade deficit-to-GDP ratio. Finally, labor market clearing implies

$$\bar{L}=L_{u,t}^{T}+L_{u,t}^{N}=L_{u,t}^{T}+\frac{1-\omega}{\omega\Psi}c_{u,t}^{T}.$$

These three expressions combined give (49) from the main text.

To obtain equation (50) from the main text, simply insert (44) in the definition of aggregate growth (46), use again the approximation $L_{u,t}^{R}\approx 0$, and evaluate on the balanced growth path

$$g_{u}=\frac{L_{u}^{T}}{\bar{L}}\frac{\beta\chi^{T}\alpha\frac{L_{u}^{T}}{\bar{L}}\bar{L}+1-\lambda}{1-\lambda\beta}+\left(1-\frac{L_{u}^{T}}{\bar{L}}\right)g_{u}^{N}.$$

Differentiating this expression gives

$$\frac{\partial g_{u}}{\partial\frac{L_{u}^{T}}{\bar{L}}}=g_{u}^{T}-g_{u}^{N}+\frac{L_{u}^{T}}{\bar{L}}\frac{\beta\chi^{T}\alpha\bar{L}}{1-\lambda\beta}.$$

Using $\frac{\beta\chi^{T}\alpha L_{u}^{T}}{1-\lambda\beta}=g_{u}^{T}-\frac{\beta(1-\lambda)}{1-\lambda\beta}$, and recognizing that $\partial(L_{u}^{T}/\bar{L})/\partial T=-(1-\omega)$, yields the result.

G.2 Innovation in both sectors

In our baseline model, firms in the non-tradable sector do not invest in innovation. In reality, however, even if the lion's share of investment in innovation occurs within tradable sectors, productivity-enhancing activities take place in non-tradable sectors as well. We now revisit the impact of capital inflows on U.S. productivity growth allowing firms in both sectors to invest in innovation.

The only difference with respect to the model in the previous section is that productivity in the non-traded sector is endogenous and evolves according to

$$A_{u,t+1}^{j,N} = A_{u,t}^{j,N} + \chi^N (A_{u,t}^{j,N})^\lambda (A_{u,t}^N)^{1-\lambda} L_{u,t}^{j,N}, \tag{G.3}$$

where $\chi^N > 0$ denotes the productivity of research in the non-tradable sector. Ignoring corner solutions and imposing symmetry, optimal investment by firms in the non-traded sector implies

$$\frac{W_{u,t}}{\chi^N A_{u,t}^N} = \beta \frac{C_{u,t}^T}{C_{u,t+1}^T} \left(P_{u,t+1}^N \varpi L_{u,t+1}^N + \frac{W_{u,t+1}}{\chi^N A_{u,t+1}^N} \left(1 + \lambda \frac{A_{u,t+2}^N - A_{u,t+1}^N}{A_{u,t+1}^N} \right) \right).$$

Using $P_{u,t}^N = A_{u,t}^T / A_{u,t}^N$, and $W_{u,t} = (\varpi/\alpha) A_{u,t}^T$ gives

$$\frac{A_{u,t+1}^N}{A_{u,t}^N} \equiv g_{u,t+1}^N = \beta \frac{c_{u,t}^T}{c_{u,t+1}^T} \left(\chi^N \alpha L_{u,t+1}^N + 1 + \lambda (g_{u,t+2}^N - 1) \right), \tag{G.4}$$

which replaces equation (45) of the baseline model. All the other equations remain unchanged relative to the previous section, once we define $L_{u,t}^R \equiv L_{u,t}^{R,T} + L_{u,t}^{R,N}$, where $L_{u,t}^{R,s} = (g_{u,t+1}^s - 1)/\chi^s$ for $s \in \{T, N\}$.

The key difference with respect to the baseline model is that now capital inflows foster productivity growth in the non-tradable sector, because firms producing non-traded goods invest more in innovation when the non-traded sector expands. Therefore, capital inflows reallocate innovation activities from the tradable to the non-tradable sector, meaning that the effect on *aggregate* productivity growth is a priori ambiguous.

To make progress, we again consider the approximation $L_{u,t}^R \equiv L_{u,t}^{R,T} + L_{u,t}^{R,N} \approx 0$, so that aggregate growth is defined by

$$g_u = \frac{L_u^T}{\bar{L}} \frac{\beta \chi^T \alpha \frac{L_u^T}{\bar{L}} \bar{L} + 1 - \lambda}{1 - \lambda\beta} + \left(1 - \frac{L_u^T}{\bar{L}}\right) \frac{\beta \chi^N \alpha \left(1 - \frac{L_u^T}{\bar{L}}\right) \bar{L} + 1 - \lambda}{1 - \lambda\beta}.$$

Going through the same steps as in the last section, we can trace the impact of a marginal permanent rise in capital inflows on aggregate growth as

$$\frac{\partial g_u}{\partial T} = -(1-\omega) \left(\underbrace{g_u^T - g_u^N}_{\text{reallocation}} + \underbrace{g_u^T - \frac{\beta(1-\lambda)}{1-\beta\lambda}}_{\text{impact on } g_u^T} - \left(\underbrace{g_u^N - \frac{\beta(1-\lambda)}{1-\beta\lambda}}_{\text{impact on } g_u^N} \right) \right). \tag{G.5}$$

A new term appears relative to equation (50), which captures the positive impact of capital inflows on productivity growth within the non-tradable sector. However, notice that expression (G.5) can be further simplified to $\frac{\partial g_u}{\partial T} = -2(1-\omega)(g_u^T - g_u^N)$. In the empirically relevant case $g_u^T > g_u^N$, a marginal rise in capital inflows thus depresses productivity growth.

What is the intuition behind this result? Again, there are two effects at play. The first one is

Table 6: Calibrated examples (continued).

	Exogenous g_u^N		*Endogenous* g_u^N		*Intersectoral spillovers*	
Trade deficit/GDP	0.0	2.0	0.0	2.0	0.0	2.0
Productivity growth:						
Aggregate	1.6	1.3	1.6	1.5	1.6	1.3
Tradables	4.4	2.4	4.4	2.2	1.6	0.1
Non-tradables	1.1	1.1	1.1	1.4	1.6	1.4
Employment share:						
Tradables	14.8	13.2	14.4	12.7	14.4	12.8
Non-tradables	83.7	86.0	81.7	83.4	81.6	83.9
Research	1.5	0.8	3.9	3.9	4.0	3.3
Welfare gains	0.0	-4.3	0.0	0.8	0.0	-3.0

Notes: All the values are expressed in percentage points. Welfare gains are expressed as consumption equivalents with respect to financial autarky.

the mechanic reallocation effect captured by the term $g_u^T - g_u^N$. Second, and more interestingly, if $g_u^T > g_u^N$ then the elasticity of productivity growth with respect to market size is higher in the traded sector compared to the non-traded one. In fact, consider that for a generic sector s

$$\frac{\partial g_u^s}{\partial L_u^s} L_u^s = g_u^s - \frac{\beta(1-\lambda)}{1-\beta\lambda}.$$

Hence, the sector characterized by faster growth is also the one in which productivity growth is more sensitive to changes in employment. Both effects point toward a negative impact on aggregate growth of a reallocation of labor from the tradable to the non-tradable sector.

We now have two parameters determining the productivity of research to calibrate, χ^T and χ^N. We set them to hit the two sectoral productivity growth rates $g^T = 1.044$ and $g^N = 1.011$, which yields $\chi^T = 3.10$ and $\chi^N = .45$. This calibration strategy thus implies that research is more productive in the tradable sector compared to the non-traded one, i.e. $\chi^T > \chi^N$. That is the way in which the model rationalizes faster productivity growth in the traded sector, in spite of a smaller market size compared to the non-traded one. The remaining parameters are unchanged relative to Section 4.3.

Table 6 shows the impact of a capital inflows shock causing a permanent trade deficit equal to 2% of GDP. There are three points to highlight. First, capital inflows lower aggregate productivity growth from 1.6% to 1.5%. So, in line with the intuition delivered by the approximation underlying expression (G.5), the rise in productivity growth in the non-traded sector is not large enough to counteract the drop in the tradable one. Second, the drop in economy-wide growth takes place even though the aggregate amount of labor devoted to research remains constant. Hence, the decline in productivity growth is purely driven by the fact that research labor reallocates to the sector in which it is less productive. Finally, in spite of the fact that the U.S. effectively receives a large transfer of resources from abroad, the welfare gains from capital inflows are modest. Once again, this happens because trade deficits amplify the inefficiencies characterizing the innovation process.

G.3 Knowledge spillovers across sectors

A recent literature argues that intersectoral knowledge spillovers are an important aspect of technological progress (Liu and Ma, 2021). Interestingly, this literature suggests that the manufacturing sector emanates particularly strong knowledge spillovers to the rest of the economy. To incorporate this notion in our model, we assume that when performing research firms build on a weighted average of the knowledge stocks in the two sectors: $(A^T_{u,t})^{\phi^T}(A^N_{u,t})^{1-\phi^T}$ in the tradable sector, and $(A^N_{u,t})^{\phi^N}(A^T_{u,t})^{1-\phi^N}$ in the non-tradable one. When $\phi^T = \phi^N = 1$ intersectoral knowledge spillovers are shut off, and the model collapses to the one studied in the previous section. We now move away from this benchmark and consider scenarios in which $0 < \phi^T < 1$ and $0 < \phi^N < 1$.

The law of motion for productivity in the tradable sector is now given by

$$A^{j,T}_{u,t+1} = A^{j,T}_{u,t} + \chi^T (A^{j,T}_{u,t})^{\lambda} \left((A^T_{u,t})^{\phi^T} (A^N_{u,t})^{1-\phi^T} \right)^{1-\lambda} L^{j,T}_{u,t}.$$

Ignoring corner solutions and imposing symmetry, optimal investment by firms in the tradable sector implies

$$\frac{W_{u,t}}{\chi^T A^T_{u,t}} a_{u,t}^{(1-\lambda)(1-\phi^T)} = \beta \frac{C^T_{u,t}}{C^T_{u,t+1}} \left(\varpi L^T_{u,t+1} + \frac{W_{u,t+1}}{\chi^T A^T_{u,t+1}} a_{u,t+1}^{(1-\lambda)(1-\phi^T)} \left(1 + \lambda \frac{A^T_{u,t+2} - A^T_{u,t+1}}{A^T_{u,t+1}} \right) \right),$$

where $a_{u,t} \equiv A^T_{u,t}/A^N_{u,t}$. Substituting out $W_{u,t}$, this expression becomes

$$g^T_{u,t+1} a_{u,t}^{(1-\lambda)(1-\phi^T)} = \beta \frac{c^T_{u,t}}{c^T_{u,t+1}} \left(\chi^T \alpha L^T_{u,t+1} + a_{u,t+1}^{(1-\lambda)(1-\phi^T)} \left(1 + \lambda (g^T_{u,t+2} - 1) \right) \right). \tag{G.6}$$

In the non-tradable sector productivity evolves according to

$$A^{j,N}_{u,t+1} = A^{j,N}_{u,t} + \chi^N (A^{j,N}_{u,t})^{\lambda} \left((A^N_{u,t})^{\phi^N} (A^T_{u,t})^{1-\phi^N} \right)^{1-\lambda} L^{j,N}_{u,t}.$$

Optimal investment by firms implies

$$\frac{W_{u,t}}{\chi^N A^N_{u,t}} a_{u,t}^{-(1-\lambda)(1-\phi^N)} = \beta \frac{C^T_{u,t}}{C^T_{u,t+1}} \left(P^N_{u,t+1} \varpi L^N_{u,t+1} + \frac{W_{u,t+1}}{\chi^N A^N_{u,t+1}} a_{u,t+1}^{-(1-\lambda)(1-\phi^N)} \left(1 + \lambda \frac{A^N_{u,t+2} - A^N_{u,t+1}}{A^N_{u,t+1}} \right) \right).$$

Substituting out $W_{u,t}$ and $P^N_{u,t}$, this expression becomes

$$g^N_{u,t+1} a_{u,t}^{-(1-\lambda)(1-\phi^N)} = \beta \frac{c^T_{u,t}}{c^T_{u,t+1}} \left(\chi^N \alpha L^N_{u,t+1} + a_{u,t+1}^{-(1-\lambda)(1-\phi^N)} \left(1 + \lambda (g^N_{u,t+2} - 1) \right) \right). \tag{G.7}$$

We evaluate the impact of capital inflows on growth by studying the balanced growth path

(BGP). The first thing to notice is that on the BGP productivity grows at the same rate in both sectors. This follows straight from the law of motion for productivity. For instance, on the BGP productivity growth in the tradable sector is

$$g_u^T = 1 + \chi^T a_u^{-(1-\lambda)(1-\phi^T)} L_u^R.$$

Constant growth thus implies that a_u is constant. But since $a_{u,t} \equiv A_{u,t}^T / A_{u,t}^N$, $A_{u,t}^T$ and $A_{u,t}^N$ must grow at the same rate. This common growth rate also equals the aggregate growth rate of the economy, and so $g_u^T = g_u^N = g_u$.

Using this fact, we can evaluate (G.6)-(G.7) on the BGP:

$$\begin{aligned} g_u &= \frac{\beta(a_u^{-(1-\lambda)(1-\phi^T)} \chi^T \alpha L_u^T + 1 - \lambda)}{1 - \lambda\beta} \\ g_u &= \frac{\beta(a_u^{(1-\lambda)(1-\phi^N)} \chi^N \alpha L_u^N + 1 - \lambda)}{1 - \lambda\beta}. \end{aligned}$$

As in Liu and Ma (2021), intersectoral knowledge spillovers act as a force toward productivity convergence between the two sectors. In fact, on the balanced growth path productivity in both sectors grows at rate

$$g_u = \frac{\beta \left((\chi^N \alpha L_u^N)^{\frac{1-\phi_T}{2-\phi_T-\phi_N}} (\chi^T \alpha L_u^T)^{\frac{1-\phi_N}{2-\phi_T-\phi_N}} + 1 - \lambda \right)}{1 - \beta\lambda}. \tag{G.8}$$

Aggregate productivity growth thus depends on each sector's market size, weighted by the strength of the intersectoral knowledge spillovers. Now consider a permanent rise in capital inflows, inducing a reallocation of labor out of the tradable sector and toward the non-tradable one.

We now use again $L_u^R \approx 0$ to write (G.8) as

$$g_u = \frac{\beta \left(\left(\chi^N \alpha \bar{L} \left(1 - \frac{L_u^T}{\bar{L}} \right) \right)^{\frac{1-\phi_T}{2-\phi_T-\phi_N}} \left(\chi^T \alpha \bar{L} \frac{L_u^T}{\bar{L}} \right)^{\frac{1-\phi_N}{2-\phi_T-\phi_N}} + 1 - \lambda \right)}{1 - \beta\lambda}.$$

We then take the derivative with respect to $L_u^T/\bar{L}$, and use again that $\partial(L_u^T/\bar{L})/\partial T = -(1-\omega)$, to obtain

$$\frac{\partial g_u}{\partial T} = -(1-\omega) \left(g_u - \frac{\beta(1-\lambda)}{1-\lambda\beta} \right) \frac{(1-\phi^N)\frac{\bar{L}}{L_u^T} - (1-\phi^T)\frac{\bar{L}}{L_u^N}}{2 - \phi^T - \phi^N}. \tag{G.9}$$

So capital inflows depress aggregate productivity growth if

$$\frac{1-\phi^N}{L_u^T} > \frac{1-\phi^T}{L_u^N}, \tag{G.10}$$

that is if the tradable sector generates sufficiently large knowledge spillovers compared to the non-tradable one. Moreover, when this condition holds, capital inflows depress productivity growth also within the non-tradable sector. Indeed, while capital inflows boost market size and firms' incentives to invest in the non-traded sector, in the long run this effect is outweighed by the drop in the knowledge spillovers received from the tradable one.

Empirical estimates of the parameters ϕ^T and ϕ^N can be obtained using the approach proposed by Liu and Ma (2021), which is based on the pattern of intersectoral patent citations. Using manufacturing and services as empirical counterparts respectively of the tradable and non-tradable sector, this approach implies $\phi^T = 0.84$ and $\phi^N = 0.4$.[74] Hence, manufacturing produces much stronger knowledge spillovers toward services, compared to the other way around. We are left to choose values for χ^T and χ^N. Given that in this model version $g_u^T = g_u^N$, we set $\chi^T = \chi^N = 1.83$ so that under financial autarky $g_u = 1.016$ (as in the other two model versions). The remaining parameters are unchanged from before.

Once again, we consider the impact of a capital inflows shock causing a permanent trade deficit equal to 2% of GDP. As we describe below, in this version of the model this shock triggers a slow transition toward a new steady state. In Table 6 we summarize these dynamics by showing the average values of all variables over the first 50 years since the start of the transition.

The main result is that now capital inflows depress productivity growth not only in the tradable sector, but in the non-tradable one too. Interestingly, this happens despite the fact that the non-tradable sector expands, giving firms in this sector more incentives to invest. This positive market size effect, however, is dominated by the drop in knowledge spillovers that non-tradable firms receive from the tradable sector. The consequence is that capital inflows trigger a sizeable decline in aggregate productivity growth, by 0.3 percentage points.[75] We get a similar result for welfare, as we find that capital inflows cause a welfare loss equal to a permanent 3% drop in financial-autarky consumption.[76] Taking stock, these results suggest that capital inflows may trigger a significant decline in productivity growth and welfare, even if research activities take place in the non-traded sector too.

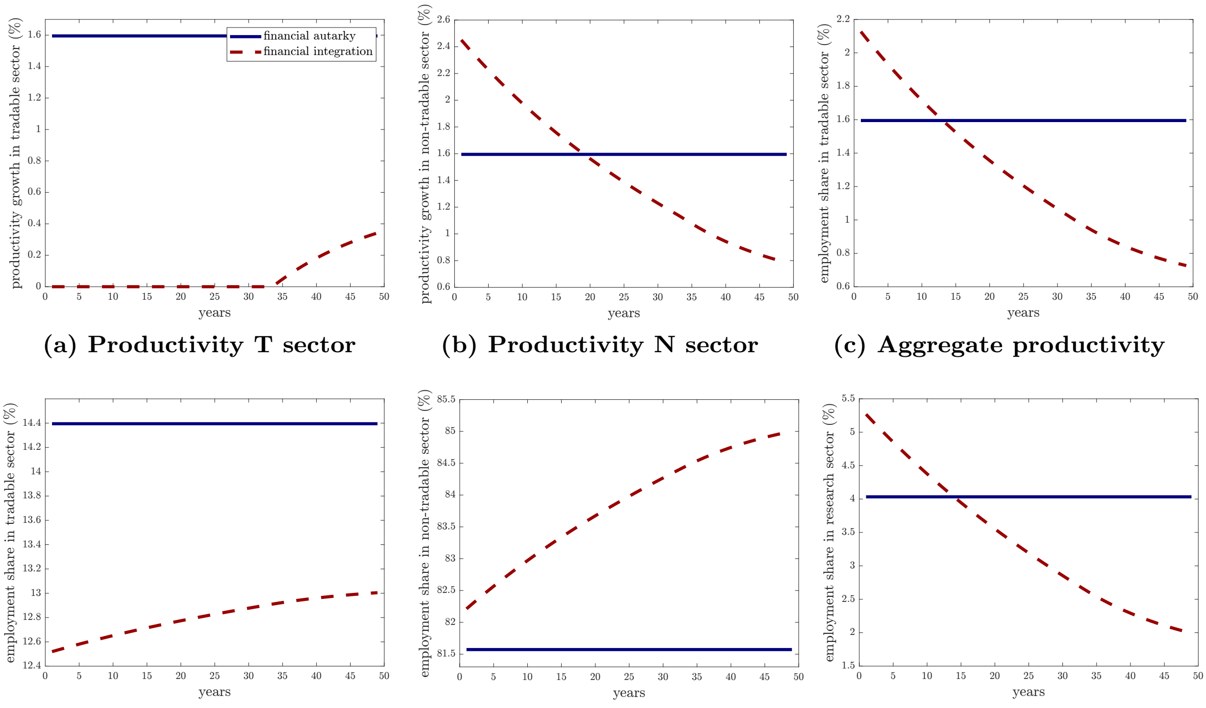
Figure 3 shows how the economy - starting from the financial autarky steady state - responds to a permanent trade deficit equal to 2% of GDP. As expected, capital inflows make the tradable sector shrink, reducing innovation activities and productivity growth there. In fact, firms' incentives to invest drop by so much that investment drops to zero and productivity in the tradable sector stagnates during the first part of the transition.[77] In contrast, the non-tradable sector expands as

[74] We are grateful to Ernest Liu for providing us these estimates.

[75] One interesting result, on which we elaborate in Appendix G.3, is that the market size and the knowledge spillovers effects operate at different horizons. Initially, the market size effect dominates, and productivity growth actually accelerates in the non-tradable sector when the capital inflows episode starts. Eventually, however, the drop in knowledge spillovers from the tradable sector drags productivity growth in the non-traded sector down. So, the longer the horizon considered the bigger is the negative impact of capital inflows on productivity growth (for instance, in the final steady state productivity growth is just 0.6%). There is an obvious parallel with the case of developing countries discussed in Section 3.3, in which productivity growth slows down because of lower knowledge spillovers originating from the world technological frontier.

[76] Just as in the previous versions of the model, the welfare loss is computed by taking into account utility since the start of the transition to the infinite future.

[77] Formally, the growth equation (G.6) holds only when firms' investment is expected to be positive forever in the future. Along the transition shown, this equation would predict growth to be initially negative, violating firms' non-negativity constraint on investment. We thus replace this equation by $g_{u,t+1}^T = 1$ until the period where investment



(a) **Productivity T sector** (b) **Productivity N sector** (c) **Aggregate productivity**

(d) **Employment T sector** (e) **Employment N sector** (f) **Employment R sector**

Figure 3: Productivity dynamics with knowledge spillovers. Notes: Financial autarky refers to balanced trade. Financial integration refers to a permanent trade deficit-to-GDP ratio equal to 2%.

a result of capital inflows. Initially, this effect implies a productivity growth acceleration in the non-traded sector. Over time, however, lower knowledge spillovers from the tradable sector drag productivity growth in the non-tradable one below its value under financial autarky. As a result, aggregate growth initially accelerates, but eventually falls below its value under financial autarky.

G.4 Semi-endogenous growth

We next turn to a version of the model in which growth is semi-endogenous. As is well understood, in this class of models long-run growth is not affected by policy variables (Jones, 2022). This result extends to capital inflows, which also leave the long-run growth rate unaffected. However, we show that capital inflows may depress productivity growth in the medium run, while the economy transits toward its balanced growth path. Moreover, since transitional dynamics tend to be slow for reasonable calibrations (e.g., Jones, 2022), capital inflows can trigger very persistent productivity growth slowdowns.

To keep the analysis tractable, let us go back to the assumption of exogenous growth in the non-traded sector. In the traded sector, the law of motion for productivity is now given by

$$A^{j,T}_{u,t+1} = A^{j,T}_{u,t} + \chi^T (A^{j,T}_{u,t})^{\lambda} (A^{T}_{u,t})^{\kappa} L^{j,T}_{u,t}, \tag{G.11}$$

where $\lambda + \kappa \equiv \phi < 1$ brings us to the class of semi-endogenous growth models (the case $\lambda + \kappa =$

turns again positive.

1 corresponds to the endogenous growth framework that we studied so far). In a symmetric equilibrium, this law of motion for productivity implies

$$g_{u,t+1}^T = 1 + \chi^T (A_{u,t}^T)^{\phi-1} L_{u,t}^R. \tag{G.12}$$

This expression embeds a well known result from the semi-endogenous growth literature: a constant growth rate of productivity can be sustained only if the number of workers allocated to research rises over time. Since in our model population is constant, it follows immediately that there is no balanced growth path with positive productivity growth in the traded sector.[78]

Instead, provided that $A_{u,0}^T < \bar{A}$ where $\bar{A}$ is a threshold value for productivity to be defined below, the economy converges asymptotically to a steady state in which productivity stops growing and the research sector disappears.[79] Along the transition, optimal investment by firms implies

$$(A_{u,t}^T)^{1-\phi} g_{u,t+1}^T = \beta \frac{c_{u,t}^T}{c_{u,t+1}^T} \left(\chi^T \alpha L_{u,t+1}^T + (A_{u,t+1}^T)^{1-\phi} \left(1 + \lambda (g_{u,t+2}^T - 1)\right) \right). \tag{G.13}$$

Using the fact that in the no growth steady state $g_{u,t}^T = g_{u,t+1}^T = 1$ and $c_{u,t}^T = c_{u,t+1}^T$, the equation above implies that in the long run productivity converges to

$$A_u^T = \left(\frac{\beta \chi^T \alpha L_u^T}{1-\beta} \right)^{\frac{1}{1-\phi}} \equiv \bar{A}. \tag{G.14}$$

From this equation it is easy to see that a permanent increase in capital inflows, which is associated with a lower L_u^T, reduces the long-run level of productivity in the tradable sector, rather than the growth rate as in our baseline model. That said, capital inflows do depress productivity growth during the transition to the no growth steady state. Moreover, since transitional dynamics are typically slow in calibrated semi-endogenous growth models, the impact of capital inflows on productivity growth can be very persistent.

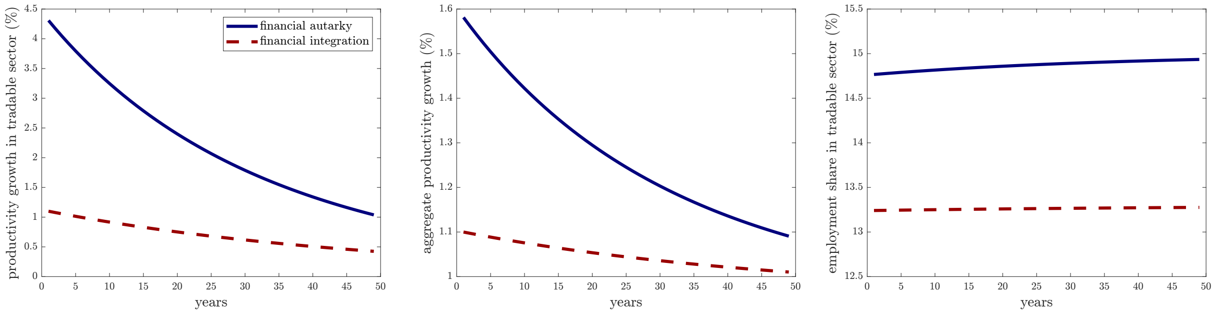
To make this point we resort to a numerical simulation. First we fix some parameters at the same levels as in Section 4.3, namely $\beta = .96$, $\alpha = .122$, $\omega = .15$ and $\lambda = .75$. The parameter χ^T determines the long-run level of productivity (see (G.14)), but does not affect the path of productivity growth. We thus normalize it to $\chi^T = 1$. The key parameter to calibrate is ϕ, which determines the shape of the ideas production function. Using a semi-endogenous growth model calibrated to the U.S., Jones (2002) argues that a typical value for the half-life of multifactor productivity is 25.7 years. We set ϕ to reproduce this number in our model under financial autarky, which yields $\phi = .867$.[80]

[78] To be clear, we focus on an economy with constant population purely to minimize the deviations from the baseline model, and we could easily introduce a positive rate of population growth. However, the main insights of this section do not depend on whether population is constant or growing over time.

[79] If $A_{u,0}^T \geq \bar{A}$ the economy jumps immediately to a steady state in which $g_{u,t}^T = 1$ and $L_{u,t}^R = 0$.

[80] To obtain this number, we consider a log-linearization of the model under financial autarky, yielding the difference equation

$$\beta \lambda \hat{g}_{u,t+2} - \hat{g}_{u,t+1} + \frac{\beta \alpha \omega \bar{L}}{1-\beta} (\beta \hat{g}_{u,t+2} - \hat{g}_{u,t+1}) = -(1-\phi)(\beta \hat{A}_{u,t+1} - \hat{A}_{u,t}),$$



(a) Productivity T sector **(b) Aggregate productivity** **(c) Employment T sector**

Figure 4: Productivity dynamics with semi-endogenous growth. Notes: Financial autarky refers to balanced trade. Financial integration refers to a permanent trade deficit-to-GDP ratio equal to 2%.

We then contrast the transitional dynamics under financial autarky versus financial integration. In the latter case, we scale capital inflows to maintain a trade deficit equal to 2% of GDP throughout the transition. Under both scenarios, we set the initial productivity level $A^T_{u,0}$ so that productivity grows initially at 4.4% in the tradable sector under financial autarky. For the non-tradable sector, we assume an exogenous growth rate of 1.1% throughout. Both numbers are in line with our analysis in Section 4.3.

The left panel of Figure 4 shows the dynamics of productivity growth in the tradable sector, the middle panel shows aggregate productivity growth, and the right panel shows the dynamics of the share of employment in the tradable sector. We find that capital inflows reduce growth rates substantially, and in a very persistent manner. For example, capital inflows depress aggregate productivity growth by 0.5%-0.3% during the first decade of the transition. Over time, as the economy approaches its zero growth steady state, the impact of capital inflows on productivity growth gradually fades away. This happens slowly, however, and capital flows visibly affect growth even 50 years after the start of the transition. In turn, the decline in growth comes about by a permanent decrease of employment allocated to the tradable sector.

G.5 Structural change

We next embed structural change in our model. We take a supply side view of structural change, as in Ngai and Pissarides (2007). That is, we assume that structural change takes place because of differences in the rate of technological progress across sectors, coupled with a demand elasticity smaller than 1.[81] We consider the empirically relevant scenario in which initially productivity grows faster in the tradable sector compared to the non-tradable one. As in Ngai and Pissarides (2007), this productivity growth differential causes labor to move from the tradable to the non-tradable sector. The difference is that in our framework the reallocation of labor slows down innovation in the tradable sector, so that in the long run convergence in productivity growth between the two

where $\hat{g}_{u,t+1} = \hat{A}_{u,t+1} - \hat{A}_{u,t}$. We use hats above a variable to denote log-deviation. Solving this equation yields a policy function $\hat{A}_{t+1} = \xi \hat{A}_t$. Half lives of productivity levels are then given by $\log(1/2)/\log(\xi)$.

[81] The analysis in Kehoe et al. (2018) suggests that this is the most important channel to understand the shift of employment out of manufacturing and toward services in the United States during the global saving glut.

sectors occurs. We then show that capital inflows depress productivity growth over the medium run, resulting in a permanent reduction in the level of productivity in the tradable sector. Moreover, in accordance with Kehoe et al. (2018), we find that while the forces of structural change account for the bulk of the decline in employment in the traded sector over the long run, capital inflows lead to additional significant declines of employment in the traded sector over the medium run.

Relative to the baseline model, the difference is that now households bundle consumption according to

$$C_{u,t} = \left(\omega^{\frac{1}{\epsilon}} \left(C_{u,t}^T\right)^{\frac{\epsilon-1}{\epsilon}} + (1-\omega)^{\frac{1}{\epsilon}} \left(C_{u,t}^N\right)^{\frac{\epsilon-1}{\epsilon}}\right)^{\frac{\epsilon}{\epsilon-1}}, \tag{G.15}$$

where $\epsilon > 0$ is the elasticity of substitution across the two goods. Our baseline model corresponds to $\epsilon = 1$, in which case (G.15) becomes $C_{u,t} = (C_{u,t}^T)^{\omega}(C_{u,t}^N)^{1-\omega}$. To replicate the pattern of structural change observed in the data, in what follows we restrict attention to the case $\epsilon < 1$.

The Euler equation (4) is replaced by

$$\frac{\omega^{\frac{1}{\epsilon}}}{(C_{u,t}^T)^{\frac{1}{\epsilon}}(C_{u,t})^{1-\frac{1}{\epsilon}}} = R_{u,t}\left(\frac{\beta\omega^{\frac{1}{\epsilon}}}{(C_{u,t+1}^T)^{\frac{1}{\epsilon}}(C_{u,t+1})^{1-\frac{1}{\epsilon}}} + \mu_{u,t}\right), \tag{G.16}$$

and the optimal allocation of expenditure between tradable and non-tradable goods (7) becomes

$$P_{u,t}^N = \left(\frac{1-\omega}{\omega}\frac{C_{u,t}^T}{C_{u,t}^N}\right)^{\frac{1}{\epsilon}}. \tag{G.17}$$

The firm sector is the same as in Section G.1. That is, for simplicity, we assume growth in the non-traded sector to be exogenous. The investment problem of firms in the traded sector is also unchanged, except that households' discount factor which firms use to evaluate their profits is now different. As a result, the investment first order condition (in the symmetric equilibrium) is now given by

$$\frac{W_{u,t}}{\chi^T A_{u,t}^T} = \beta\frac{(C_{u,t}^T)^{\frac{1}{\epsilon}}(C_{u,t})^{1-\frac{1}{\epsilon}}}{(C_{u,t+1}^T)^{\frac{1}{\epsilon}}(C_{u,t+1})^{1-\frac{1}{\epsilon}}}\left(\varpi L_{u,t+1}^T + \frac{W_{u,t+1}}{\chi^T A_{u,t+1}^T}\left(1+\lambda\frac{A_{u,t+2}^T - A_{u,t+1}^T}{A_{u,t+1}^T}\right)\right). \tag{G.18}$$

Combining (G.15) and (G.17) we see that

$$C_{i,t} = \omega C_{i,t}^T\left(\omega + (1-\omega)\left(P_{i,t}^N\right)^{1-\epsilon}\right)^{\frac{\epsilon}{\epsilon-1}},$$

which implies that

$$\left(C_{u,t}^T\right)^{\frac{1}{\epsilon}}\left(C_{u,t}\right)^{1-\frac{1}{\epsilon}} = C_{u,t}^T\left(\omega + (1-\omega)\left(P_{u,t}^N\right)^{1-\epsilon}\right).$$

Inserting this in (G.18), and using again that $W_{u,t} = (\varpi/\alpha)A_{u,t}^T$, we obtain the growth equation for this model version

$$g^T_{u,t+1} = \beta \frac{c^T_{u,t}\left(\omega + (1-\omega)\left(P^N_{u,t}\right)^{1-\epsilon}\right)}{c^T_{u,t+1}\left(\omega + (1-\omega)(P^N_{u,t+1})^{1-\epsilon}\right)} \left(\chi^T \alpha L^T_{u,t+1} + 1 + \lambda(g_{u,t+2}-1)\right). \tag{G.19}$$

We can use (G.19) to understand some properties of the balanced growth path. On the balanced growth path, g^T_u, c^T_u, L^T_u and P^N_u are all constant. Now consider that firms' profit maximization, coupled with free sectoral labor mobility, implies that

$$P^N_{u,t} = \frac{A^T_{u,t}}{A^N_{u,t}}, \tag{G.20}$$

just as in the baseline model. Therefore, on the balanced growth path the two sectors share the same rate of productivity growth, and so g^T_u converges to the (exogenous) rate of productivity growth in the non-traded sector g^N_u

$$g^T_u = g^N_u. \tag{G.21}$$

To see how inter-sectoral convergence in productivity growth occurs, imagine that initially conditions are such that productivity grows faster in the tradable sector than in the non-tradable one. As in Ngai and Pissarides (2007), in response labor migrates toward the low productivity growth sector, i.e. out of the tradable sector and into the non-tradable one.[82] But lower market size in the traded sector leads to a drop in g^T_u. This process goes on until productivity growth is equalized across the two sectors and the economy reaches it balanced growth path. On the balanced growth path, the amount of labor allocated to the production of traded goods is equal to

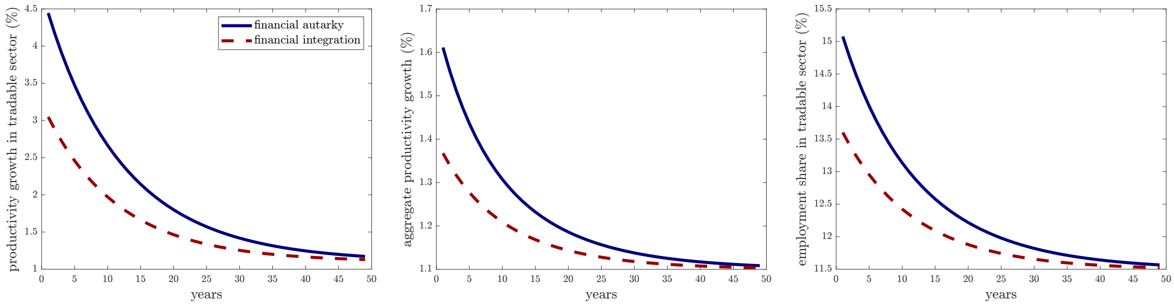
$$L^T_u = \frac{1}{\chi^T \alpha}\left(g^N_u \frac{1-\lambda\beta}{\beta} - (1-\lambda)\right). \tag{G.22}$$

while relative sectoral productivity is given by

$$\frac{A^N_{u,t}}{A^T_{u,t}} = \left(\frac{1-\omega}{\omega}\frac{c^T_u}{\Psi L^N_u}\right)^{\frac{\epsilon}{\epsilon-1}}. \tag{G.23}$$

What is the effect of capital inflows in this economy? As in our baseline model, capital inflows tend to reduce the amount of labor allocated to the production of traded goods, and so investment in innovation in the traded sector. But now there is also a second, counteracting, effect. Lower productivity growth in the traded sector induces a migration of labor out of the non-traded sector and into the traded one. In the long run, these two conflicting forces balance out, and capital flows do not affect sectoral labor allocation or productivity growth (see again (G.21) and (G.22)). Capital inflows do, however, reduce productivity growth in the traded sector during the transition,

[82] The intuition is standard. Due to the Balassa-Samuelson effect, the relative price of tradables falls over time, sustaining their demand. If the elasticity of substitution between the two goods is one, as in our baseline model, the rise in demand is exactly such that sectoral labor allocation is not affected. If the elasticity of substitution between the two goods is smaller than one, instead, demand for tradables increases more slowly than productivity, causing a fall in employment in the tradable sector.



(a) Productivity T sector **(b) Aggregate productivity** **(c) Employment T sector**

Figure 5: Dynamics of productivity and employment with structural change. Notes: Financial autarky refers to balanced trade. Financial integration refers to a permanent trade deficit-to-GDP ratio equal to 2%.

and therefore the long-run level of productivity in the tradable sector.[83]

We illustrate these results with a numerical simulation. As in previous simulations, we set $\beta = .96$, $\alpha = .122$ and $\lambda = .75$. Turning to the utility function, we set $\omega = .15$ and $\epsilon = .15$, in the range of values commonly considered by the structural change literature (Ngai and Pissarides, 2008; Herrendorf et al., 2013). We then set $\chi^T = 3.2$ and $A^T_{u,0}/A^N_{u,0} = 1.06$, so that initially, under financial autarky, productivity growth is around 4.4% and employment is around 15% of the total labor force in the tradable sector.

Figure 5 shows the results, by comparing an economy with balanced trade against one running a permanent trade deficit equal to 2% of GDP. Initially, productivity grows faster in the tradable sector than in the non-tradable one. As a consequence, during the transition toward the final balanced growth path, labor moves from the traded to the non-traded sector, and convergence in productivity growth between the two sectors occurs. As expected, capital inflows lead to a persistent reduction in employment in the traded sector, which causes a persistent slowdown in productivity growth.

Quantitatively, the first thing to notice is that it takes a significant amount of time, around 50 years, for the economy to reach its final balanced growth path. Over this period, the forces of structural change account for the bulk of the decline in employment in the tradable sector (around 3.5 percentage points). However, capital inflows play an important role too. For instance, on impact capital inflows cause an additional 1.5 percentage point decline in the share of labor allocated to the tradable sector. This result is in line with the numbers reported by Kehoe et al. (2018). Similarly, capital inflows have a significant impact on productivity growth during the transition. Indeed, capital inflows cause on impact a 0.25 percentage point drop in aggregate productivity growth.

[83]This can be intuitively gauged by looking at expression (G.23). In the long run, capital inflows increase c^T_u, but leave L^N_u unchanged. It follows that capital inflows induce a drop in A^T_u/A^N_u. Since the growth rate of A^N_u is exogenous, this means that productivity growth in the tradable sector must have been low during the transition.

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