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Converge or integrate? A note on Gourinchas and Jeanne : The elusive gains from international financial integration

Philippe Darreau
University of Limoges

Francois Pigalle
University of Limoges

Abstract

Gourinchas and Jeanne (2006) explain that the gains from capital market integration are small because the natural convergence of economies would have "done the work" of integration if it had not occurred. We provide a simple illustration of this standard theoretical argument using the simplest Solow model in a small open economy.

The authors thank Shelby Woods and Pierre-Olivier Gourinchas. Corresponding authors : LAPE, 5 rue Felix Eboue, 87031 Limoges Cedex, France. Email. philippe.darreau@unilim.fr, francois.pigalle@unilim.fr

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Contact: Philippe Darreau - darreau@numericable.com, Francois Pigalle - francois.pigalle@unilim.fr.

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1. Introduction

"*Standard theoretical arguments tell us that countries with relatively little capital benefit from financial integration as foreign capital flows in and speeds up the process of convergence*". In a very influential paper Gourinchas and Jeanne (2006) explain that these gains from capital market integration are low because the natural convergence of economies would have "done the work" of integration if it had not occurred. We provide a simple illustration of their argument using the graph of Schröder (1972), the simplest Solow model in a small open economy. Section 2 shows that the gains of integration are small on average. Section 3 shows that the distortion of autarky does not disappear much more quickly, on average, through pure convergence than through integration.

2. Gains from integration are not very large on average

Consider the Solow model of manuals. The production function is neoclassical, and inputs are capital and labor. The labor growth rate is n, the technical progress growth rate is x, capital depreciation is δ and savings rate is s. There is a parametric similarity and thus all countries of the world have the same steady state. GDP per unit of effective labor is $q = f(k)$ where k is the capital per unit of effective labor. National wealth in units of effective labor is $a = k + e$ where e is borrowing ($e < 0$) or loaning ($e > 0$) abroad. GNP per effective unit of effective labor is $y = q + Re = w + Rk + Re = w + Ra$ where $R = f'(k)$ is the gross interest rate.

Like Gourinchas and Jeanne we takes a model of small open economy. This framework was illustrated by Shröeder (1972). Consider Figure 1 a small open economy with inital wealth k_0 and rest of the world at steady state k^*. The small economy can either remain in autarky and converge "naturally" to its steady state, or financially integrate with the rest of the world and transit to its steady state as a small open economy.

If it does not integrate, the country will converge toward the steady state k^*. Its capital will increase gradually to k_0 to k^*. Its consumption will increase to BD to FE (see Figure 1). Gradually the gross interest rate R_0, will decrease to reach R^*.

If it is integrated, the country benefits from R^* immediately. The straight line $y = w^* + R^*a$, tangent to $q = f(k)$ in F has the slope R^* and ordinate w^*. The straight line sy tangent to sq in E has the slope sR^* and ordinate sw^*. As $R_0 > R^*$ the small economy borrows $e_0 < 0$, and its capital immediately becomes k^*. Its GDP is immediately q^*, and its GNP is y_0. The country would pay $-R^*e_0$ in interest. The country benefits from higher wages but suffers from a lower interest rate, but the immediate effect on income is positive since $y_0 > q_0$. This result is due to the concavity of the production function. Consumption increases immediately from BD to AC. Using a Cobb-Douglas function $q = k^\alpha$ like Gourinchas and Jeanne, we can calculate, at the moment of opening, the percentage increase in consumption :

$$\frac{c_0^{\text{int}} - c_0^{\text{aut}}}{c_0^{\text{aut}}} = \frac{(1-s)(y_0 - q_0) =}{(1-s)q_0} = \frac{q^* + R^*e_0 - q_0}{q_0} = \frac{k^{*\alpha} + \alpha k^{*\alpha-1}(k_0 - k^*)}{k_0^\alpha} - 1$$

$$\frac{c_0^{\text{int}} - c_0^{\text{aut}}}{c_0^{\text{aut}}} = (1-\alpha)\left(\frac{k^*}{k_0}\right)^\alpha + \alpha\left(\frac{k^*}{k_0}\right)^{\alpha-1} - 1 \tag{1}$$

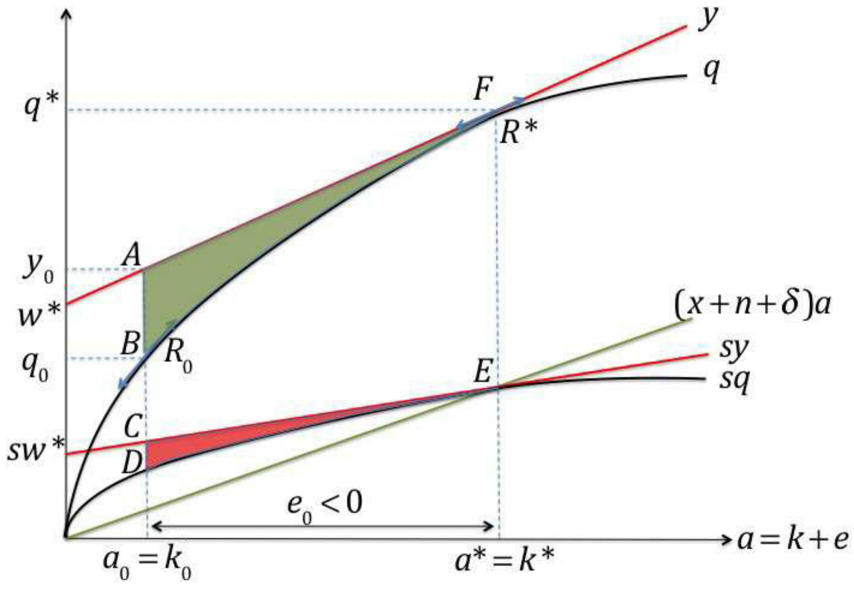

Figure 1: Gain from integration

Assuming, as Gourinchas and Jeanne, that $\alpha = 0.3$ and that steady state capital k^* is 2.46 [1] times the initial capital k_0, we get the instant gain: $(1-0.3)(2.46)^{0.3}+0.3(2.46)^{-0.7}-1 = 7.68\%$. For a given deviation from the steady state, this gain is an increasing then decreasing function of α.

Over the whole period consumption increases by the difference between the integral of the triangle ABF (increased income) and the integral of the triangle CDE (increased savings). The gain is on average :

$$\text{average gain} = \frac{1}{k^*-k_0}\int_{k_0}^{k^*}\left((1-\alpha)\left(\frac{k*}{k_0}\right)^{\alpha}+\alpha\left(\frac{k^*}{k_0}\right)^{\alpha-1}-1\right)dk$$

$$\text{average gain} = \frac{\left(\frac{k^*}{k_0}\right)^{\alpha-1}\left(2\left(\frac{k^*}{k_0}\right)^{1-\alpha}-\alpha\left(\frac{k^*}{k_0}\right)^{-1}-(2-\alpha)\right)}{\left(1-\left(\frac{k^*}{k_0}\right)^{-1}\right)(2-\alpha)}-1 \quad (2)$$

Assuming, as G&J that $\alpha = 0.3$ and that the steady state capital is 2.46 times the initial capital, we get an average gain of 2.01%[2] .

Figure 1 displays the G&J argument: even if the benefit of integration is initially significant, it is small on average. The area of the triangle ABF is small. The surface is small especially if k is close to the steady state (k^*/k_0 low) and depends on the concavity of the production function (α). This graph also shows that by integrating, the economy increases its savings by CDE with respect to autarky. This is true in the Solow model

[1] G&J consider the ratio k/y. Their benchmark is $k^*/y^* = 2.63$ and $r = R - \delta = 5.42\%$. Note that $k^*/k_0 = ((k^*/y^*)/(k_0/q_0))^{1/(1-\alpha)}$ and average capital-output ratio (from PWT 6.1) equal to 1.40 so $k^*/k_0 \approx 2.46$.

[2] G&J find that the gain is less than 2% between $k/y = 1.29$ and $k/y = 4.38$. In Solow's model gains are less than 2% between $k/y = 1.41$ and $k/y = 4.21$. See Appendix.

where the savings rate is constant, but not in the Ramsey model used by G&J. As savings increase, convergence to the steady state will be faster.

3. The speed of convergence is not much higher

The dynamic is different in autarky than in an open economy. In autarky "convergence" is done according to the dynamic equation: $Dk = s.q - (n + x + \delta)k$. In a small open economy[3], dynamics will be done according to the equation : $Da = s.y - (n + x + \delta)a$ with $y = w(k^*) + R(k^*)a$. Figure 2 shows the capital growth rate under autarky and under integration. We represent $s.q/k$ and $s.y/a$ and the constant $(n + x + \delta)$. The difference represents the growth rate. The curve $s.q/k$ is decreasing and convex since the average product of capital is decreasing. The curve $s.y/a = s(w^*/a) + sR^*$ is decreasing and convex since the denominator of constant wage w^*, increases. The slope of $s.q/k$ is $(-s.w/k^2)$, and the slope of $s.y/a$ is $(-s.w^*/a^2)$. The two slopes are the same for $k = a^*$; the first is less than the second for $k < a^*$ and higher for $k > a^*$.

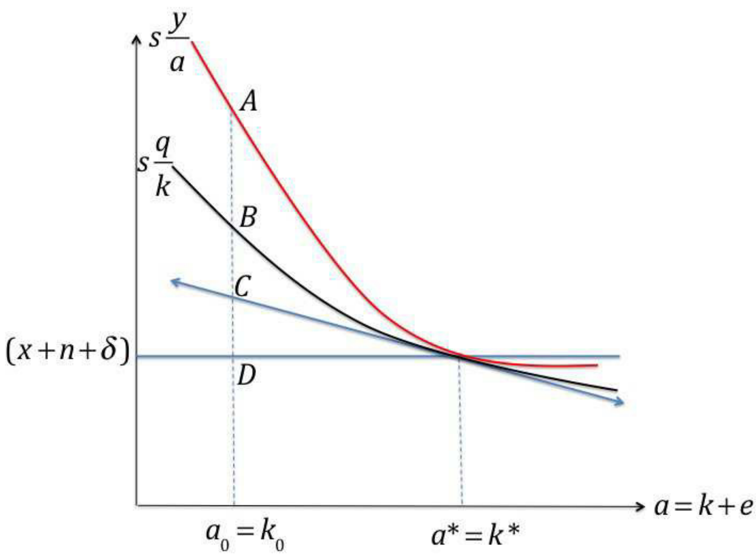

Figure 2: Growth rates

Figure 2 shows that the transitional growth rate is higher when there is integration (AD) than under autarky (BD). However, the linear approximation around the steady state is identical for both processes (CD). The speed of convergence is not much higher; it is in both cases equal to $\beta = (1 - \alpha)(x + n + \delta)$.

4. Conclusion

Gourinchas and Jeanne calibrate the Ramsey model to show small gains from the integration of capital for a poor country compared to the natural convergence. The Solow model does not measure the gain in utility and does not reflect the change in the savings rate. However it provides a simple illustration of the argument.

[3]In a small open economy dynamics is very simple. For an explanation of the dynamics in a general equilibrium model, see Darreau and Pigalle (2015).

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Appendix

Same figure than G&J p721 for instant and average gains :

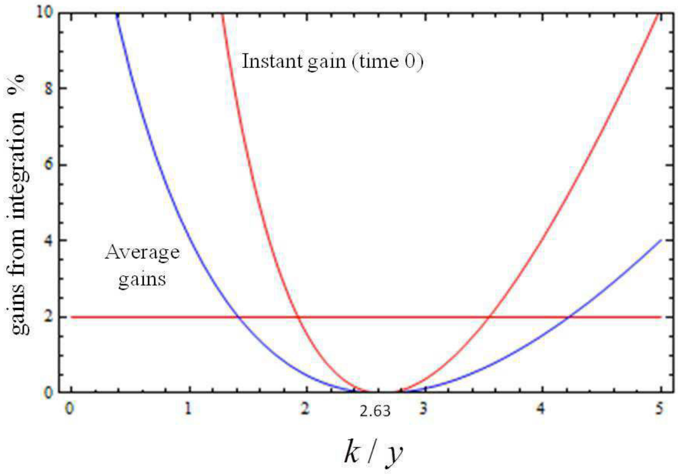

Figure 3: Instant and average gains