NBER WORKING PAPER SERIES

HOW BIG ARE THE GAINS FROM INTERNATIONAL FINANCIAL INTEGRATION?

Indrit Hoxha
Sebnem Kalemli-Ozcan
Dietrich Vollrath

Working Paper 14636
http://www.nber.org/papers/w14636

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2009

The authors would like to thank the participants at the 2007 NBER Summer Institute, 2008 IEFS Meetings, 2008 CEPR-ESSIM Meetings, Fabrizio Perri, Andrei Levchenko, David Weil and Helen Popper for their comments and suggestions. All remaining errors are ours alone. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

How Big are the Gains from International Financial Integration?
Indrit Hoxha, Sebnem Kalemli-Ozcan, and Dietrich Vollrath
NBER Working Paper No. 14636
January 2009
JEL No. F36,F41,F43,O4

ABSTRACT

We compare welfare in a calibrated neoclassical model of consumption under autarky to welfare under financial integration. The estimated welfare gains of integration depend intimately on the assumed speed of convergence between domestic and world rates of return. Using observed data from 1960-2000 to derive the initial fundamental characteristics for each of 92 countries, we parameterize the convergence process and calculate welfare under different assumptions regarding rates of convergence. Allowing for realistic rates, we calculate that welfare is nearly six times larger than previously found. Expanding our analysis to include the productivity gains from the inflow of FDI implies welfare gains twelve times larger than found before. Our results indicate substantial gains from international financial integration arising from persistent differences in fundamentals across nations.

Indrit Hoxha
University of Houston
Department of Economics
Houston, TX 77204
indrit.hoxha@mail.uh.edu

Dietrich Vollrath
University of Houston
Department of Economics
Houston, TX 77204
devollrath@uh.edu

Sebnem Kalemli-Ozcan
University of Houston
Department of Economics
Houston, TX 77204
and NBER
sebnem.kalemli-ozcan@mail.uh.edu

1 Introduction

Financial liberalization can generate a more efficient allocation of resources as capital flows equalize the rate of return across countries. The welfare benefits of such a reallocation arise from the increase in consumption this allows. The size of this welfare gain depends crucially on the difference between the current domestic rate of return, R_i^0, and the world rate of return, R^w. More specifically, for a given country i we can express the ratio of welfare under full integration (V_i^{int}) to welfare under current conditions (V_i^0) as

$$\frac{V_i^{int}}{V_i^0} \propto \left(R_i^0 - R^w\right). \tag{1}$$

The actual welfare benefits depend not only on the absolute difference between R_i^0 and R^w, but also on the speed at which the domestic rate of return would naturally converge to R^w given the current conditions. If a country will reach R^w very quickly, then the welfare benefits will be negligible. However, with slow convergence integration can be an important source of welfare gains.

To aid in understanding the role of convergence, consider a minor modification to equation (1), adding and subtracting the steady state rate of return in country i, conditional on country i's characteristics in period zero, $(R_i^*|x_i^0)$. x_i^0 is a vector of fundamental parameters for country i (e.g. time discount rate, technological growth rate), and R_i^* is the steady state rate of return given those parameters.

$$\frac{V_i^{int}}{V_i^{aut}} \propto \underbrace{R_i^0 - (R_i^*|x_i^0)}_{\text{Capital scarcity}} + \underbrace{(R_i^*|x_i^0) - R^w}_{\text{Fundamentals}} \tag{2}$$

The convergence of the rate of return R_i^0 to R^w consists of two elements. R_i^0 is converging towards $(R_i^*|x_i^0)$, while at the same time $(R_i^*|x_i^0)$ may be converging towards R^w.

We can characterize these two sources of welfare gains from financial integration more precisely. *Capital scarcity* arises when a country at time zero has less capital than it would at the steady state of $(R_i^*|x_i^0)$. The convergence to this conditional steady state is often referred to as β-convergence, which has in the past been a particular focus of the empirical growth literature.[1] The second term involves gains from what we refer to as *fundamentals*, arising because there are persistent (although not permanent) differences between nations

[1] Sala-i-Martin (1996), reviewing the existing literature, suggested that β-convergence occurred at the rate of 2% per year, or countries closed 2% of the gap between their current income and their steady state income level per year. Work by Caselli, Esquivel and Lefort (1996) suggests that β-convergence may be as fast as 8-11% per year.

in their time discount rate, population growth rate, and/or technological growth rate (i.e. differences in x_i^0). The more persistent these inherent fundamental differences, the slower the convergence from $(R_i^*|x_i^0)$ to R^w, and the larger the welfare gains of integration. This tendency for countries to converge towards a common natural rate of return is a version of σ-convergence.[2] It is important to note that x_i^0 is constant with respect to integration in the first part of our paper. In our baseline calculations, integration is not assumed to alter the fundamental characteristics of an economy. We relax this assumption later in the paper.

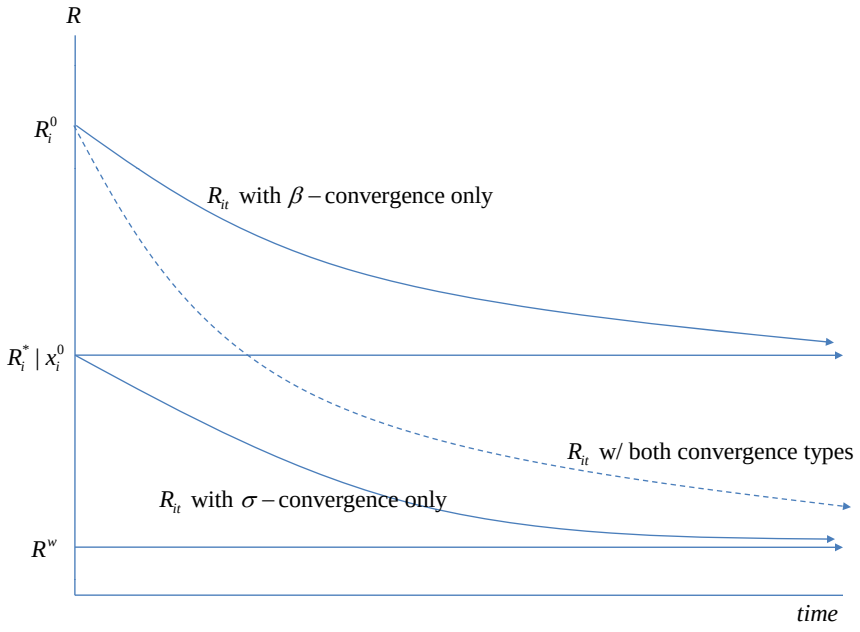

Figure 1: Rate of Return Convergence and its Decomposition

This decomposition of the overall path of convergence is illustrated in figure 1. The welfare gains achievable through financial integration are associated with the area between the dashed curve (representing the natural time path of the rate of return) and the line horizontal at R^w. The greater this area, the greater the

[2]True σ convergence concerns the convergence of absolute income levels over time. For our purposes, we will only be concerned with the convergence in rates of return, while differences in absolute income may persist. Compared to β-convergence, there is no evidence of σ-convergence occurring over the last 140 years, see Pritchett (1997). Despite this fact, it is normally assumed that over the very long run future there will be some tendency for σ-convergence.

benefits of financial integration. The time path of the rate of return depends upon both types of convergence. Holding x_i^0 constant over time, countries β-converge towards $(R_i^*|x_i^0)$. At the same time, though, $(R_i^*|x_i^0)$ may be σ-converging towards R^w. Determining the welfare gains of integration is therefore intimately tied to the speeds of both types of convergence.

In an influential paper, Gourinchas and Jeanne (2006) (GJ hereafter) examined the benefits of financial integration from the perspective of capital scarcity. To the consternation of many economists, they find that these welfare gains of full integration are quite small, equivalent to, at most, a 2% permanent increase in consumption. To concentrate on capital scarcity, they assume that $(R_i^*|x_i^0)$ is immediately equal to the world rate for every country. In other words, σ-convergence is instantaneous in their analysis, and $x_i^0 = x^w$ for each country. The welfare gains they calculate depend only upon the speed of β-convergence.

This paper reconsiders the welfare gains of financial integration, explicitly allowing for both capital scarcity and fundamental differences across countries. More specifically, we use a simple neo-classical model of optimal savings to derive the implied value of $(R_i^*|x_i^0)$ in the year 2000, where x_i^0 is made up of the values for the time discount rate, population growth rate, and technological growth rate derived from observed data from 1960–2000 for each country. Values of R_i^0 are simply the observed marginal product of capital in the year 2000, and R^w is set exogenously. The processes of β and σ convergence are parameterized so that we can explore various combinations of these convergence speeds on welfare.

We calculate the elasticity of welfare with respect to foreign capital flows for each of 92 developed and developing countries. The results show that the speed of σ convergence is central to finding sizable welfare gains from integration. In our main results, which include both β convergence and σ convergence at 2% per year, the population weighted average elasticity is 0.07.[3] Relaxing capital controls slighty, say by allowing foreign capital inflows equal to 10% of current consumption, would therefore increase welfare by 0.7%. A large-scale financial integration, in which foreign capital flowed in and immediately pushed the domestic return down to R^w, as in GJ, would involve capital flows equal to 100–200% of current consumption, depending on the exact country. This full integration would generate welfare gains of between 7–14% for the average country.

These results suggest much larger welfare gains than found in the work of GJ. Setting our convergence parameters to match their assumptions, we generate an elasticity of welfare with respect to foreign capital

[3]The convergence speed is the percent of the gap closed in each period. A 2% speed implies that half of the gap between R_i^0 and $(R_i^*|x_i^0)$ is closed in about 34 years.

of 0.013, on average. Hence, with a large-scale financial integration we match their result and get a welfare gain between 1.3%-2.6% at most. However, when we add σ-convergence over time, we generate welfare gains about 6 times larger for any given capital flow obtaining the results mentioned in the above paragraph. For several countries our welfare estimates are 10–12 times larger.

In the first part of the paper, we generate the above results by presuming that integration has no effect on the fundamental parameters x_i^0. As an extension to this, we also consider the possibility that foreign capital flows have an additional direct effect on productivity. In other words, we consider the possibility that financial integration directly affects the vector x_i^0. This productivity effect, as we will conceive of it here, arises when foreign capital inflows (specifically, FDI) have a positive effect on the efficiency with which capital is utilized domestically.[4] In this case, as foreign capital flows in there are two conflicting effects on the domestic rate of return. The increased capital stock pushes the return down, closing the gap due to capital scarcity, but at the same time, the increased productivity that comes with FDI pushes up the long-run growth rate in x_i^0, and increases $(R_i^*|x_i^0)$. The counter-acting effect of FDI on productivity slows down the convergence of domestic returns to the world rate, increasing the welfare gains.

The key to incorporating FDI productivity effects into our calibration is obtaining a well-identified estimate of the elasticity of total factor productivity (TFP) with respect to FDI. The primary issue here is that foreign capital may flow to those countries or firms that already have high productivity, and therefore any estimated elasticity of TFP with respect to FDI is potentially biased upward.[5] To close in on the true elasticity of TFP with respect to FDI we turn to firm-level studies from developing countries and those firm's response to foreign ownership. After examining a variety of studies, we found several (Arnold and Javorcik, 2005; Evenett and Voicu, 2003; Javorcik, 2004) able to achieve identification of this effect, and from these we derive our estimates of the elasticity of productivity with respect to FDI.

Once we incorporate this productivity effect, the elasticity of welfare with respect to foreign capital flows is 0.133–0.159, depending on our assumptions regarding the size of the productivity effect. Thus the productivity effects of FDI double the welfare gains of financial integration. With magnitudes such as these, a

[4]These conditions will increase the beneficial effects of foreign capital on the host economy as argued by Kose, Prasad, Rogoff, and Wei (2006). Alfaro, Chanda, Kalemli-Ozcan, and Sayek (2004, 2007) show FDI is beneficial only given a certain level of domestic financial development, and Klein (2007) shows the positive effect of capital account liberalization depends on institutional quality. Borensztain, De Gregorio, and Lee (1998) show that technology transfers through FDI occur only with a minimum threshold of human capital.

[5]As suggested by Blomstrom, Lipsey and Zejan (1996) in a world of completely mobile capital, the amount of physical capital installed in a country relative to the world average is fully explained by TFP. Kalemli-Ozcan, Reshef, Sorensen, and Yosha (2008) show that capital flows within the United States are consistent with these predictions.

10% increase in capital inflows (as FDI) with respect to current consumption would generate a welfare gain of around 1.4%. A large-scale integration that allowed in FDI equivalent to 100% of current consumption would offer welfare gains of about 14%. Note, though, that this view of the productivity benefits of foreign capital are extremely restrictive, since it focused only on FDI and it's direct effects on industrial production. To the extent the foreign capital may induce institutional improvement or greater efficiency in capital allocation within countries, the welfare benefits would be even larger.

The paper proceeds as follows. Section 2 describes the savings model employed and performs the calibration to evaluate the role of foreign capital flows on welfare. Section 3 establishes the role of FDI on productivity and evaluates its welfare consequences. Section 4 concludes.

2 The Benefits of Foreign Capital Flows

As noted in the introduction, the main purpose here is to evaluate the welfare gains available through financial integration given the differences between countries in their fundamental characteristics. We do this in the context of a simple neo-classical model of optimal savings and calculate the welfare benefits of foreign capital inflows to see how much of an improvement financial integration provides. We follow GJ's basic setup.

2.1 Optimal Savings Model

Assume utility takes the form

$$V = \sum_{t=0}^{\infty} \rho^t (1+n)^t u(c_t) \tag{3}$$

where ρ is the time discount factor, n is the growth rate of the population and $u(c_t)$ is the utility of consumption in period t. We will assume that $u(c_t) = c_t^{1-\sigma}/(1-\sigma)$, a constant relative risk aversion utility function with $\sigma > 0$.

Production of output is described by the following Cobb-Douglas function

$$Y_t = K_t^{\alpha} \left(A_t L_t\right)^{1-\alpha} \tag{4}$$

where K_t denotes the stock of domestic capital, L_t is the labor supply, and A_t is a labor-augmenting measure

of productivity. Labor supply is assumed to grow exogenously at the rate n, so that $L_{t+1} = (1+n)L_t$. Productivity grows at the rate g implying that $A_{t+1} = (1+g)A_t$.

If we denote productivity and population normalized variables with a hat, $\hat{x}_t = x_t/(A_t L_t)$, then we can write the dynamic budget constraint for each economy as

$$\hat{k}_{t+1} = (1-\delta-n-g)\hat{k}_t + \hat{y}_t - \hat{c}_t \tag{5}$$

where δ is the depreciation rate. Additionally, denote the return on capital as $R_{t+1} = \alpha \hat{k}_{t+1}^{\alpha-1} + 1 - \delta$.

Utility maximization delivers the Euler equation relating consumption over adjacent periods as

$$\hat{c}_{t+1} = \hat{c}_t \frac{(\rho R_{t+1})^{1/\sigma}}{1+g}. \tag{6}$$

In steady state it will have to be that $\hat{c}_{t+1} = \hat{c}_t$, which yields the following conditional steady state rate of return

$$R^* = \frac{(1+g)^\sigma}{\rho} \tag{7}$$

The level of this conditional rate of return will be the crucial input into our welfare calculations, as seen in the following section. In the terminology used in the introduction, the fundamental vector $x_i^0 = [g_i, \rho_i]$, and the conditional steady state rate of return for country i could be written more explicitly as

$$R_i^* | x_i^0 = \frac{(1+g_i)^\sigma}{\rho_i}. \tag{8}$$

2.2 Welfare Evaluation

To measure the welfare gains of integration within our neo-classical model, we the Hicksian equivalent variation in consumption from foreign capital flows originally provided by GJ. Their paper provides full details, but the idea is to examine the welfare gain of a marginal increase in international financial integration. If we allow an increase of foreign capital of $d\kappa_{t+1}$ at time t, this increases the wage rate and decreases the return to savings in period $t+1$. The marginal increase in domestic net income is $(R_{t+1} - R^w)d\kappa_{t+1}$ where R_{t+1} is the domestic return to capital and R^w is the world rate of return.

The welfare gain of this inflow of foreign capital is therefore

$$dU_{t+1} = u'(c_{t+1})(R_{t+1} - R^w)d\kappa_{t+1}. \tag{9}$$

To evaluate financial integration at time zero, consider an inflow of foreign capital relative to current consumption equal to

$$\frac{d\kappa_{t+1}}{c_{t+1}} = \overline{\kappa} \tag{10}$$

where $\overline{\kappa}$ is a constant. In each period t, foreign capital inflows are allowed in equal to $\overline{\kappa}c_t$.

One advantage of evaluating welfare with this method is that we can explore the gains from incrementally opening up domestic capital markets to foreign flows. So we can examine the welfare benefit of allowing in foreign capital equal to say, 1% or 10% of current consumption ($\overline{\kappa} = 0.01$ or 0.10). This provides, perhaps, a more realistic evaluation of the welfare gains as financial integration often occurs in moderated steps rather than full-blown liberalizations.

GJ show that with log preferences, one can express the Hicksian equivalent variation in consumption from foreign capital flows for country i as

$$\mu_i \approx \rho \left(\hat{R}_i - R^w \right) \overline{\kappa} \tag{11}$$

where μ_i measures the percent permanent increase in consumption equivalent to the welfare benefit from a flow of $\overline{\kappa}$ units of foreign capital per period. The value of $\hat{R}_i$ is the permanent value of the natural rate of return that would hold in autarky, defined as

$$\hat{R}_i \equiv (1 - \rho) \sum_{0}^{\infty} \rho^t R_{i,t+1} \tag{12}$$

and it is this term that will occupy most of our analysis. The rate of return $R_{i,t+1}$ is the domestic rate of return that would hold in country i at period t if the country were autarkic. In other words, the welfare gain in (11) depends upon the discounted difference between autarky and world rates of return. Thus the welfare gains depend crucially on the assumptions one makes regarding the path of $R_{i,t+1}$ over time. In terms of figure 1, we are trying to capture the area between the dashed line representing the natural time path of the

rate of return and the horizontal line at R^w.

2.3 $\beta-$ and $\sigma-$ Convergence and Financial Integration

As noted, the path that $R_{i,t+1}$ would take naturally is crucial to calculating the welfare benefits of financial integration. The more persistent the difference between domestic and world rates of return, the larger the welfare gains will be from integration.

The persistence of the difference depends on the two types of convergence. In any period $R_{i,t+1}$ is converging over time to $(R_i^*|x_i^0)$, the conditional steady state value determined by the fundamentals in period $t+1$. This is β-convergence.

On the other hand, we also assume that $(R_i^*|x_i^0)$ itself converges over time to R^w, meaning that we have σ-convergence. If there were *not* σ-convergence, then in the long run a country with $(R_i^*|x_i^{t+1}) > R^w$ would find itself with infinite debt to the rest of the world.

We parameterize these two types of convergence as follows. Let $\lambda \in (0,1)$ represent the speed of β-convergence, while $\gamma \in (0,1)$ represents the speed of σ-convergence and write $R_{i,t+1}$ as

$$R_{i,t+1} = \lambda^t R_{i,0} + (1-\lambda^t)\left(\gamma^t (R_i^*|x_i^0) + (1-\gamma^t)R^w\right). \tag{13}$$

At $t = 0$ the rate of return is the currently observed rate of return. As t increases, the rate of return β-converges towards the conditional steady state return, but this conditional return is also σ-converging towards the world rate. After a sufficient number of periods has passed the domestic rate of return will be nearly identical to the world rate.

The parameters λ and γ can be easily interpreted as half-lives. The time to close half of the gap between R_1 and R^* is equal to $-\ln(2)/\ln(\lambda)$. Similarly, the half life of the gap between R^* and R^w is equal to $-\ln(2)/\ln(\gamma)$. For example, a value of 0.91 for either parameter indicates a half-life of 7.4 years, while a value of 0.99 gives a half-life of 69 years.

If we incorporate the parameterized rate of return in (13) into (12) and then evaluate the equivalent variation in (11) we arrive at the following expression:

$$\mu_i \approx \rho(1-\rho)\left(\frac{R_{i,0}-R^w}{1-\rho\lambda} + \frac{R_i^*-R^w}{1-\rho\gamma} + \frac{R^w-R_i^*}{1-\rho\gamma\lambda}\right)\overline{\kappa}. \tag{14}$$

This general formulation provides for us a way of characterizing the welfare gains from integration under different assumptions regarding convergence of both types.

GJ shows that β-convergence does not apparently lead to significant welfare gains. They have assumed $\gamma = 0$, which might be restrictive. In the next section we consider how the calculated welfare gains change once we allow $\gamma > 0$. This implies that fundamental differences between R_i^* and R^w persist over longer periods and foreign capital will continue to generate welfare gains by raising net income even if countries are at their steady states.

2.4 Calibration and Results

To calculate μ_i we have to provide an initial rate of return, R_{i0} as well as values for both R^w and $(R_i^*|x_i^0)$. Recall from (7) that the vector x_i^0 contains the technological growth rate, g_i, and the discount rate ρ_i.

For each country i, the technological growth rate, g_i, is taken to be equal to the growth rate of A_{it} over the period 1960-2000. The A_{it} series is derived as a residual from the production function in (4). The capital stock data used in this calculation is obtained using the perpetual inventory method, as described in the appendix and identical to the algorithm used by Bernanke and Gurkaynak (2001).

The remaining parameter to choose for any given country is the value of ρ_i, the discount rate. To obtain an estimate, we utilize the observed consumption behavior over 1960–2000. Consumption per capita in any given year is obtained from the Penn World Tables, and is the PPP adjusted value of total consumption plus total government spending in that year divided by total population.[6] We assume that over this period each country was obeying an Euler equation as in (6). We have data on $\hat{c}_{i,t+1}$ and $\hat{c}_{i,t}$. Data on $\hat{k}_{it}$ allows us to derive the return to capital, $R_{i,t+1}$. For each year we can back out the implied value of ρ_{it} from the Euler equation. We use the average value of ρ_{it} over the period 1960 to 2000 for each country as the input to our calibration.

In addition to country-specific values of ρ_i and g_i we require several other common parameters. As noted, our base specification assumes that the coefficient of relative risk aversion is $\sigma = 1$ for all countries, yielding log utility. Capital's share in output, α, is assumed to be 0.3, in line with the work Gollin (2002). With all

[6]Note that Deaton and Heston (2008) criticize the ICP calculations underlying the PPP adjusted values from Penn World Tables. Government spending is in their "comparison resistant" category. We do not distinguish between personal consumption and government consumption though because we do not have a simple way to model the breakdown between these two components without massively expanding the model. We have to note that we follow the literature that comes before us given our main task of comparing the welfare gains.

these values determined, we can use (7) to determine $(R^*|x_i^0)$.

The initial rate of return, R_{i0}, is simply the marginal return to capital in the year 2000, derived from the production function in (4) using data on A_{it} and the stock of capital per person.

The last input required is the value of R^w. For our primary analysis and to make our results comparable with those of GJ, we adopt their value of $R^w = 1.0542$, which is derived from a value of $\rho^w = 0.96$ and $g^w = 0.012$. These are roughly in line with values from the U.S., which seems appropriate given the large role the U.S. plays in international capital markets.

Table 1 reports the population-weighted averages of μ_i by region for the 92 countries included in our analysis. The panels of the table vary in their assumptions regarding the speeds of convergence. The baseline calculations use the value of $R^w = 1.0542$, as stated above, and the following section of the paper discusses the robustness checks done using higher values of R^w.

To start in panel A, we essentially replicate the original calculations of GJ. They consider only the welfare gains achievable through capital scarcity, meaning that they are concerned with the effects of β-convergence. They assume that σ-convergence is instantaneous, so that $\gamma = 0$. This reduces (14) to

$$\mu_i \approx \rho(1-\rho)\left(\frac{R_{i,0} - R^w}{1-\rho\lambda}\right)\overline{\kappa} \tag{15}$$

which shows how important the value of λ is. An additional note is that GJ, in line with assuming that σ convergence is instantaneous, assume that the time discount rate, ρ, is identical across countries at a value of 0.96. The combination of these assumptions produces the effects in panel A of table 1, where the size of λ is set to 0.77, which is the rate of convergence necessary to replicate their results.[7]

The results show that an increase in foreign capital flows of 1% (i.e. $\overline{\kappa} = 0.01$) of current consumption would raise welfare by only 0.013%, on average. These effects are slightly higher for the less developed countries in our sample, such as those in Sub-Saharan Africa or the Middle East. Even a hypothetical full-blown integration that allowed in capital flows equal to 100% of current consumption would generate only a 1.3% increase in welfare, roughly in line with what GJ find.

How large are the welfare gains if we allow for slow σ-convergence? In panel B, we reverse the GJ analysis,

[7]This value of λ says that countries close 23% of the gap between R_{it} and R^w every period. This is different than the speed of convergence of *income per capita* implied by the Ramsey model, which is around 11% in the GJ analysis. The 23% rate is consistent with the 11% number when we realize that the convergence rate of R_{it} must be roughly equal to $(\alpha - 1)/\alpha$ times the rate of convergence of y_{it} in a neo-classical model.

so to speak, and presume that β-convergence is instantaneous, while σ-convergence occurs at a rate of 2% a year (yielding a parameter of $\gamma = 0.98$). In addition, we let the time discount rate, ρ, be unique to each country, rather than assuming it is identical for all. As can be seen in the table, the elasticity of welfare with respect to foreign capital is now 0.80, or about six times larger than in panel A. Thus our hypothetical full integration ($\overline{\kappa} = 1$) would yield a welfare gain of 8%, rather than just 1.3%.

Panels C and D compute the elasticities under several different combinations of assumptions regarding β and σ convergence. Panel C allows $\lambda = 0.77$, as in GJ, but also incorporates $\gamma = 0.98$. Here the elasticity actually falls slightly to 0.075, on average. What is happening is that there is an interaction between the two convergence rates. As σ-convergence occurs, it creates a wider gap between the current rate of return and the conditional steady state. This larger gap generates a bigger effect of β convergence, increasing the speed of overall convergence. Thus the combination of the two yields slightly lower estimates.

The final panel shows a similar effect when we slow β convergence down to only 2% per year. The average elasticity of welfare is now 0.07. Note though, that for the developing countries in our sample, the welfare elasticities remain quite large, even relative to the prior panels. For the countries of Sub-Saharan Africa, the elasticity is 0.17, implying that a $\overline{\kappa} = 0.10$ increase in capital flows yields a welfare gain of 1.7%, and a full-blown integration with $\overline{\kappa} = 1$ would generate welfare gains of around 17%. The effects in the Middle East are sizable, though not as large as those found in Sub-Saharan Africa. Latin America and the Asian nations appear to have smaller gains, but they remain significant relative to the developed countries included in the Europe and Neo-Europe category. For these rich nations, the gains of financial integration are essentially equal to zero regardless of our assumptions regarding convergence speed.

Ultimately, what we see is that financial integration can have important effects on welfare if we take into account the fact that countries differ in their fundamental characteristics. They may converge in the long-run, but recent history has given us no reason to suspect that this σ-convergence is quick, much less instantaneous. Allowing for relatively slow long-run convergence shows that integration can be very beneficial.

Table 1 showed calculations using $\gamma = 0.98$, or a relatively slow speed of σ-convergence, with a half-life of 34 years. However, given the long-run evidence, it seems unlikely that σ-convergence is much faster than this. As Pritchett (1997) has shown, there is essentially no evidence that countries are converging absolutely over time. There is little to suggest that developing countries fundamentals (time discount rate and technological growth rate) are rapidly approaching developed-world values.

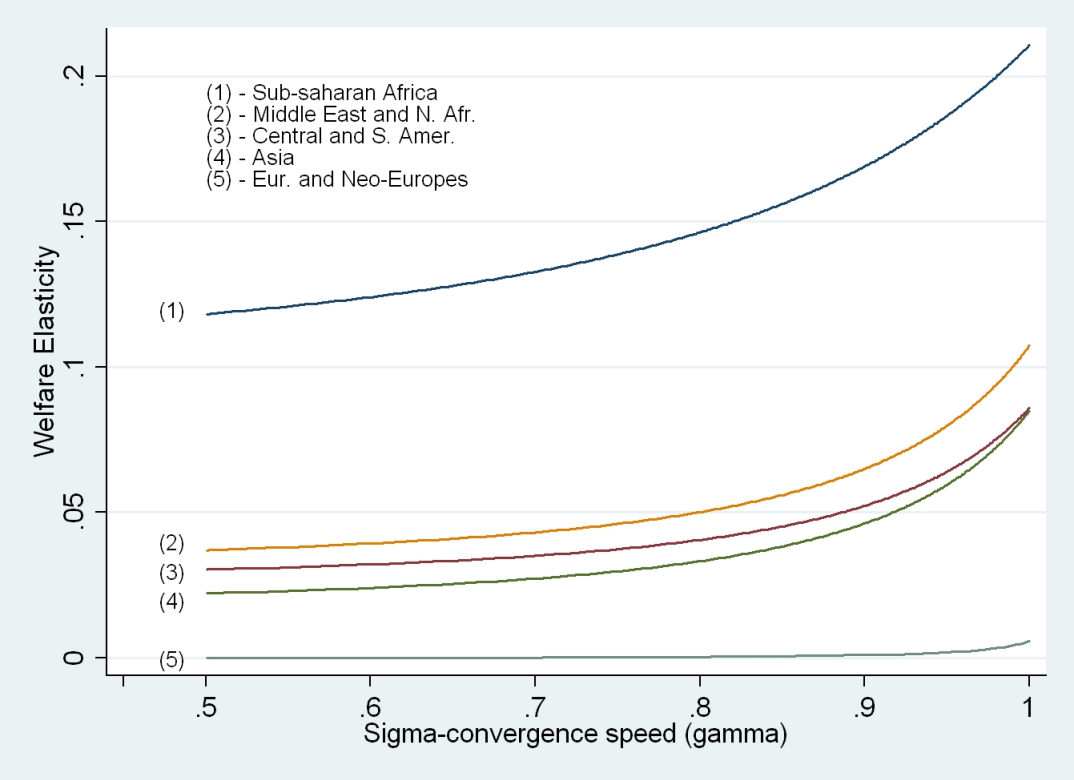

Figure 2: σ-convergence Speed and Welfare Elasticity

Note: The figure plots the welfare elasticity μ for each of five regions under different assumptions regarding the speed of σ-convergence, measured by the parameter γ. $1-\gamma$ measures the percent of the gap between the conditional steady state R_i^* and the world rate R^w that is closed each period. Larger values of γ thus indicate slower convergence, and hence higher welfare. For all levels of γ, the λ parameter (measuring β-convergence) is set to 0.77.

In the interest of comparison, though, figure 2 plots the average value of μ for each of the five regions across varying values of γ. The lowest value considered is $\gamma = 0.5$, which would suggest that the half-life of differences between R_i^* and R^w is only one year. As can be seen, for each region the welfare gains of integration are increasing in γ. European and Neo-European countries do not respond much to the change in parameter value, as they are already quite close to the world rate of return.

In contrast, all the developing regions of the world show that welfare gains increase as σ-convergence slows down. Notice, though, that even at improbably fast speeds of σ-convergence, the welfare elasticities are still 0.12 for Sub-Saharan Africa and between 0.03 and 0.04 for the other regions.

2.5 Robustness

In our analysis, gains from financial integration arise because of persistent differences between R^* and R^w. In the last section we presumed that $R^w = 1.0542$, in line with long-run U.S. values. However, it is highly likely that many nations, even if perfectly integrated into world financial markets, will not be able to access capital at such a low rate of interest. For a variety of reasons, such as sovereign risk, the actual rate available to an integrated nation may be higher.

To examine the effect of this, we repeat our welfare calculations under different assumptions regarding R^w. Table 1 reports in the final two columns the average value of μ_i, by region, under different assumptions regarding R^w. When $R^w = 1.08$, the overall elasticity of welfare gains for the 92 countries falls to 0.05 in panel D, as compared to 0.07 under our original assumptions. If $R^w = 1.10$, as in the final column of the table, then the average elasticity falls to 0.033.

While generally smaller, for most of the developing nations in the sample the welfare elasticity of foreign capital flows remains sizable. Full blown integrations ($\overline{\kappa} = 1$) in which sovereign risk or other factors made the world rate $R^w = 1.10$ would still generate welfare gains of 13.6% in Africa, 6.6% in the Middle East, and 2.8% in Asia. To the extent that these regions are able to access cheaper capital, their welfare benefits of integration will rise.

3 Productivity and FDI

The apparent welfare gains from financial integration are quite large. Our analysis to this point has presumed that foreign capital markets offer only one benefit: the ability to shift consumption across time. There is also evidence that foreign capital inflows can have significant impacts on productivity itself through technology transfer, competition effects, or a variety of other channels reviewed previously. In other words, it is possible that financial integration may influence the vector x_i^0 directly.

Recall from equation (9) that the gain in welfare from inflows of foreign capital derives from the net gain in income multiplied by the marginal utility of consumption. If there is a productivity effect from foreign capital, then the net gain in income is not $R_{t+1} - R^w$, but rather $R_{t+1} - R^w + \theta$, where θ measures the marginal gain in income arising because of the foreign capital productivity effect. The utility gain is thus

$$dU_{t+1} = u'(c_{t+1})(R_{t+1} - R^w + \theta)d\kappa_{t+1}. \tag{16}$$

and a similar derivation to the previous analysis shows that the equivalent variation can be written as

$$\mu_i \approx \rho(1-\rho)\left(\frac{R_{i,0} - R^w}{1-\rho\lambda} + \frac{R_i^* - R^w}{1-\rho\gamma} + \frac{R^w - R_i^*}{1-\rho\gamma\lambda} + \frac{\theta}{1-\rho}\right)\overline{\kappa}. \tag{17}$$

So now we require an estimate of the size of θ, the marginal effect of FDI on output.

To begin naively, consider figure 3, which plots the log of residual total factor productivity against the log of FDI per capita in 1995. The positive relationship is clear, but the usefulness of such data is limited. Foreign capital may flow to those countries that already have high productivity, and therefore the elasticity of TFP with respect to FDI (the slope of the regression line in figure 3) is biased upward. A simple cross-country analysis such as this, though, does give us an idea of the upper bound on this elasticity, approximately 0.177. To pursue a more relevant value of θ we examine the micro literature on firm level effects of FDI in the following section.

3.1 Foreign Capital and Productivity

There are several channels by which foreign capital may enhance total factor productivity within domestic economies: the easing of financing constraints (Harrison, Love, and McMillan, 2004), increased com-

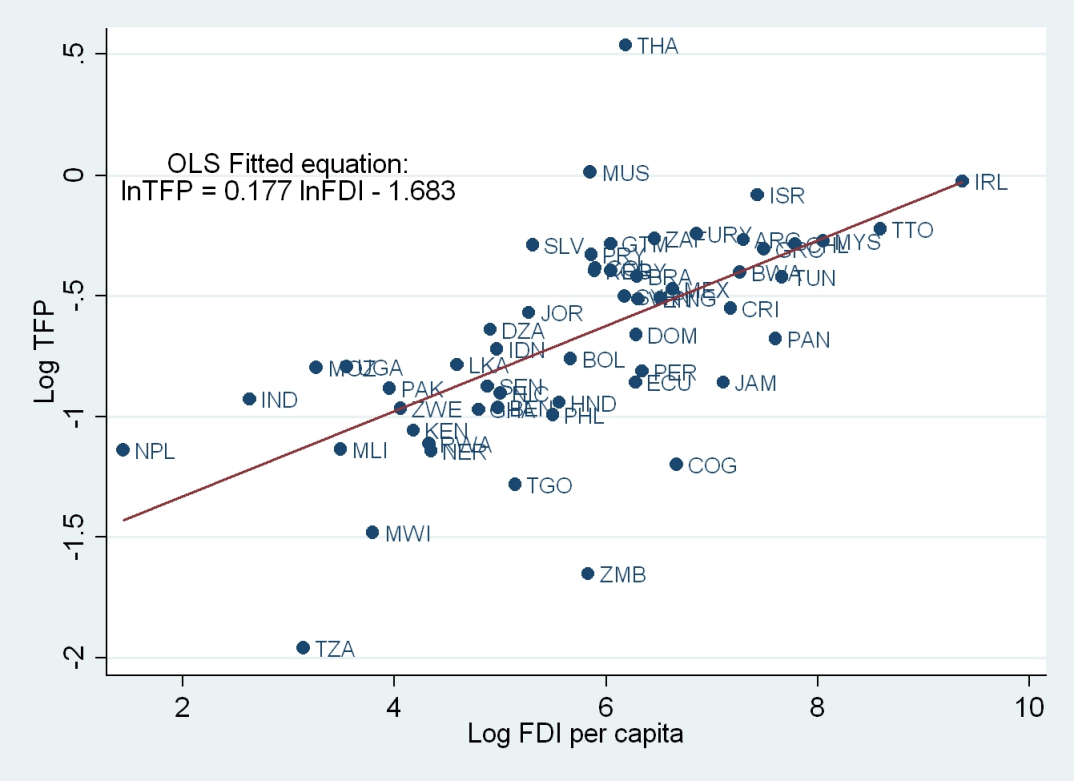

Figure 3: Cross-country Relationship of TFP and FDI

Note: TFP is the residual of the production function from equation (4), using output and capital data from Bernanke and Gurkaynak (2001). FDI per capita is from Lane and Milesi-Ferretti (2006), and is measured in U.S. dollars, 2000.

petition and a reduced cost of capital (Henry, 2003), improved productivity of domestic firms through spillovers/lingakes (Aitken and Harrison, 1999; Javorcik, 2004; Blalock and Gertler, 2005), and facilitating risk sharing and hence investment in riskier and high yielding projects (Obstfeld, 1994; Kalemli-Ozcan, Sorensen, and Yosha, 2003).[8]

Starting with Caves (1974), researchers originally focused on country case studies and industry level cross sectional studies. These studies find a positive correlation between the productivity of a multinational enterprise (MNE) and average value added per worker of the domestic firms within the same sector.[9] Of course a positive cross-sectional correlation between firms productivity and wages and FDI suffers from the same problem of endogeneity as in macro studies and hence is not necessarily informative. It does not reveal whether FDI raises productivity or whether multinationals are attracted to regions and industries in which domestic firms are more productive and workers are more skilled.

A more promising approach is to investigate the change in firm productivity and the change in FDI, where the unobserved time-invariant industry and region factors that affect firm productivity are removed. The standard regression of this approach is as follows:

$$\Delta y_{it} = \Delta X_{it}\phi_0 + \Delta FDI_{it}\phi_1 + \epsilon_{it} \tag{18}$$

where y_{it} is some measure of firm level productivity and X_{it} represents firm specific controls. A positive estimate of ϕ_1 is interpreted as positive spill-overs. There are many studies within this framework. However, starting with Aitken and Harrison (1999) most of these studies find a negative effect or no effect of foreign presence.[10] Positive spill-over effects are found only for developed countries. Moran (2005) argues that the original industry and case studies underline the importance of competitive environment and this might explain why studies find negative results in studies about countries who pursued inward oriented policies, such as Venezuela (Aitken and Harrison, 1999).[11] In addition, these panel studies suffer from another

[8]Note that this is a selective list of references and the reader should see the extensive survey of Kose, Prasad, Rogoff, and Wei (2006) for a full list.

[9]A multinational enterprise (MNE) is a firm that owns and controls production facilities or other income-generating assets in at least two countries. When a foreign investor begins a green-field operation (i.e., constructs new production facilities) or acquires control of an existing local firm, that investment is regarded as a direct investment in the balance of payments statistics. An investment tends to be classified as direct if a foreign investor holds at least 10 percent of a local firm's equity. This arbitrary threshold is meant to reflect the notion that large stockholders, even if they do not hold a majority stake, will have a strong say in a company's decisions and participate in and influence its management.

[10]See surveys by Gorg and Strobl (2001) and Lipsey (2004).

[11]This is also true for the panel studies of Colombia, India, and Morocco. Note that the famous Rodrik dictum "One dollar of FDI is worth no more (or no less) than a dollar of any other kind of investment" is based on Venezuelan and Moroccan studies.

identification problem. The underlying assumption that changes in FDI are exogenous to unobserved shocks to firm's productivity is hard to justify. There are two ways to proceed: 1) To find an instrument for FDI, a hard task given the difficulty in thinking of a factor that is correlated with attractiveness of an industry or region which is at the same time uncorrelated with domestic firm's productivity; or 2) To find a natural experiment, i.e., a control group that takes care of the unobserved shock.

Given these issues, we focus on several recent studies from the literature that have dealt carefully with the endogeneity issues and have produced well-identified estimates on the causal role of FDI on productivity at the firm level. Our next set of development accounting is based on these estimates, which can be divided into two broad categories: direct productivity effects and spill-over productivity effects.

3.1.1 Direct Productivity Effects

To be useful in our development accounting exercise, estimates of the effect of foreign ownership on productivity must overcome several issues. The first is that acquired plants are not randomly selected from the population, biasing estimates if this simultaneity is not accounted for. Essentially, do firms become more productive because they receive FDI, or does FDI "cherry pick" the most productive firms in a developing economy? The second issue is that the estimates must be for firm total factor productivity, not partial measures such as output per worker. Finally, the actual measure of total factor productivity should be estimated correctly, accounting for the simultaneous nature of productivity and input decisions.

Of the variety of studies of foreign ownership and firm level productivity, we identify three that fit our criteria: Benfratello and Sembenelli (2002), Evenett and Voicu (2003), and Arnold and Javorcik (2005). Benfratello and Sembenelli study Italian firms and find no positive effect of foreign ownership on productivity levels. This result, though, is for a developed economy, and as such is less relevant to our current focus on developing nations.

Arnold and Javorcik (2005) study Indonesian firms during the period 1984–1994 and use a propensity score matching method to identify the effect of foreign acquisition on firms total factor productivity. The propensity matching yields a sample of acquired firms matched with statistically identical non-acquired firms.[12] The authors then use difference-in-differences to estimate the effect of acquisition on the "treated"

[12]This technique is used to create a control group of firms that are statistically identical to the acquired firms. The technique depends on the sample of acquired firms looking very similar to the non-acquired firms in the first place. If the acquired firms are distinctly different from non-acquired firms in all the observable variables, then the technique will not be valid. Arnold and Javorcik document that their acquired and non-acquired firms are nearly identical on all the variables they have data for.

group, the acquired firms. Their estimates show a 34% increase in productivity from foreign acquisition in their preferred specification using 185 matched pairs of firms (one acquired by foreigners and one not).

The specifications from Arnold and Javorcik assume that log TFP is a linear function of foreign ownership, so that productivity takes the functional form of

$$\ln TFP = \phi \frac{k^F}{k} \tag{19}$$

where k represents the total capital stock, k^F is the capital stock owned by foreigners, and ϕ is the estimated effect of foreign ownership on productivity. The preferred estimates of Arnold and Javorcik show ϕ equal to 0.293. For use in our accounting, it will be useful to translate ϕ into an elasticity of TFP with respect to the foreign capital share. To do this, consider that we can write (19) as $\ln TFP = \phi exp\left(\ln \frac{k^F}{k}\right)$ and take the derivative of ln TFP with respect to the natural log of k^F/k,

$$\frac{\partial \ln TFP}{\partial \ln k^F/k} = \phi \frac{k^F}{k} \equiv \theta \tag{20}$$

The elasticity (denoted θ as it now matches the elasticity of output with respect to foreign capital inflows) thus depends on k^F/k, and for this we take the cutoff value used by Arnold and Javorcik. That is, in their paper they measure k^F/k as a binary variable, taking a value of 1 if a firm has foreign ownership greater than or equal to 20%, and a value of zero otherwise. The value of θ is thus 0.293 x 0.200 = 0.059.

The study of Evenett and Voicu (2003) looks at a sample of Czech firms in the period 1995–1998. They find that when they account for sample attrition and selection problems, there are substantial productivity benefits to firms that received FDI. Their empirical specifications are similar to Arnold and Javorcik (2005) and their estimated value of ϕ is 0.358, from a sample of 205 firms. Applying a similar conversion to that used previously, and noting that Evenett and Voicu's cutoff level of FDI is 10%, we have that θ is equal to 0.036.

The values of θ are distinctly lower than the cross-country value of θ, 0.177. The fact that these micro-estimates lie below the cross-country value lends confidence. We previously discussed that the cross-country value is biased upwards due to reverse causality between productivity and foreign capital, so we expect the true value to lie below 0.177.

3.1.2 Spill-over Effects

In Javorcik (2004), significant effects of FDI are found when firms act as suppliers to foreign-owned firms, even if they are not foreign-owned themselves. The measure of downstream FDI is a proxy for the share of output that is sold to foreign-owned firms. As this data is not available by firm, the study assumes that each firm in sector j supplies to sector m according to the national input-output tables. The foreign share in sector m is based on a measure of horizontal FDI in that sector. The combined measure is written as

$$DownFDI_j = \sum_m \alpha_{jm} \sum_{i \in j} \frac{(k_i^F / k_i) Y_i}{\sum_{i \in j} Y_i}. \tag{21}$$

This shows that downstream FDI depends on the parameters of the input-output tables, α_{jm}, as well as the foreign share of firm capital (k_i^F / k_i). As this share increases in any sector m, the $DownFDI_j$ index increases.

The productivity effects of this downstream FDI as specified by Javorcik imply a productivity function nearly identical to that in (19)

$$\ln TFP = \phi DownFDI_j \tag{22}$$

where ϕ now measures the effect of FDI spill-overs on productivity. From Javorcik we obtain several estimates of ϕ that lie between 0.035 and 0.041.[13] As the $DownFDI_j$ measure is continuous (i.e. does not use a cutoff value as the direct productivity studies did), we translate the value of ϕ directly to an elasticity θ.[14]

3.2 Calibration and Results

From the direct productivity literature we find that estimates of θ lie between 0.036 and 0.059, while the spill-over literature suggests a θ between 0.035 and 0.041. Now these effects do not cancel one another out, so for simplicity we add together these effects to reflect the overall impact of FDI on the economy, so that θ lies in the range 0.071–0.100.

[13] We specifically use the Olley-Pakes estimates from panel A of Javorcik's table 7. The sample is 11,630 observations from between 1,918 and 2,711 Lithuanian firms a year between 1996–2000.

[14] In addition to Javorcik (2004), recent research by Blalock and Gertler (2005) has shown significant effects of foreign ownership on productivity. Their evidence on the direct productivity effects is convincing in that they use the "natural experiment" of Indonesia's currency crisis to identify the effect of foreign ownership on output, capital accumulation, and employment across Indonesian firms. However, they focus only on exporting firms and so we do not utilize their estimates for our purpose.

We can now recalculate the elasticity of welfare with respect to foreign capital, using equation (17) to find μ_i and incorporating the values of θ derived from the micro-economic literature. Table (2) reports the calibrated elasticities from this exercise, with the panels varying by their assumed value of θ. In both panels, the presumed speeds of convergence are constant at $\lambda = 0.98$ and $\gamma = 0.98$.

As can be seen, the estimated welfare gains increase appreciably from the previous exercise. Even with our low-end estimate of $\theta = 0.071$, we have that the population weighted average elasticity is 0.133, nearly twice as large as we find without incorporating FDI into the calculation. The effects are particularly strong for Sub-Saharan Africa, but all the developing regions show strong welfare gains from foreign capital.

The value for the developed countries is 0.076, much larger than we found without allowing for FDI. However, it seems likely that the effect of FDI on these already developed countries is likely not as large as it would be in less developed nations. So one could well dismiss the results for Europe and the Neo-Europes from this table. To that end, we report the population-weighted average of μ_i for only the 71 developing countries included. As can be seen, the elasticity of welfare is quite high, and indicates large potential gains from financial integration.

These results are only strengthened when we use our upper-bound estimate for θ of 0.100. They indicate that a 10% inflow of foreign capital (in the form of FDI) would raise welfare by 1.7% for the average developing country. This is a value as large as that found by GJ for complete financial integration. If we were to allow a large-scale liberalization that brought in FDI equivalent to 100% of current consumption ($\overline{\kappa} = 1$), then the welfare gains are on the order of 24% for Sub-Saharan Africa, 18% for the Middle East, 15% for Asia, and 13.6% for Latin America. There appears to be the potential for very large welfare benefits from financial integration, particularly when we allow for the possibility that integration affects the fundamentals of a country directly.

4 Conclusion

This paper has evaluated the welfare benefits of international financial integration that arise from long-run *fundamental differences* between nations. These benefits are distinguished from the gains that may arise from *capital scarcity*, which have been explored previously and found to be relatively small.

Fundamental differences between nations arise because the time discount rate, population growth rate,

and technological growth rate of countries are not identical, and so the natural domestic rate of return differs across countries. In addition, while we allow the domestic rate of return to converge to a common world rate over time, the pace of this convergence could be quite slow.

Using observed data from 1960–2000 on 92 countries to establish their fundamental values, and parameterizing the speed of both β-convergence and σ-convergence we computed the elasticity of welfare with respect to foreign capital flows. What we found was that allowing for relatively slow convergence of both types (2% a year), this elasticity was 0.07. This means that foreign capital inflows equal to 10% of current consumption will raise welfare by 0.7%. Larger inflows have larger effects, so that large-scale integration, with inflows of foreign capital equivalent to 100% of current consumption could raise welfare by a full 7%, and even more for most developing countries.

There is mounting evidence that aside from gains arising from an increased capital stocks, foreign capital brings with it benefits to productivity. To incorporate this into our estimates, we draw on well identified firm-level studies of FDI to establish the elasticity of output with respect to FDI. Using this in our calibrations, we can account for the additional welfare gains that arise from greater productivity. Using the low-end estimates of the size of this effect, we find the elasticity of welfare with respect to foreign capital is nearly twice as large as our baseline estimates. Given that this analysis is limited to only the plant-level effects of FDI, the potential welfare gains of integration could in fact be much larger.

Overall, the results indicate that international financial market integration can have serious and long-lasting benefits. These gains do not come from the path that economists have traditionally focused on, capital scarcity, but rather because of persistent differences in fundamental characteristics among nations. Once these are accounted for, the benefits of financial integration become clear.

A Data Descriptions and Sources

A.0.1 Country Level Data

We take output and investment data from the Penn World Tables 6.1. Capital stocks in 2000 are calculated using the perpetual inventory method, such that $K_{t+1} = (1-\delta)K_t + I_t$ assuming that depreciation is equal to $\delta = 0.06$. The initial stock of capital, in 1960, is calculated as $K_{1960} = (I_{1960}/(\delta + g_{1960}) * (1-\delta) + I_{1960}$, where g_{1960} is the growth rate of output between 1960 and 1970. Population is from the Penn World Tables 6.1. The results are not materially different if one uses working-age populations only.

A.1 Sub-samples of Countries

Central and South America: Argentina, Bolivia, Brazil, Barbados, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, Paraguay, El Salvador, Trinidad and Tobago, Uruguay, Venezuela

Sub-Saharan Africa: Burundi, Benin, Burkina Faso, Cote d'Ivoire, Cameroon, Rep. of Congo, Cape Verde, Ethiopia, Gabon, Ghana, Guinea, The Gambia, Guinea-Bissau, Equatorial Guinea, Kenya, Lesotho, Madagascar, Mali, Mozambique, Mauritius, Malawi, Niger, Nigeria, Rwanda, Senegal, Chad, Togo, Tanzania, Uganda, South Africa, Zambia, Zimbabwe

Middle East and North Africa: Algeria, Egypt, Iran, Israel, Jordan, Morocco, Syria, Turkey

Asia: Bangladesh, China, Comoros, Indonesia, India, South Korea, Sri Lanka, Pakistan, Philippines, Seychelles, Thailand, Hong Kong, Malaysia, Nepal

Europe and Neo-Europes: Australia, Austria, Belgium, Canada, Switzerland, Denmark, Spain, Finland, France, Great Britain, Greece, Ireland, Iceland, Italy, Japan, Luxembourg, Netherlands, Norway, New Zealand, Portugal, Romania, Sweden, United States

References

[1] Aitken, Brian and Ann E. Harrison (1999)"Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela," American Economic Review, 89.

[2] Alfaro, Laura and Areendam Chanda and Sebnem Kalemli-Ozcan and Selin Sayek (2004) "FDI and Economic Growth: The Role of Local Financial Markets," Journal of International Economics, 64.

[3] Arnold, Jens, and Beata Smarzynska Javorcik (2005) "Gifted Kids or Pushy Parents? Foreign Acquisitions and Plant Performance in Indonesia," CEPR Discussion Papers 5065.

[4] Benfratello, Luigi, and Alessandro Sembenelli(2002) "Research joint ventures and firm level performance," Research Policy, 31.

[5] Bernanke, Benjamin and Refet Gürkaynak (2001) "Is Growth Exogenous? Taking Mankiw, Romer and Weil Seriously," NBER Macroeconomics Annual 2001, MIT Press.

[6] Blalock, Garrick and Paul J. Gertler (2005) "Foreign Direct Investment and Externalities: The Case for Public Intervention" in Does Foreign Direct Investment Promote Development?, eds: Moran, Graham, and Blomstrom, Washington, D.C.

[7] Blomstrom, Magnus and Robert Lipsey and Mario Zejan (1996) "Is Fixed Capital the Key to Economic Growth?" The Quarterly Journal of Economics, 111.

[8] Borensztein, Eduardo, Jose De Gregorio and Jong-Wha Lee (1998) "How does foreign direct investment affect economic growth?1," Journal of International Economics, 45.

[9] Caselli, Francesco, Gerardo Esquivel and Fernando Lefort (1996) "Reopening the Convergence Debate: A New Look at Cross-Country Growth Empirics," Journal of Economic Growth, 1.

[10] Caves, Richard E. (1974) "Multinational Firms, Competition, and Productivity in Host-Country Markets," Economica, 41.

[11] Deaton, Angus and Alan Heston (2008) "Understanding PPPs and PPP-based National Accounts," NBER Working Paper 14499.

[12] Evenett, Simon and Alex Voicu (2003) "Picking Winners or Creating Them? Revising the Benefits of FDI in the Czech Republic," Oxford University, mimeo.

[13] Gollin, Douglas (2002) "Getting Income Shares Right," Journal of Political Economy, 110(2):458-474.

[14] Gorg, Holger and Eric Strobl (2002) "Multinational Companies and Indigenous Development: An Empirical Analysis," European Economic Review, 46.

[15] Gourinchas, Pierre-Olivier and Olivier Jeanne (2006) "The Elusive Gains from International Financial Integration," Review of Economic Studies, 73.

[16] Harrison Ann E., Inessa Love, and Margaret McMillan (2004) "Global capital flows and financing constraints," Journal of Development Economics, 75.

[17] Henry, Peter Blair (2003) "Capital Account Liberalization, the Cost of Capital, and Economic Growth," American Economic Review, 93.

[18] Javorcik,Beata Smarzynska (2004) "Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages," American Economic Review, 94.

[19] Kalemli-Ozcan, Sebnem and Bent Sorensen and Oved Yosha (2003) "Risk Sharing and Industrial Specialization: Regional and International Evidence", American Economic Review, 93.

[20] Kalemli-Ozcan, Sebnem, Ariell Reshef, Bent Sorensen, and Oved Yosha (2008) "Why Does Capital Flow to Rich States?", Review of Economis and Statistics, forthcoming.

[21] Klein, Michael W. (2007) "Capital Account Openness and the Varieties of Growth Experience," NBER Working Paper 9500.

[22] Kose Ayhan, Prasad, Eswar, Kenneth Rogoff and Shang-Jin Wei (2006) "Financial Globalization: A Reappraisal", mimeo.

[23] Lane, Philip and Gian Maria Milesi-Ferretti (2006) "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004," Institute for International Integration Studies Discussion Paper Series 126.

[24] Lipsey, Robert E. (2004) "Home and Host Country Effects of FDI," in Challenges to Globalization, eds: Robert E. Baldwin and L. Alan Winters, Chicago, University of Chicago Press.

[25] Moran, Theodore H. (2005) "How Does Foreign Direct Investment Affect Host Country Development? Using Industry Case Studies to Make Reliable Generalizations", in Does Foreign Direct Investment Promote Development?, eds: Theodore H. Moran, Edward M. Graham, and Magnus Blomstrom, Washington, D.C.

[26] Obstfeld, Maurice (1994) "Risk-Taking, Global Diversification, and Growth," American Economic Review, 84(5): 1310-1329.

[27] Pritchett, Lant(1997) "Divergence, Big Time," Journal of Economic Perspectives, 11.

[28] Sala-i-Martin, Xavier (1996) "The Classical Approach to Convergence Analysis," Economic Journal, 106.

Table 1: Welfare Effects of Financial Integration

		Baseline:		Robustness:	
		$R^w = 1.054$		$R^w = 1.08$	$R^w = 1.10$
Region	N	Mean μ	SD μ	Mean μ	Mean μ
Panel A: Matching Gourinchas and Jeanne (2006), $\lambda = 0.77$ *and* $\gamma = 0$					
Central and South Amer.	21	0.008	0.007	0.004	0.001
Sub-Saharan Africa	33	0.039	0.036	0.035	0.033
Asia	10	0.011	0.008	0.007	0.004
Middle East and N. Africa	7	0.020	0.022	0.016	0.013
Europe and Neo-Europes	21	0.001	0.002	-0.003	-0.006
All	92	0.013	0.019	0.010	0.007
Panel B: Instant β *convergence,* $\lambda = 0$ *and* $\gamma = 0.98$					
Central and South Amer.	21	0.048	0.042	0.029	0.014
Sub-Saharan Africa	33	0.187	0.116	0.170	0.156
Asia	10	0.076	0.034	0.057	0.042
Middle East and N. Africa	7	0.113	0.094	0.094	0.079
Europe and Neo-Europes	21	0.017	0.017	0.001	-0.012
All	92	0.080	0.075	0.062	0.048
Panel C: Fast β *convergence* $\lambda = 0.77$ *and* $\gamma = 0.98$					
Central and South Amer.	21	0.045	0.040	0.026	0.011
Sub-Saharan Africa	33	0.171	0.112	0.154	0.141
Asia	10	0.072	0.034	0.052	0.037
Middle East and N. Africa	7	0.108	0.097	0.088	0.074
Europe and Neo-Europes	21	0.015	0.015	-0.002	-0.015
All	92	0.075	0.072	0.056	0.042
Panel D: Slow β *convergence* $\lambda = 0.98$ *and* $\gamma = 0.98$					
Central and South Amer.	21	0.045	0.037	0.023	0.006
Sub-Saharan Africa	33	0.170	0.116	0.151	0.136
Asia	10	0.066	0.041	0.044	0.028
Middle East and N. Africa	7	0.103	0.103	0.082	0.066
Europe and Neo-Europes	21	0.009	0.012	-0.013	-0.027
All	92	0.070	0.075	0.050	0.033

Notes: The table reports the population-weighted mean and standard deviation of the value μ, which is the elasticity of welfare with respect to foreign capital flows relative to current consumption. See text for details of it's construction. N is the number of observations in each group, and the countries comprising each group are listed in the appendix. All results are calculated using a coefficient of relative risk aversion of $\sigma = 1$. The panels vary in their assumptions regarding the speed of β-convergence (the λ parameter) and the speed of σ-convergence (the γ parameter). The robustness checks vary the long-run world rate of return that countries are converging towards.

Table 2: Welfare Effects of Financial Integration, including the Effect of FDI on Productivity

		Baseline: $R^w = 1.054$		Robustness: $R^w = 1.08$	$R^w = 1.10$
Region	N	Mean μ	SD μ	Mean μ	Mean μ
Panel A: Low-end estimate of $\theta = 0.071$					
Central and South Amer.	21	0.110	0.033	0.088	0.071
Sub-Saharan Africa	33	0.222	0.110	0.203	0.189
Asia	10	0.130	0.038	0.108	0.091
Middle East and N. Africa	7	0.163	0.097	0.142	0.126
Europe and Neo-Europes	21	0.076	0.011	0.056	0.04
All	92	0.133	0.069	0.112	0.096
ex. Europe and Neo-Eur.	71	0.145	0.071	0.124	0.107
Panel B: High-end estimate of $\theta = 0.100$					
Central and South Amer.	21	0.136	0.032	0.114	0.097
Sub-Saharan Africa	33	0.243	0.108	0.224	0.210
Asia	10	0.156	0.037	0.134	0.117
Middle East and N. Africa	7	0.187	0.095	0.166	0.150
Europe and Neo-Europes	21	0.104	0.010	0.083	0.068
All	92	0.159	0.067	0.138	0.121
ex. Europe and Neo-Eur.	71	0.170	0.068	0.149	0.132

Notes: The table reports the population-weighted mean and standard deviation of the value μ, which is the elasticity of welfare with respect to foreign capital flows relative to current consumption. See text for details of its construction. N is the number of observations in each group, and the countries comprising each group are listed in the appendix. All results are calculated using a coefficient of relative risk aversion of $\sigma = 1$. For both panels the speed of β-convergence is set to $\lambda = 0.77$ and the speed of σ-convergence is $\gamma = 0.98$. The panels differ in the assumed elasticity of TFP with respect to FDI inflows, derived from micro-estimates as discussed in the text. The robustness checks vary the long-run world rate of return that countries are converging towards.