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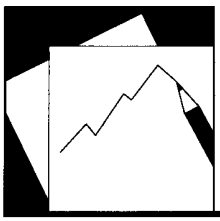

IMF Working Paper

Finance and Convergence: What's Ahead For Emerging Europe?

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European Department

Finance and Convergence: What's Ahead for Emerging Europe?

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Authorized for distribution by Luc Everaert

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Abstract

This paper singles out the key short-term risks and medium-term challenges related to finance and convergence in emerging Europe. With the help of a general equilibrium theoretical framework, the paper identifies pragmatic directions for policymakers. While the "speed limits" to capital inflows may be hard to determine, the costs of breaking them are likely substantial. To ensure "safe driving," policymakers ought to build buffers and reduce vulnerabilities. Equally important, yet often overlooked, is the need to prepare for "the curve ahead"—the reversal of external current account imbalances. To avoid painful adjustments, flexible factor markets and strong financial systems will be more important than ever.

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I. INTRODUCTION

The massive inflow of private capital has played a key role in the convergence of the economies of emerging Europe to higher living standards. Along with foreign direct investment, these capital inflows have primarily taken the shape of credit intermediated by banks. In most recipient countries, the inflow of capital has sparked a rapid, if not blistering, pace of financial deepening.

The inflow of capital has greatly benefited the economies of emerging Europe. Consumers have been able to fast forward their spending in anticipation of successful income convergence to Europe's more advanced economies. Producers have obtained funding for projects that were previously either too costly or too difficult to finance. International investors have been granted an opportunity to diversify their business in the search for higher yield. And, in doing so, they have engaged in a mutually beneficial sharing of risks.

These benefits have come neither uniformly nor without perils. First, the extent and allocation of capital inflows have differed markedly across countries. Second, the sheer speed of inflows has created concerns about vulnerabilities. Where these vulnerabilities are significant, the risks to macroeconomic and financial stability may have risen appreciably, especially in an environment where also risk appetite has fallen.

The risks associated with rapid capital inflows have triggered a lively debate on whether Europe's emerging economies have been "breaking the speed limits". Some observers have argued that emerging Europe is on a one-way road to prosperity. They contend that even if risks to growth and stability materialize, these risks pale in comparison to the benefits of fast convergence. Others, however, have cautioned that emerging Europe is setting itself up for a hard landing. As evidenced by the swelling of macroeconomic imbalances (e.g. current account deficits) and the proliferation of microeconomic distortions (e.g. lending standards), the vulnerabilities are high and rising.

Opinions remain equally divided on how to address the inflow of capital—which is unprecedented in most countries— with effective policy measures. While measures of macroeconomic and prudential tightening have in some countries helped dampen the inflow of capital and, thereby, the resulting growth of credit, their overall effectiveness has usually been limited. Moreover, the range of available policy options is often restricted by the choice of the exchange rate regime. Thus, in practical terms, even if it is considered optimal to stem the tide of fast-paced capital inflows, the policies have often turned out to be ineffective and constrained.

With uncertainty about the risks and constraints on the possible remedies, what's ahead for emerging Europe? What are the key risks and challenges for the region? And, importantly, what can policymakers do to meet these challenges and ensure smooth convergence? These are the key questions that this paper addresses. The approach of the paper will be to cast these questions, as well as the ongoing debate on risks and vulnerabilities, into a general equilibrium framework. Applying this framework to emerging Europe, the paper singles out key short-term risks and medium-term challenges. It also offers pragmatic directions for policymakers on the basis of a two-pronged strategy:

- *Drive safely at high speed.* While the "speed limits" to capital flows are largely unknown, the costs of breaking them may be substantial. To ensure safe driving at high speed, policymakers ought to reduce vulnerabilities and build buffers or safety margins. Such caution is desirable in view of the uncertainty that surrounds the observed pace of convergence and, in particular, the extent to which it reflects an equilibrium phenomenon. A cautious strategy is also helpful in providing a safety margin against sudden shifts in market sentiment, an approach that would seem particularly pertinent in light of recent financial market turbulence.

- *Prepare for the curve ahead.* An equally important, yet often-overlooked, aspect of the ongoing process of income convergence is that it will entail a fundamental reorientation of the economies involved. Protracted current account imbalances will have to change course, and resources will need to shift to productive investments, particularly in the tradables sector; else, an abrupt correction or a painful period of slow growth may follow. Policymakers will need to prepare for the curve ahead. In this regard, flexible factor markets and strong financial systems will be more important than ever.

The remainder of this paper is structured as follows. Section II briefly describes a number of stylized features of the income convergence process in emerging Europe. Section III presents the theoretical model. Section IV relates several aspects of the model to the debate on the sustainability of capital flows to emerging Europe. Section V summarizes the policy implications.

II. Stylized Features

A. Capital Flows and Consumption Smoothing

Over the last two decades, it has become clear that the growth potential in the economies of emerging Europe is very large. As these economies have opened up, and their financial systems have reached a basic threshold of development, investors have taken advantage by injecting capital, thereby accelerating the convergence process.

Capital flows allow agents to smooth consumption or, more broadly, welfare over their lifetime. Where capital does not flow in—perhaps because lenders are worried about a country's ability to repay—consumption and investment will grow more slowly. Savings will need to be set aside to fund the expansion, and higher interest rates will provide this incentive. Capital inflows fast-forward this process: consumption can accelerate more quickly and increase well before production rises.

The data attest to the importance of capital inflows in accelerating convergence. Income levels have been catching up quickly, with the fastest progress observed in the Baltics, Bulgaria and Romania (Figure 1), countries that started from low levels. Not surprisingly, these countries have also been experiencing the largest current account deficits in the region (Figure 2).

Financial systems have played a vital role in intermediating the capital inflows to emerging Europe, quickening the pace of financial deepening. Initially, finance arrived in large quantities, with foreign direct investment providing the lion's share. As financial development and bank consolidation progressed with the help of foreign investors, however, financial systems came to play a paramount role.

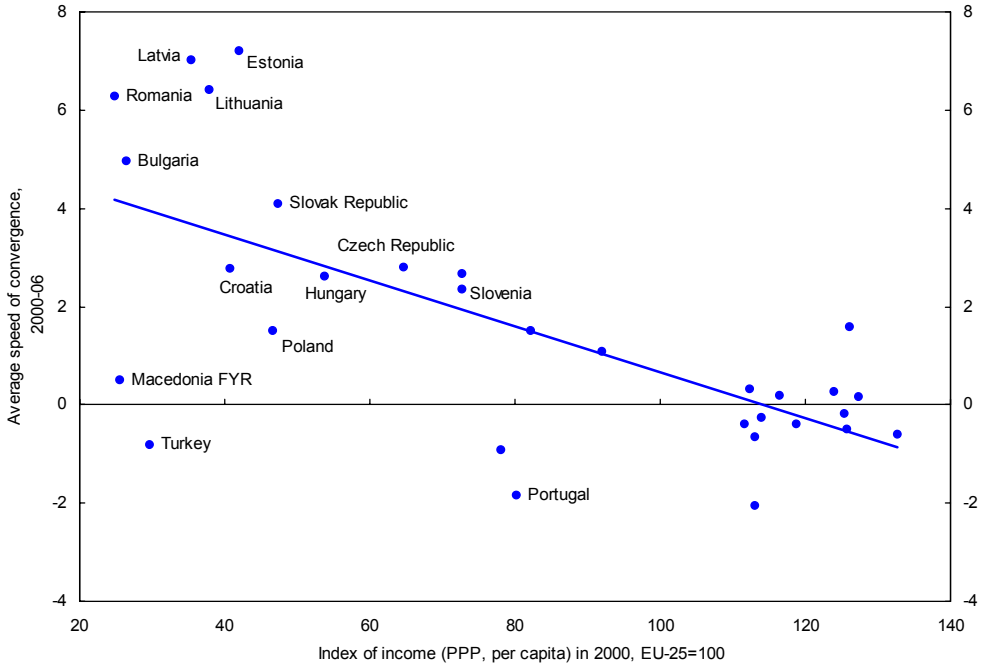
As a result, bank-intermediated credit has expanded considerably (Table 1). This expansion is, however, by no means uniform across countries, in part because starting points have differed. While the pace of financial deepening in the Baltics and the Balkans has been very fast, others, such as the Czech Republic and Poland, have experienced a much more subdued pace, at least until very recently.

B. Diversification and Risk Sharing

A second feature is the role of capital flows in diversifying and sharing risk. In this regard, a striking aspect of the convergence in emerging Europe is that it has been taking place on the back of increasing financial globalization. Financial globalization has created vast opportunities for diversification and risk sharing, further enhancing finance's role in convergence. The degree of financial globalization, as measured by the ratio of total foreign assets and liabilities to GDP, has reached high levels in many emerging European countries (Figure 3). Moreover, as illustrated in Figure 1, capital has been flowing from richer to poorer countries.

In this convergence process, diversification and risk sharing have materialized concretely through the operations of foreign banks and the inflow of foreign direct investment. In the search for higher profitability, foreign banks have diversified themselves by endowing affiliates abroad with large amounts of risk capital. This risk capital funds opportunities with higher returns. The risk-sharing nature of foreign direct investment is well known: it seeks to take advantage of upside profit potential, but also bears part of the downside risk.

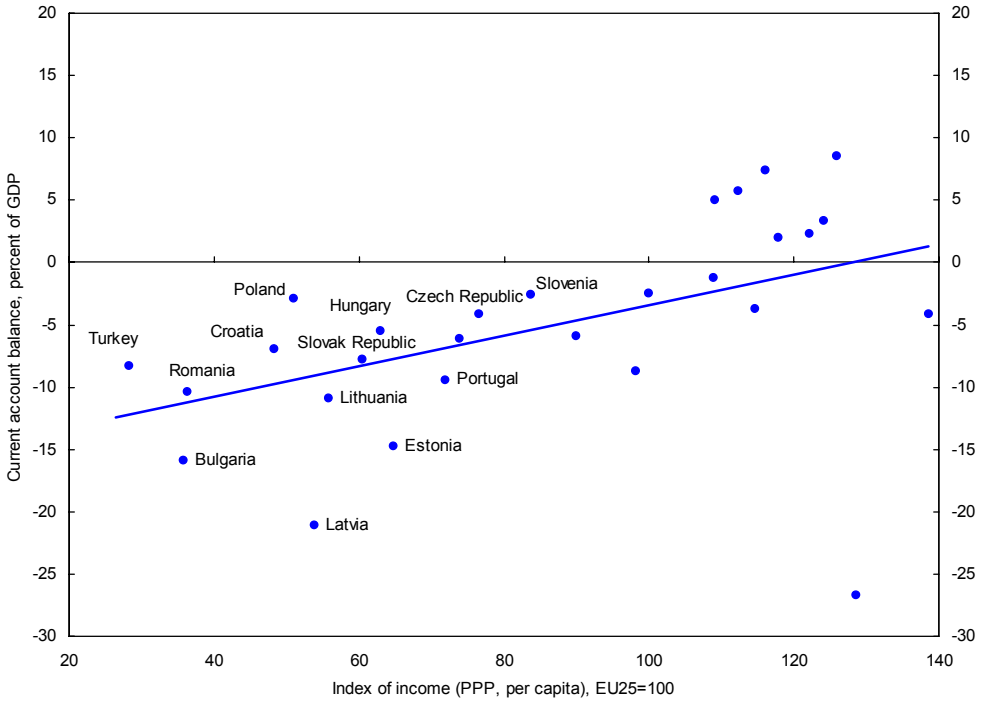
Figure 1. Convergence in Europe, 2000-2006



Source: Eurostat; and IMF staff calculations.

Note: In each period, income levels are indexed so that the EU 25 average is normalized to 100. Income levels are per capita and purchasing power parity adjusted. The average speed of convergence is measured as the geometrically averaged change in the index over the period 2000-2006. The sample consists of the EU25, Croatia, Iceland, Macedonia FYR, Romania, Switzerland, and Turkey.

Figure 2. Current Account Balances and Income Levels in Europe, 2006



Source: Eurostat; and IMF staff calculations.

Note: In each period, income levels of individual countries are indexed so that the average of the EU25 is normalized to 100. Income levels are per capita and purchasing power parity adjusted. The sample consists of the EU25, Croatia, Iceland, Macedonia FYR, Romania, Switzerland, and Turkey.

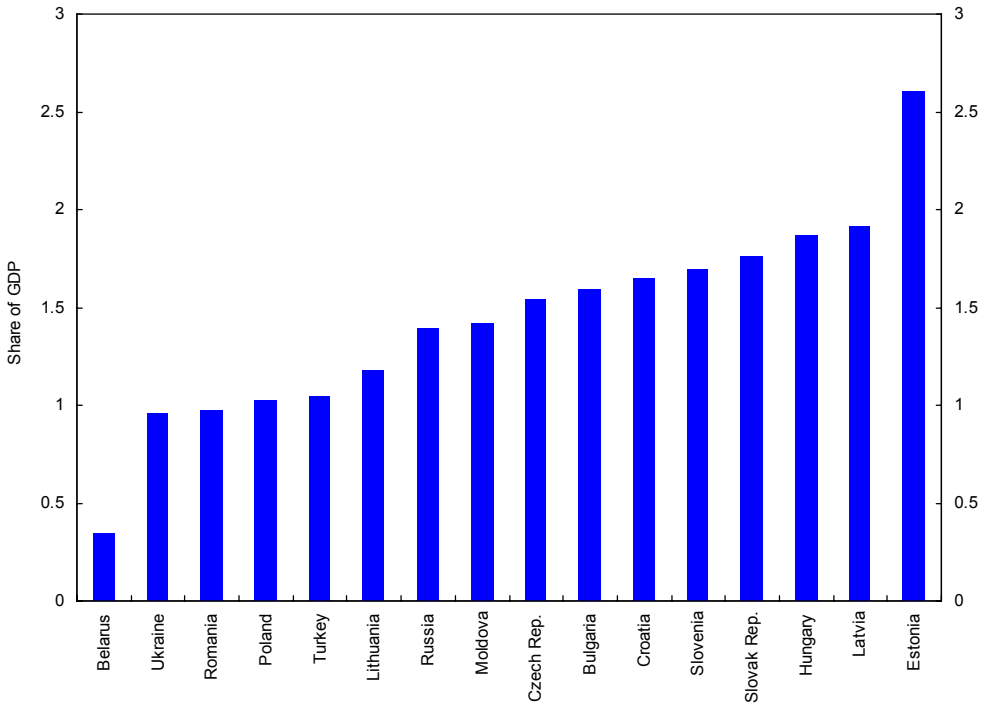
Table 1. Credit to Nonfinancial Corporations and Households
(percent of GDP)

	2000	2001	2002	2003	2004	2005	2006	Average yearly change
Bulgaria	14.9	16.3	21.4	28.5	41.4	50.1	62.1	7.9
Croatia	49.9	52.4	63.6	66.7	70.1	83.5	96.6	7.8
Czech Republic		34.2	31.1	33.2	34.5	38.5	45.0	2.2
Estonia	28.5	30.4	33.0	37.6	48.1	67.4	95.4	11.2
Hungary	35.6	35.5	36.3	42.9	45.6	50.8	55.6	3.3
Latvia	19.5	25.8	31.8	40.6	51.1	70.8	93.1	12.3
Lithuania	14.8	15.0	16.7	23.0	28.6	38.3	54.0	6.5
Poland	24.3	25.3	26.5	28.2	26.9	28.8	34.7	1.7
Romania	12.4	13.5	15.3	18.6	21.5	25.9	34.6	3.7
Russia	15.7	18.8	20.9	24.8	27.4	30.6	33.6	3.0
Serbia		12.0	14.9	14.4	18.1	23.3	24.3	2.5
Slovak Republic				32.3	29.7	35.3	40.1	2.6
Slovenia	44.4	46.9	49.0	51.7	54.9	67.4	76.9	5.4
Ukraine	12.2	14.6	19.5	27.4	28.9	37.1	51.7	6.6
Turkey	30.7	32.8	25.0	24.9	27.8	34.4	43.2	2.1

Source: BIS; national authorities; and IMF staff calculations.

Note: Data include direct cross-border credit. Average yearly change applied to the percentage-point change in the credit-to-GDP ratio over the sample period available for each country.

Figure 3. Share of Foreign Assets and Liabilities in GDP, 2005



Source: International Financial Statistics.

Greater risk sharing is, in principle, welfare improving and can further speed the convergence process. Uncertainty about the outcome is an integral part of this process, especially when current developments are driven by expected future gains in productivity and income levels. Financial globalization may allow for the transfer of risk to those most willing to bear it. Thus, from the point of view of borrowers, the opportunities for better risk sharing add to the attractiveness of foreign capital inflows and enlarge the current account deficit.

C. The Shift Towards Nontradables

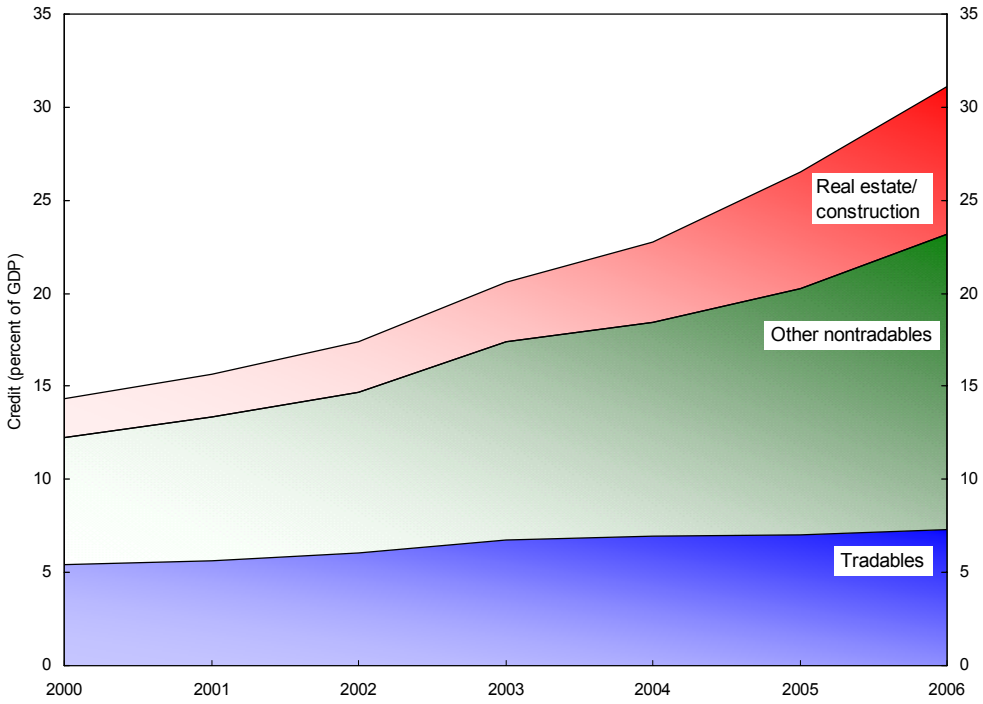
A third feature relates to large observed sectoral changes that led to an expansion of the nontradable goods sector relative to the tradable goods sector. The shift towards nontradables is evident by examining the patterns of financial deepening. As it turns out, the ongoing financial deepening still benefits the nontradables sector disproportionately. For example, whereas over 2000-06 credit to the nonfinancial tradables sector stagnated, credit to the nontradables sector more than doubled (Figure 4). Similarly, over the same period, households saw a tripling in credit for housing purposes, whereas consumer credit and other types of credit roughly doubled (Figure 5).

As will be discussed at length in the next section, these patterns are consistent with a convergence process that consists of two distinct stages, where it seems that most emerging economies in Europe are still in the first stage:

- The **expansion stage** features large capital inflows, a growing current account deficit, and an acceleration in spending on tradable and nontradable goods. But, whereas tradables can be easily imported from abroad, nontradables need to be produced locally, creating a bottleneck in the expansion stage. Excess demand will push up the relative price of nontradables, produce a real exchange rate appreciation and result in a shift of resources to the nontradables sector.

- The **reorientation stage** is characterized by a rebalancing of the current account. Capacity in the nontradables sector would be built up gradually, dampening the price pressure. The relative price of nontradables would fall, and resources would shift back to the tradables sector. This sector will need to expand so that domestic demand can be satisfied and the foreign debt serviced.

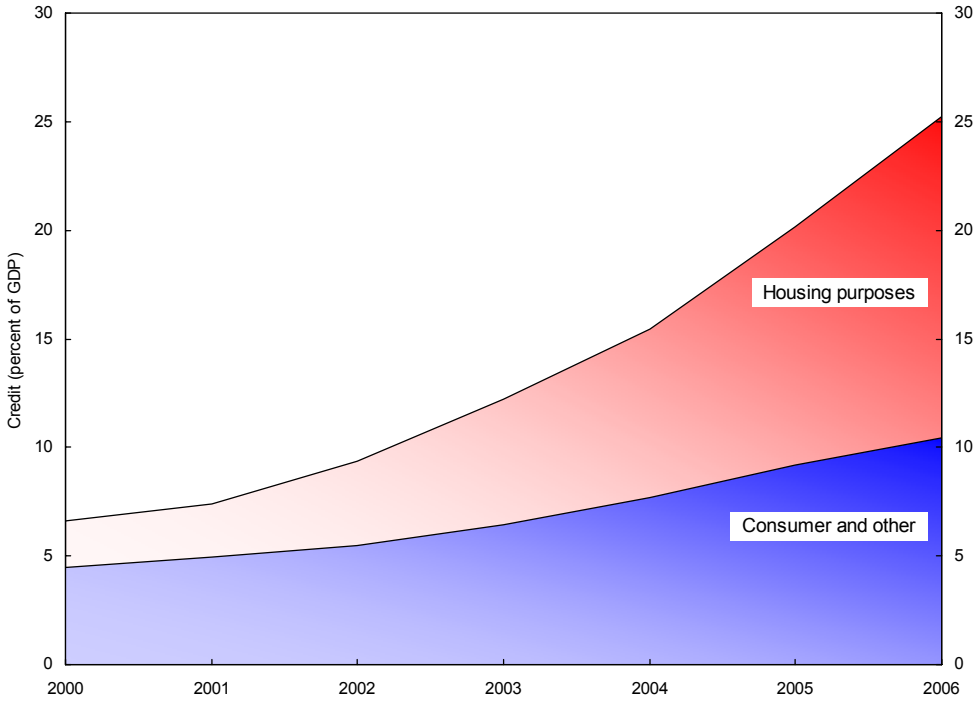
Figure 4. Credit to Nonfinancial Corporations, 2000-2006



Source:National authorities; and IMF staff calculations.

Notes: Credit measures exclude direct credit from abroad. The sample of countries consists of Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Serbia, the Slovak Republic, Slovenia , Ukraine, and Turkey.

Figure 5. Credit to Households, 2000-2006



Source:National authorities; and IMF staff calculations.

Notes: Credit measures exclude direct credit from abroad. The sample of countries consists of Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Serbia, the Slovak Republic, Slovenia , Ukraine, and Turkey.

III. A Model of Finance and Convergence

A. Model Setup

To provide a coherent framework for the policy discussion later on, this section sets up a stochastic dynamic general equilibrium model of convergence with explicit treatment of the financial sector (Fernandez de Cordoba and Kehoe, 2000; Schellekens, 2000; and, Bems and Jonsson Hartelius, 2006). The model is sufficiently general to encompass the stylized features of finance and convergence described in the previous section.

The economy considered in this model is a small open economy, populated with a representative agent. The model features three types of goods: a tradable, a nontradable and an investment good. The representative agent acts both as a consumer of final goods and as a producer of final and intermediate goods, and maximizes utility over an infinite horizon.

The convergence process is modeled as the dynamic response of this economy to the announcement of a future productivity improvement. The productivity improvement is subject to uncertainty. In the good state of nature (G), which occurs with probability π, productivity gradually rises to a higher level. In the bad state of nature (B), which occurs with probability $1-\pi$, productivity fails to improve further after the second period and remains at that level forever afterwards. To make matters simple, the announcement of the shock occurs in the first period and the uncertainty about the path of productivity is resolved already in the second period.

Following the announcement of the future productivity shock, the agent may wish to adjust his consumption plans. In doing so, he is likely to interact with the rest of the world by borrowing or lending at mutually agreeable terms. As attention is restricted to productivity improvements, the agent in this model will always wish to borrow from the rest of the world. In responding to the shock, the agent will need to take into account two key restrictions:

- The borrowing plans of the agent must be consistent with a number of contractual constraints on the borrower-lender relationship that arise from an incentive problem.
- Any adjustment in labor and capital is subject to a cost. Adjustment costs make the convergence process to the new steady state more protracted, and result in swings in relative goods prices.

In what follows, we describe the problem faced by the representative agent in his roles of consumer, producer of final goods in the tradable and nontradable sectors, and producer of intermediate goods in the investment sector. Subsequently, we describe the aggregate resource constraints of this economy.

Consumer Problem

The consumer maximizes his lifetime expected utility derived from the consumption of tradable and nontradable goods:

$$\max U(c_{T1}, c_{N1}) + \pi \sum_{t=1}^{+\infty} \beta^t U(c^G_{Tt+1}, c^G_{Nt+1}) + (1-\pi) \sum_{t=1}^{+\infty} \beta^t U(c^B_{Tt+1}, c^B_{Nt+1})$$

$$\text{with respect to } \begin{cases} c_{T1}, c_{N1}, k_2, b_2, \alpha_2^i \text{ in period 1} \\ c^i_{Tt}, c^i_{Nt}, k^i_{t+1}, b^i_{t+1}, \alpha^i_{t+1} \text{ in period t, t>1} \end{cases}$$

subject to a per-period budget constraint

$$c^i_{Tt} + p^i_{Nt} c^i_{Nt} + q^i_t i^i_{Tt}(k^i_{Tt+1}, k^i_{Tt}) + q^i_t i^i_{Nt}(k^i_{Nt+1}, k^i_{Nt}) + b^i_{t+1} \leq w^i_t + (1+\alpha^i_t) b^i_t + h^i_t k^i_t,$$

where superscripts $i \in \{G, B\}$ refer to the state of nature, subscripts T and N refer to the tradable and nontradable goods sectors, and subscript t refers to time. Choice variables (where for brevity the superscripts are omitted) are: c_{Tt} and c_{Nt}, the consumption of the tradable and nontradable goods in period t; k_{t+1}, the domestic capital stock at time the beginning of period $t+1$; b_{t+1}, the amount of tradable goods that is lent, or borrowed if negative, and will need to be repaid in period $t+1$ with interest rate α_{t+1} depending on which state of nature materializes. Finally, β is the discount factor with $0 < \beta < 1$.

The tradable good is the numeraire good in this model, p_{Nt} is the relative price of the nontradable good, $i^i_{Tt}(k^i_{Tt+1}, k^i_{Tt})$ and $i^i_{Nt}(k^i_{Nt+1}, k^i_{Nt})$ represent investment in the capital stock of the tradable and nontradable sectors, q_t is the relative price of investment, w_t is the wage at which an endowment of labor normalized to unity is supplied inelastically, and $h_t k_t$ is income from renting capital at the relative price h_t to producers in the tradable and nontradable sectors. Note that q_t is the price at which the consumer acquires capital for period $t+1$ (the transaction takes place at the end of period t), whereas h_t is the price at which the consumer rents capital in period t to firms.

Since the state of nature is revealed only in the second period, period-one variables are not contingent on the state and do not carry a superscript. Note here that k_2 and b_2 refer to choices of capital and debt which are made in period one. Also note that α_2^i is contracted upon in period 1, but will come into effect only in period two as interest payments are made after the state of nature is revealed. Thus, the contractual interest rate may be contingent with $\alpha_2^G \neq \alpha_2^B$ or uncontingent with $\alpha_2^G = \alpha_2^B$. Once the uncertainty has been resolved, loan rates in this model will be constant and equal to the inverse of the discount factor.

Thus, in each period and for every state of nature, the consumer ensures that labor income, rental income, and the proceeds from lending (principal plus interest) exceed the consumption expenditure of tradable and nontradable goods, investment outlays for the

tradable and nontradable sector, and any lending that is conducted. Note that the investment decision takes into account the existing capital stocks in the tradable and nontradable sectors (k_{Tt}^i and k_{Nt}^i), which the consumer takes as given from the optimization problem of the producer problem. It is further assumed that b_1 is given. We rule out Ponzi schemes by assuming that $b_{t+1} + q_{t+1}k_{t+1}$, in any period cannot be smaller than $-A$, for A sufficiently large.

The representative agent is able to transact with the rest of the world in the form of the borrowing or the lending of resources. The model assumes a particular environment that will govern the contractual relationship between the agent if he chooses to borrow ($b_{t+1}^i < 0$).

Strategic Default

First, we assume agents have an incentive to default strategically—as opposed to involuntarily—on debt that is not collateralized with a fixed asset. This incentive can be motivated in different ways. One such way would be to assume that income generated from renting out the factors of production is not verifiable to courts whereas the stocks of durable fixed assets, such as capital in this model, can be verified. We further assume that the inside value of the durable asset is larger than its outside value. This wedge, captured by the value $1-\phi$ with $0 < \phi < 1$, may arise due to limited asset redeployability or inefficiencies associated with the transfer of ownership.

Thus, in every state of the world and in every period, the borrower will need to be incentivized to repay the debt. Restricting attention to renegotiation-proof contracts, the maximum outstanding liability can never exceed the external value of the collateralized asset:

$$-\left(1+\alpha_{t+1}^G\right)b_{t+1}^G \;\le\; \phi q_{t+1}^G k_{t+1}^G$$

and

$$-\left(1+\alpha_{t+1}^B\right)b_{t+1}^B \;\le\; \phi q_{t+1}^B k_{t+1}^B$$

which are the incentive compatibility constraints in the good and bad states of the world (ICG and ICB). For the first period, b_2 and k_2 will not depend on the state of nature, i.e.

$$-\left(1+\alpha_2^i\right)b_2 \;\le\; \phi q_2^i k_2 \qquad \text{for } i \in \{G, B\}$$

Individual Rationality

Second, for the lender to be willing to participate in a particular contract, the proceeds of the loan will need to exceed the funding cost of the loan. Since we will assume perfect competition among lenders on the funding side, the proceeds of the loan must exceed the funding cost at the world market:

$$1+\alpha_{t+1}^{i} \geq 1+r \qquad \text{for } i \in \{G,B\}$$

Again, the constraint is different in the first period of the model since the contract needs to price in risk:

$$\pi\left(1+\alpha_2^G\right)+\left(1-\pi\right)\left(1+\alpha_2^B\right) \geq \left(1+r\right)$$

where it is required that the lender breaks even in ex ante terms. We will also assume perfect competition on the lending side. This will result in the weak inequalities described above becoming equalities, since any expected profit would cause a competitor to undercut the contract offered.

Solvency

Third, we will impose a solvency constraint on the space of feasible contracts. The solvency constraint amounts to limiting the effective risk aversion of the lender. Specifically, we assume the lender is risk neutral with respect to uncertainty in the normal course of business, but infinitely risk averse with respect to states of nature that could deplete his statutory or risk capital. Thus, the lender will only write contracts when he has full confidence that the maximal loss that could ever occur is smaller than the value of his risk or statutory capital:

$$\left(1-\omega\right)\left(1+r\right) \leq \left(1+\alpha_{t+1}^{B}\right),$$

where ω is the risk-capital-to-asset ratio with $0 \leq \omega$.

Producer Problems

Tradable and Nontradable Sectors

The representative consumer in his role as producer maximizes profits in an environment of perfect competition in product and factor markets. We focus attention on the optimization problem in the tradable sector as the case of the nontradable sector is identical.

Taking prices as given (with p_{Tt} normalized to 1, since the tradable good is numeraire), the producer chooses how much capital and labor to buy in each period by maximizing:

$$\max_{\{k_{Tt}^i, l_{Tt}^i\}} \Pi_{T1} + \frac{1}{U_{C_T}\left(c_{T1}, c_{N1}\right)} \sum_{t=1}^{\infty} \beta^t \left(\pi U_{C_T}\left(c_{Tt+1}^G, c_{Nt+1}^G\right)\Pi_{Tt+1}^G + \left(1-\pi\right) U_{C_T}\left(c_{Tt+1}^B, c_{Nt+1}^B\right)\Pi_{Tt+1}^B \right)$$

$$\text{with } \Pi_{Tt}^i = \left(p_{Tt}^i F_T^i(k_{Tt}^i, l_{Tt}^i, l_{Tt-1}^i) - w_t^i - h_{Tt}^i k_{Tt}^i \right)$$

$$\text{and } i \in \{G,B\}$$

The maximand contains the expected value of future profits Π^i_{Tt}, which consist of the value of production minus wage and capital rental costs. Note that the production function $F^i_T(k^i_{Tt}, l^i_{Tt}, l^i_{Tt-1})$ includes past values of labor employed in the sector, as changing labor is subjected to adjustment costs. The dependency of the production function on the state of nature will later be exploited to introduce productivity shocks.

The introduction of lagged labor means that the maximization problem of the producer cannot be solved on a within-period basis. Therefore, the entire infinite horizon problem needs to be considered. Moreover, future profits are discounted with consumption-based interest rates, allowing for the possibility of the Euler equations not being satisfied. In the case of credit constraints, for example, the consumption-based interest rate will adjust to a level different from the world rate:

$$1+r_c = \frac{1}{\beta}\frac{U_{C_T}\left(c^G_{Tt}, c^G_{Nt}\right)}{U_{C_T}\left(c^G_{Tt+1}, c^G_{Nt+1}\right)} \neq 1+r$$

which would serve in this case as the relevant measure to discount future profits.

Investment Sector

The producer problem in the investment sector is simpler since it can be solved within each period. Taking the prices q_t and p_{Nt} as given, the producer in the investment good sector maximizes:

$$\max_{\{x^i_{Tt}, x^i_{Nt}\}} q^i_t F_I\left(x^i_{Tt}, x^i_{Nt}\right) - x^i_{Tt} - p^i_{Nt} x^i_{Nt} \qquad \text{for } i \in \{G, B\}$$

where x^i_{Tt} and x^i_{Nt} are the inputs of tradable and nontradable goods into the investment sector at date t in state of nature i.

Aggregate Resource Constraints

The aggregate resource constraints for the tradable and nontradable sector are as follows. In addition to being consumed, the tradable and the nontradable goods can be used as inputs into the investment sector. The economy's resource constraint for nontradable goods is:

$$c^i_{Nt} + x^i_{Nt} \leq F_N(k^i_{Nt}, l^i_{Nt}, l^i_{Nt-1}) \quad \text{for } i \in \{G, B\},$$

where the consumption of nontradables as a final good and intermediate good cannot exceed the domestic production of nontradables. The resource constraint for tradable goods incorporates the possibility of trading with the rest of the world:

$$c^i_{Tt} + x^i_{Tt} + b^i_{t+1} - b^i_t(1+\alpha^i_t) \leq F_T(k^i_{Tt}, l^i_{Tt}, l^i_{Tt}) \quad \text{for } i \in \{G, B\},$$

where $b^i_{t+1} - b^i_t(1+\alpha^i_t)$ is the trade balance in state i of nature.

We further need to ensure that the following constraints are satisfied:

$$k^i_{t+1} = k^i_{Tt+1} + k^i_{Nt+1} \qquad \text{for } i \in \{G, B\}$$

$$l^i_{Tt} + l^i_{Nt} = 1 \qquad \text{for } i \in \{G, B\}$$

which are, respectively, an aggregation constraint needed to ensure that the capital stock level derived in the consumer problem equals the capital stock levels used in the tradable and nontradable sectors as derived in the producer problems, and a resource constraint applicable in the labor market, ensuring that labor used in the tradable and nontradable sectors needs to add up to the endowment of labor which was normalized to one.

Capital accumulation occurs as follows. The investment good augments the capital stock in the subsequent period, which gives the following law of motion for capital in the tradable sector (the law of motion is analogous in the nontradable sector):

$$k^i_{Tt+1} \leq (1-\delta) k^i_{Tt} + \Phi\left(\frac{i^i_{Tt}}{k^i_{Tt}}\right) k^i_{Tt} \qquad \text{for } i \in \{G, B\}$$

where δ is the depreciation rate with $0 < \delta < 1$ and the following resource condition is satisfied:

$$i^i_{Tt}(k^i_{Tt+1}, k^i_{Tt}) + i^i_{Nt}(k^i_{Nt+1}, k^i_{Nt}) = F_I(x^i_{Tt}, x^i_{Nt}) \quad \text{for } i \in \{G, B\}$$

Finally, the model allows for different specifications of interest rate determination. If the economy is closed in period t, there can be no foreign borrowing or lending, $b_{t+1} = b_t$, and the return on investment is endogenously determined in the model. If the economy is open, the interest rate is equal to an exogenously given international rate, r, and b_{t+1} is endogenously determined.

B. Definition of Equilibrium

An equilibrium in this model is characterized by sequences of prices $\left\{\hat{p}^i_{Nt}, \hat{w}^i_t, \hat{q}^i_t, \hat{h}^i_t, \hat{r}^i_{t+1}\right\}$, consumption and assets $\left\{\hat{c}^i_{Tt}, \hat{c}^i_{Nt}, \hat{k}^i_{t+1}, \hat{b}^i_{t+1}\right\}$, sectoral production plans $\left\{\hat{k}^i_{Tt}, \hat{l}^i_{Tt}\right\}$ and $\left\{\hat{k}^i_{Nt}, \hat{l}^i_{Nt}\right\}$, and inputs into the investment sector $\left\{\hat{x}^i_{Tt}, \hat{x}^i_{Nt}\right\}$, for $t = 1, 2, ..., +\infty$ and $i \in \{G, B\}$, such that:

1. Given prices $\left\{\hat{p}^i_{Nt}, \hat{w}^i_t, \hat{q}^i_t, \hat{h}^i_t, \hat{r}^i_{t+1}\right\}$ the representative consumer's first order conditions are satisfied in every period;

2. Given prices $\left\{\hat{p}^i_{Nt}, \hat{w}^i_t, \hat{q}^i_t, \hat{h}^i_t, \hat{r}^i_{t+1}\right\}$ the representative producers in the tradable and nontradable sectors choose factor inputs $\left\{\hat{k}^i_{Tt}, \hat{l}^i_{Tt}\right\}$ and $\left\{\hat{k}^i_{Nt}, \hat{l}^i_{Nt}\right\}$ so that the first order conditions are satisfied in every period;

3. Given pr ices $\hat{p}^i_{Nt}$ and $\hat{q}^i_t$ the investment sector's first order conditions are satisfied in every period;

4. The market clearing conditions are satisfied in every period. If the economy is closed in period t, $b^i_{t+1} = b^i_t$;

5. Factor markets clear in every period:

$$\hat{k}^i_{Tt} + \hat{k}^i_{Nt} = \hat{k}^i_t$$
$$\hat{l}^i_{Tt} + \hat{l}^i_{Nt} = \hat{l}^t_t = 1.$$

C. Characterization of Equilibrium

In what follows, we characterize the equilibrium of the model. We describe the initial steady state and the transitional dynamics towards the new steady state. We first present the choice of functional forms and parameter values. We then discuss the model solution for three cases. The first case is that of an open economy without uncertainty and without collateral constraints. To provide a benchmark, this model solution is compared to the case of autarky. The second case is that of an open economy without uncertainty but with collateral constraints. The third case is that of an open economy with uncertainty but without collateral constraints.

Functional Forms and Parameterization

To solve the model, we need to make some assumptions about the functional forms and parameter values. We assume that consumer utility is given by:

$$U(c_{Tt}, c_{Nt}) = \frac{(c^{\varepsilon}_{Tt} c^{1-\varepsilon}_{Nt})^{1-\rho} - 1}{1-\rho},$$

where a unitary elasticity of substitution between tradable and nontradable goods is imposed, ε is the weight of tradable goods in consumption expenditures and ρ captures the intertemporal elasticity of substitution in consumption.

Investment goods are produced from tradable and nontradable goods as follows:

$$F_I(x_{Tt}, x_{Nt}) = G x_{Tt}^{\gamma} x_{Nt}^{1-\gamma},$$

where γ is the weight of tradable goods in investment expenditures. As in consumption, we impose a unitary elasticity of substitution between the two goods.

The production function for sector $j = \{T, N\}$ is assumed to take the following form:

$$F_j(k_{jt}, l_{jt}, l_{jt-1}) = A_{jt} k_{jt}^{\alpha} l_{jt}^{1-\alpha} - \lambda \left(\frac{l_{jt} - l_{jt-1}}{l_{jt-1}} \right)^2 l_{jt-1}, \lambda \geq 0.$$

where apart from producing output with the standard Cobb-Douglas production function with capital and labor as production factors, producers in each sector incur costs every time the stock of labor is changed. We assume that such costs are quadratic with level parameter λ capturing the size labor adjustment costs.

Following Lucas and Prescott (1971), we introduce sectoral investment adjustment costs:

$$\Phi\left(\frac{i_{jt}}{k_{jt}} \right) = \frac{\delta^{1-\eta} \left(\frac{i_{jt}}{k_{jt}} \right)^{\eta} - (1-\eta)\delta}{\eta}$$

where $\eta \in (0,1]$ is the investment adjustment cost parameter and $\eta = 1$ represents the case of no adjustment costs. The functional form satisfies $\Phi(\delta) = \delta$, $\Phi'(\delta) = 1$ and $\Phi''(\delta) = 0$. Thus, similar to labor, there are no investment adjustment costs in the steady state.

Parameterizing the model's steady state, we set one period equal to one year. The initial net foreign asset position is set as $b_0 = 0$, which captures the closed-economy steady nature of the initial steady state. The intertemporal elasticity of substitution in consumption is set at $1/\rho = 0.5$, as in the real business cycle literature. The discount factor is set at $\beta = 0.96$. The expenditure weights for tradables in consumption and investment, ε and γ, are based on input-output table data for new member state countries, and take values of 0.34 and 0.44, respectively. Note that consumption is more intensive in nontradables than investment. The income share for capital, α, is set to 0.33, the same for both sectors (which is in line with input-output data). Next, given values of β and α, δ is set to match the investment-output ratio, equal to 0.21. The choice of all parameter values is summarized in Table 2.

Table 2. Parameter Values

Parameter	Value
$1/\rho$	0.50
β	0.96
ε	0.34
γ	0.44
α	0.33
δ	0.073
$A_T = A_N$	1.10

The ratio of steady state productivity levels in the two sectors, A_T / A_N, is normalized to unity, which implies that the relative price in the initial steady state is also unity, $p_N = 1$, but otherwise has no effect on model outcomes. Finally, given all other parameter values, we assume that $A_T = 1.10$. The relevant model outcomes are however independent of the initial productivity level. To complete the parameterization of the model's steady state, we normalize

$$G = \left[(1-\gamma)^{1-\gamma} \gamma^{\gamma} \right]^{-1}.$$

All experiments start from the same initial steady state. We subsequently impose a shock to productivity and track down the transitional dynamics to the new steady state in terms of consumption, output, the current account balance, the sectoral distribution of output, the relative price of nontradables, the interest rate and the wage rate. Note that the transitionally dynamics for each variable are expressed relative to the initial steady state, except for the interest rate (which is denoted in absolute percentages), the current account balance (percent of output) and sectoral composition of output (nontradable output in percent of total output)

Finally there are several model parameters that do not affect the initial steady state, but matter for the transitional dynamics and the final steady state. For the productivity shock we assume an initial growth rate of 3% with persistence of 0.8. This implies an eventual 16 percent increase in the level of productivity. Unless noted otherwise, the same productivity increase is assumed in both sectors. Next, for the benchmark case we assume that the level parameter for labor adjustment costs, λ, takes a value of 2 and investment adjustment cost parameter, η, is 0.9. Both values are standard in the literature, although there is no conclusive empirical evidence available in favor of these particular values. In subsequent sections we investigate how model solution is affected by varying factor adjustment costs.

The remaining model parameters, π, ϕ and ω, are relevant only for the case with collateral constraints and/or uncertainty with risk sharing and are considered in the feasible range. The choice of there parameter values is discussed in more detail in subsequent sections.

Case 1: Opening Up to Capital Flows

In what follows, we will for expositional clarity first reduce the general model to the case of no uncertainty. Thus, the representative agent will solve optimal plans under perfect foresight. It is also instructive to start by considering the two extreme cases of credit constraints: $\phi = 0$ and $\phi = +\infty$, which, given the assumed nature of shocks, are equivalent to cases of autarky and a fully open economy.

Consider first autarky, where the economy is fully insulated from the rest of the world. The economy rests in a steady state and is hit by an unanticipated permanent increase in productivity, as described in previous section. In this economy, consumption plan will prescribe c_{Tt} and c_{Nt} such that:

$$U_{c_N}(c_{Tt}, c_{Nt}) - p_{Nt} U_{c_T}(c_{Tt}, c_{Nt}) = 0$$

and the choice of the next period's aggregate capital stock, k_{t+1} will require:

$$U_{c_T}(c_{Tt}, c_{Nt}) q_t \frac{\partial i_t}{\partial k_{t+1}} + \beta U_{c_T}(c_{Tt+1}, c_{Nt+1}) \left(q_{t+1} \frac{\partial i_{t+1}}{\partial k_{t+1}} - h_{t+1} \right) = 0$$

With $b_{t+1} = 0, \forall t$, the domestic consumption-based interest rate, r^c_{t+1}, can be backed out as:

$$(1 + r^c_{t+1}) = \frac{U_{c_T}(c_{Tt}, c_{Nt})}{\beta U_{c_T}(c_{Tt+1}, c_{Nt+1})}$$

The optimal production plan for final goods producers will require choices for capital, k_{jt}, and labor, l_{jt}, in both sectors, $j \in \{T, N\}$:

$$p_{jt} F_k(k_{jt}, l_{jt}, l_{jt-1}) - h_{jt} = 0$$

$$\frac{\partial F_j(k_{jt}, l_{jt}, l_{jt-1})}{\partial l_{jt}} + \beta \frac{\partial F_j(k_{jt+1}, l_{jt+1}, l_{jt})}{\partial l_{jt}} - w_t = 0$$

Investment good producers optimally bundle tradable and nontradable inputs according to relative prices:

$$q_t F_{I_{x_T}}(t) - 1 = 0$$

$$q_t F_{I_{x_N}}(t) - p_{Nt} = 0$$

The solid lines in Figure 6 illustrate how the shock moves the economy away from steady state, creating an excess demand for resources. The excess demand is met by an adjustment in the domestic interest rate, since the current account balance cannot adjust. The domestic rate rises above the steady state level.

The optimal plan features an immediate jump in consumption followed by a gradual rise in output and further gradual increases in consumption. The convergence process takes a prolonged period of time, which is a result of both the gradual nature of resource accumulation in a closed economy and the presence of frictions in production factors. It is noteworthy that the autarky case does not feature any major cross-sectoral dynamics.[2] This is because tradable goods are effectively equivalent to nontradable goods. Therefore, the relative price of nontradables and the share of capital in the nontradable sector remain flat.

Consider next a fully open economy, represented by dashed line in Figure. The two model solutions start from an identical steady state and are subjected to the same productivity shock. The difference with the previous case is that the optimal consumption plan now involves the optimal choice of b_{t+1} subject to the condition:

$$U_{c_T}(c_{Tt}, c_{Nt}) - \beta(1+\alpha_{t+1})U_{c_T}(c_{Tt+1}, c_{Nt+1}) = 0\,,$$

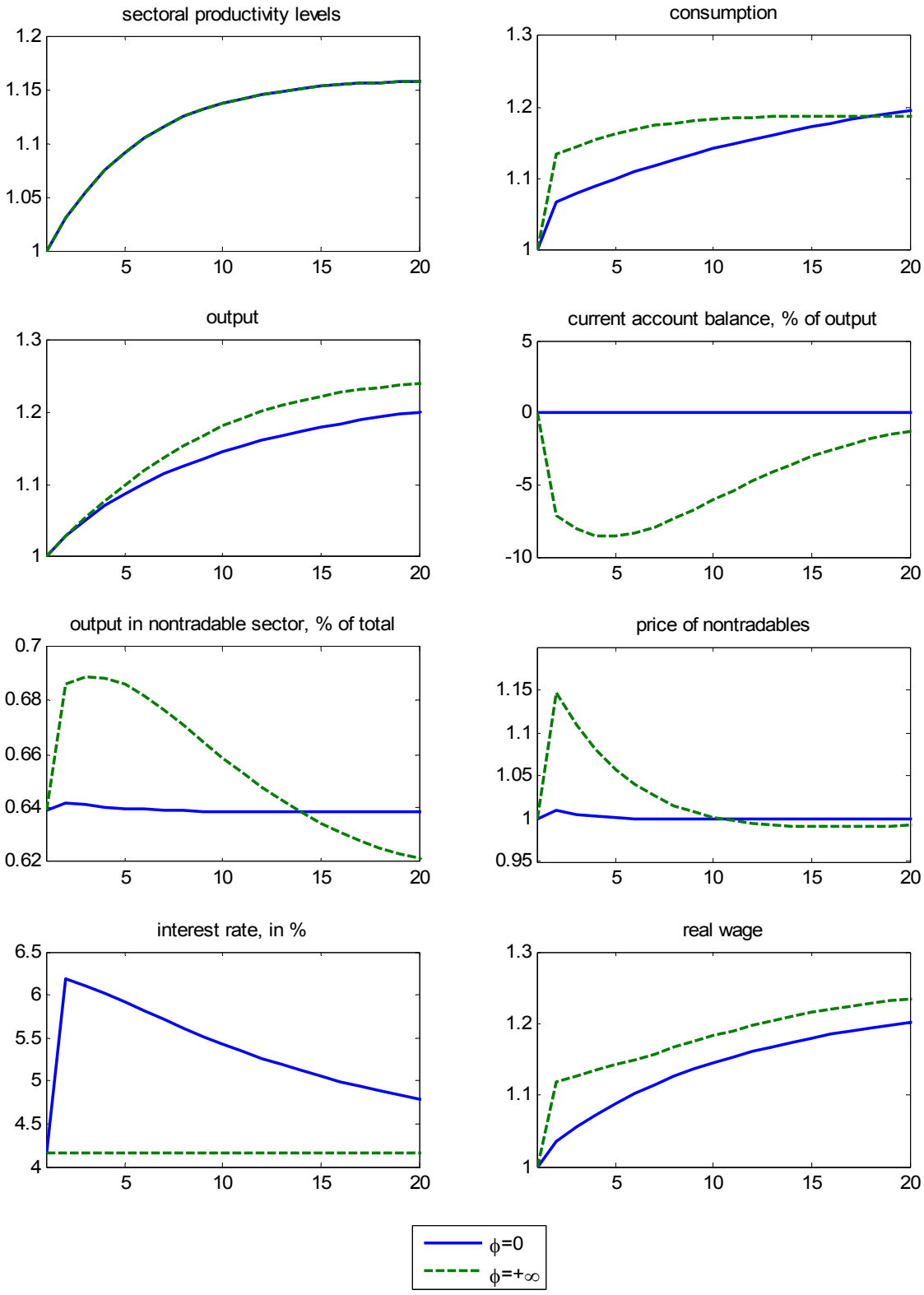
where due to competition in loans and funds, $\alpha_{t+1} = r = 1/\beta$ at all times. Thus, domestic interest rates converges immediately to the world interest rate.

The benefits of openness are well known. In comparison to autarky, the convergence process is sped up in terms of both consumption and output. This is achieved by borrowing resources from the rest of the world, which are then consumed or invested to achieve a faster convergence of the capital stock to the new steady state level. For a prolonged period of time, the model economy runs current account deficits.

The convergence process takes place through adjustment in quantities and prices. Relative to the initial steady state, the new steady state in an open economy exhibits trade surpluses, a larger share of tradable output in total output, and a lower consumption level. This is because net foreign assets have turned negative and servicing the balance requires domestic tradable resources.

[2] To be precise, there are some cross-sectoral dynamics due to the assumed difference in tradable good intensities in consumption and investment, i.e. $\varepsilon < \gamma$.

Figure 6. Convergence With and Without Capital Flows



In comparison with autarky, the convergence process in an open economy involves notable cross sectoral dynamics, which allows us to distinguish between two stages in the transition process.

- In a first stage, the economy exhibits a shift of production factors and economic activity towards the nontradable sector. This is due to the fact that the necessary quantities of tradables can be readily borrowed from the rest of the world while the supply of nontradables become a bottleneck in the convergence process. Equilibrium is restored by partly increasing the capacity of the nontradable sector and partly raising the relative price of nontradable goods.

- In a second stage, economic activity shifts back towards tradables as the repayment of the foreign debt, denominated in tradables, becomes the dominant concern. The more borrowing of foreign capital is done in the first stage, the more the tradable sector in the second stage will exceed the initial steady state level.

As a digression, note that the nature of the productivity shock matters significantly. If the *productivity increase occurs at some future date after the announcement*, the issue of confidence comes into play. If, as in this deterministic setting, agents have full confidence that productivity will increase, agents will raise consumption well before the productivity rise actually materializes. Output however does not increase until the productivity shock is realized. As a result, external borrowing picks up relative to economic activity. Therefore, postponed productivity growth leads to larger cross-sectoral swings, where the share of economic activity in the nontraded sector is substantially larger initially and substantially smaller in later periods. To sum up, the transitional dynamics crucially depend, among other factors, on the time path of the productivity increase.

Finally, *the productivity improvement may apply to different sectors differently.* If this is the case, the sector with the relatively higher productivity growth will have a lower relative price in the final steady state. This additional channel of relative price adjustment will affect the transitional dynamics of the relative price and, therefore, all other variables. Thus, the transitional dynamics also depend to an important extent on the sectoral distribution of productivity shock.

Case 2: Alleviating Credit Constraints

The second case features the basic open economy model, where the credit constraint is binding but not prohibitively so as in the case of autarky. As noted earlier, the credit constraint arises because the borrower cannot commit to repay more than the external value of collateralizable assets. Therefore, with a binding collateral constraint, we have:

$$b_{t+1} + \frac{\phi}{1+\alpha_{t+1}} q_{t+1} k_{t+1} = 0$$

where α_{t+1} will be pinned down to r due to perfect competition in the funds and loan markets and the assumption of perfect foresight. Note that the solvency constraint of the lender will be satisfied at all times because there is perfect foresight.

The choice of the next-period capital stock is similar to the autarky case:

$$U_{c_T}(c_{Tt}, c_{Nt}) q_t \frac{\partial i_t}{\partial k_{t+1}} + \beta U_{c_T}(c_{Tt+1}, c_{Nt+1}) \left(q_{t+1} \frac{\partial i_{t+1}}{\partial k_{t+1}} - h_{t+1} \right)$$
$$+ \left(U_{c_T}(c_{Tt}, c_{Nt}) - \beta U_{c_T}(c_{Tt+1}, c_{Nt+1}) \right) \phi q_{t+1} = 0$$

except for the last term which states that investment in capital has a positive impact on the availability of collateral and, therefore, the ability to borrow.

As Figure 7 illustrates, the introduction of a price-sensitive collateral constraint, results in some powerful "financial accelerator" dynamics. The financial accelerator here operates through the general equilibrium interaction between the relative price of capital, the quantity of collateral and the amount of borrowing. In fact, two stages of financial acceleration can be distinguished.

- The first stage of acceleration occurs during the initial period, where the credit constraint does not bind in general equilibrium. In this case, the credit constraint is alleviated thanks to both the jump in the price of the capital good and the growth in the stock of capital. If the relative price did not increase by as much, the borrowing possibilities in subsequent periods would have been more restricted.

- The second stage operates throughout subsequent periods, where as a result of endogenous dynamics in the price and quantity of capital collateral constraints continue to be gradually relaxed.[3]

However, in spite of these accelerators, the introduction of the credit constraint itself implies a slower rate of convergence to the new steady state. As confirmed in Figure, an economy with tighter credit constraints (the solid line) shows a less pronounced current account deficit.[4] Consumption and output increase more gradually than is the case for an economy where credit constraints are less tight (the dashed line). The slower rate of convergence in the economy with tighter credit constraints also implies less volatility in sectoral output and relative prices.

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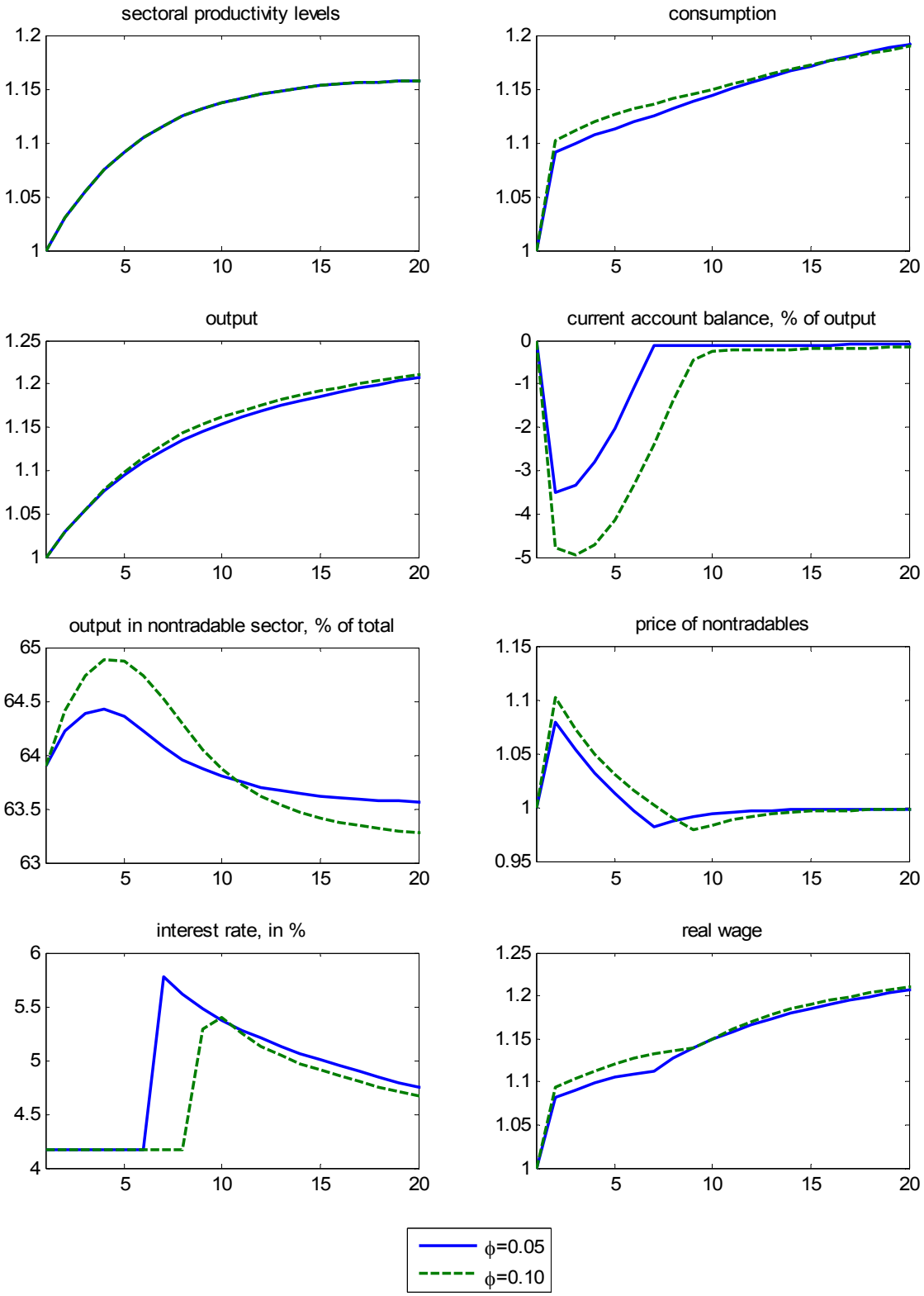
[3] Note that the increase in the relative price of nontradables is passed through to the relative price of the capital good, depending on how nontradable-intensive the production process of the capital good is.

[4] Note that the current account remains here in deficit, even though it is very close to being zero.

Figure 7. Open Economy with Credit Constraints



Case 3: Uncertainty and Risk Sharing

We now introduce uncertainty about the size of the productivity shock. The new element is that the agent is unsure in period one whether or not the announced productivity improvement is real or illusory. This uncertainty is resolved in period two. With probability π, the agent receives corroborating evidence confirming the expectation that the productivity improvement is forthcoming. This is the good state of nature (G). However, with probability $1-\pi$, the agent finds out that there will be no further productivity improvements. This is referred to as the bad state of nature (B).

Uncertainty about productivity realizations represents a source of volatility to the utility of risk averse borrowers. Their optimal response will be to attempt to share some of these risks if the price is right. The optimal contract will ensure an efficient sharing of risk. The scope for risk sharing depends crucially on the risk preferences of the foreign counterparty, which is captured in the model by ω.

What does risk sharing mean in the context of the model? Turning to the solution for this case, optimization with respect to b_2 produces the following first-order condition:

$$U_{c_T}(c_{T1}, c_{N1}) - \beta\pi(1+\alpha_2^G)U_{c_T}(c_{T2}^G, c_{N2}^G) - \beta(1-\pi)(1+\alpha_2^B)U_{c_T}(c_{T2}^B, c_{N2}^B) = 0.$$

where α_2^G and α_2^B no longer need to be equal across states of nature. The extent to which the repayment rates differ will determine the degree of risk sharing between the lender and the borrower. If lender is infinitely risk averse, then the solvency constraint,

$$(1-\omega)(1+r) = (1+\alpha_{t+1}^B),$$

binds for $\omega = 0$ at $\alpha_2^B = r$. Hence, given the binding individual rationality constraint, in this case we have $\alpha_2^G = \alpha_2^B = r$. However, for cases of less than infinite risk aversion we have $\omega > 0$ and $\alpha_2^B < r < \alpha_2^G$.

In the extreme case where the lender is risk neutral with respect to all states of nature ($\omega >> 0$), the solvency constraint will never bind. From a central planner point of view, the solution will involve optimal risk sharing with the lender providing perfect insurance to the borrower. This will ensure that the path of consumption and welfare will be the same for both states of nature from period two onwards.

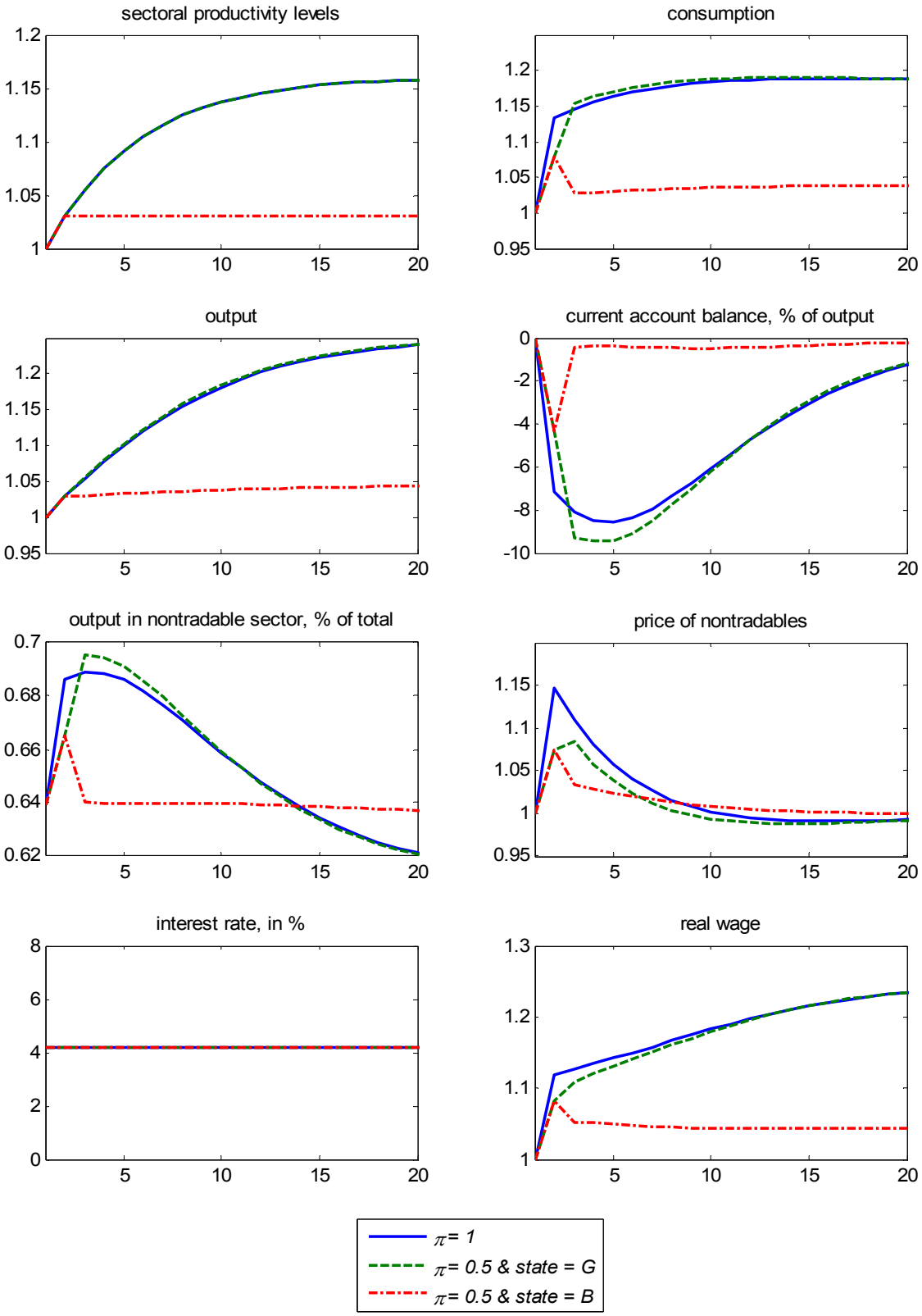
However, even without the benefits of risk sharing, the introduction of uncertainty raises interesting results. Consider the optimal dynamic response paths for the case of infinitely risk averse foreign investors, $\omega = 0$, in Figure 8, where for comparative purposes also the model solution in the case of perfect foresight is displayed.[5] It is clear that within an environment of uncertainty, the risk averse representative agent will now be more cautious. This is reflected in current account deficits and consumption growth rates that are initially more subdued. Additionally, the initial boom in the relative price of nontradables is now smaller and also more persistent.

Once the uncertainty is resolved, the transitional dynamics can be described as follows. The good state of the world represents good news and results in a further expansion of consumption, output, and the current account deficit. The opposite holds true for the bad state, where the agent learns that he has overconsumed, overinvested and overborrowed relative to what is justified by the new information received. Hence, consumption, investment and the current account deficit are all optimally scaled back.

In the interest of computational simplicity, the model features only one period of uncertainty. Hence, the benefits of risk sharing are limited to that period. A more general introduction of uncertainty would allow for effects which are quantitatively more substantial. Still, at a qualitative level, the model suggests that with $\alpha_2^B < r < \alpha_2^G$, the optimal solution represents a compromise between the smoothing of consumption over time and across states of nature. Intertemporal smoothing is scaled back to some degree so that consumption can be better smoothed across the good and bad state of the world. In the initial period, risk sharing will lead to more foreign borrowing and larger relative price increases.

[5] The case of risk sharing will be shown in Figure 10.

Figure 8. Uncertainty and Risk Sharing



IV. POLICY CHALLENGES

Building on the stylized features and theoretical framework discussed in previous sections, we now turn to the discussion of the key short-term risks and medium-term challenges for emerging Europe. As it turns out, the short-term risks will relate chiefly to the expansion stage of convergence, whereas the medium-term challenges have mostly to do with the reorientation stage.

A. Short-Term Risks

What can be done to ensure the expansion stage goes smoothly and sets the country on a secure path to higher living standards? Clearly, the faster convergence is, the more quickly its benefits can be realized; however, the more likely also that risks appear. The main challenge in the expansion stage is therefore to "drive safely." But what are the speed limits? Can one tell whether they are being broken? And what can policymakers do about it?

Do We Really Know the Speed Limits?

The question offers a fertile ground for debate (Demekas, 2007). The speed limits to capital inflows and the expansion of credit are not only hard to measure, they are also neither unique across countries nor fixed over time. As the theoretical model indicates, the following four determinants are central:

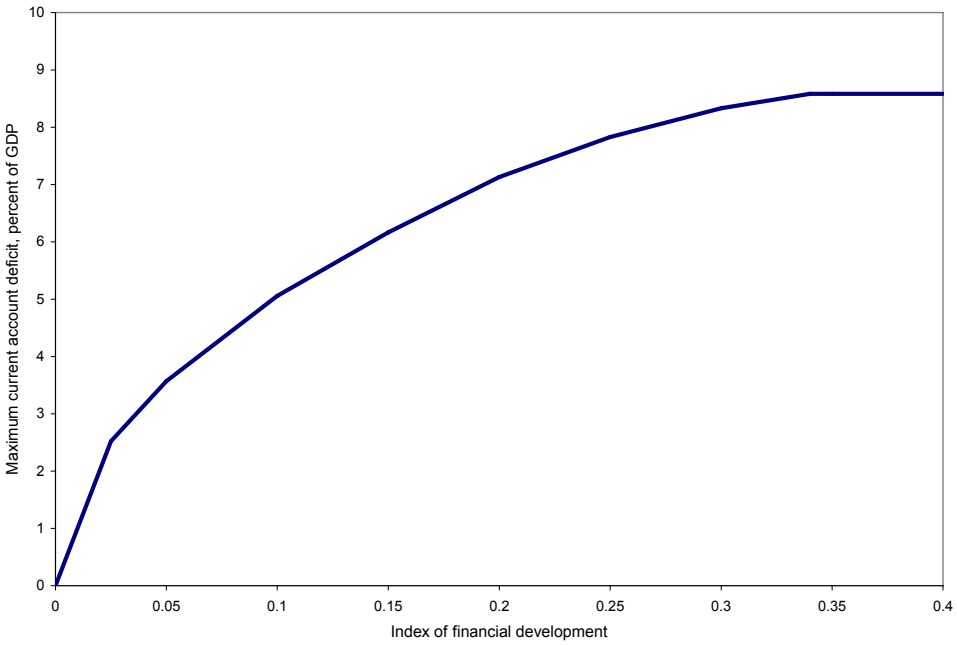
- *Productivity gains***.** How bright is the future? This will matter much for the optimal speed limit. Greater future productivity will justify higher speed or, in other words, larger current account deficits. But larger deficits will also imply greater shifts in and out of the nontradables sector, producing larger swings in prices.

- *Factor market flexibility.* How flexibly can an economy adapt itself to this bright future? Critical in this regard is the flexibility of labor and capital markets. Greater flexibility means greater compatibility with higher speed limits and larger imbalances.

- *Financial development.* How financially developed is the economy to begin with? On the one hand, further progress on this front allows countries to converge at higher speeds (Figure 9). On the other hand, the speed of convergence needs to remain commensurate with the degree of financial development.

- *Risk appetite*. How willing are foreign investors in providing risk capital? A larger appetite for risk allows domestic agents to share some of the risks of the possibly bumpy road ahead with outside investors. Thus, to the extent that capital inflows provide a degree of insurance, borrowers will find it optimal to rely on them more heavily (Figure 10).

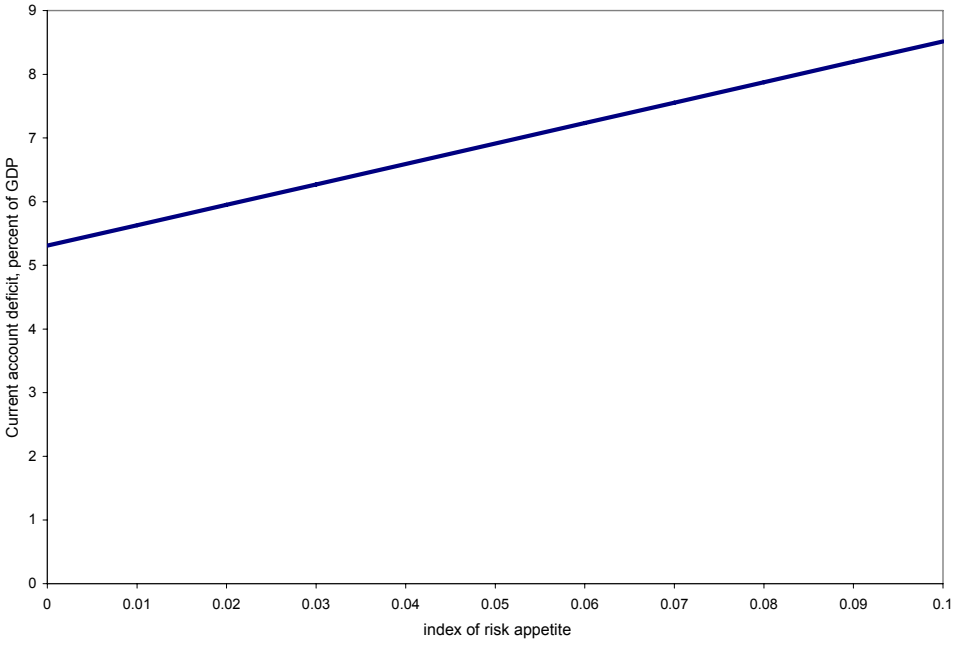
Figure 9. Financial Development and the Current Account



Source: IMF staff simulations.

Note: The index of financial development refers to the economy's aggregate loan-to-value ratio, i.e. aggregate credit over aggregate capital. The variation in this index is due to changes in the liquidation cost of collateral, parameter φ (see Schellekens, 2000). Model parameterization is as presented in Section III.C, with π=1. For φ > 0.34 , the credit constraint is not binding.

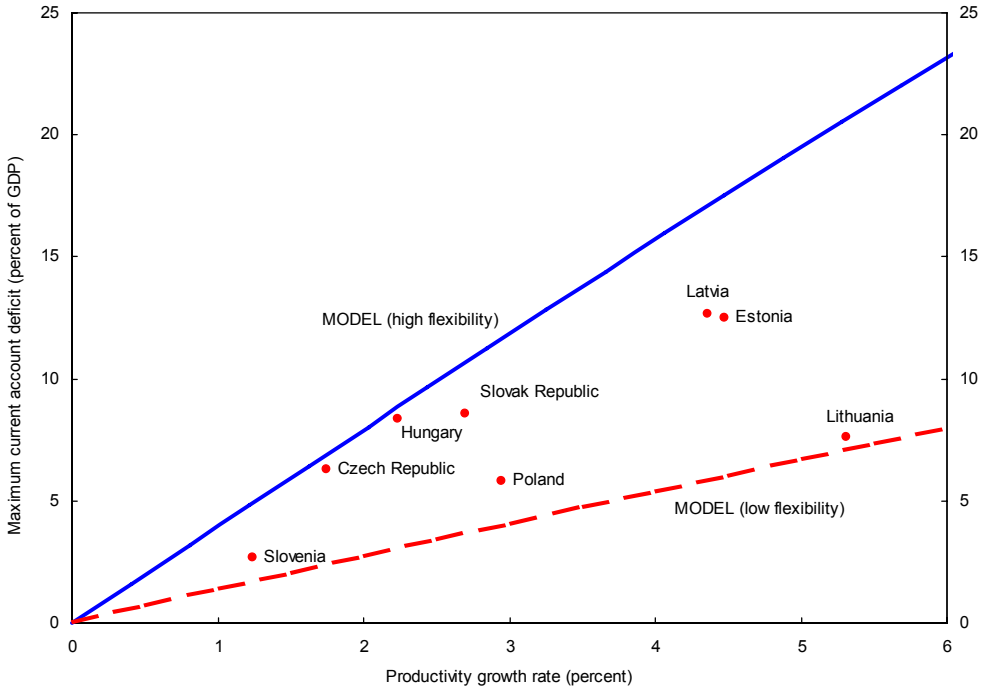
Figure 10. Risk Sharing and the Current Account



Source: IMF staff calculations and simulations.

Note: The index of risk appetite is varied with parameter ώ in the model. Investors are assumed to be risk neutral up to the point where losses exceed ώ percent of invested assets. At this point, investors become infinitely risk averse. The current account deficit refers to the first period after the shock. Model parameterization is as presented in Section III.C, with π=0.5 and φ=+∞.

Figure 11. Productivity, Flexibility and the Current Account



Source: IMF staff calculations and simulations.

Note: Empirical data: annual geometric average growth rate in total factor productivity over 2000-2005 and maximum CA deficit to GDP ratio over 2000-2005. Simulated data: productivity growth occurs in first period after the shock. Model parameterization as presented in Section III.C, with λ=20 and η=0.3 for the solid line and λ=0.1 and η=0.97 for the dashed line. In addition, π=1 and φ=+∞.

While theory provides only qualitative guidance, Figure 11 is suggestive nonetheless. Conceptually, larger current account deficits are consistent with larger productivity improvements (the positively sloped lines, generated from model simulations), and flexibility in the labor and capital markets allows for greater latitude in borrowing from abroad for a given productivity improvement (the solid versus the dashed lines). Introducing actual data into the figure illustrates that whether the current account deficits are too high depends on a host of factors. If factor flexibility were low (the dashed line), all countries would appear to be speeding. Conversely, if factor markets were highly flexible (the solid line), all of them would appear to be crawling. Thus, speed limits depend on many factors and are hard to determine precisely; but increasing productivity and the flexibility of factor markets are key to strengthening the sustainability of the current account.

Breaking the Speed Limits

When driving becomes unsafe, policymakers have an unmistakable role to intervene. Indeed, if the speed limits are being broken, fast convergence and rapid financial deepening give rise to a litany of concerns that must be addressed. And the financial sector may exacerbate these concerns.

Among the macroeconomic concerns, the significant problem is that breaking the speed limits causes demand to outstrip supply, putting excessive pressure on prices and wages and causing overheating. Monetary and fiscal policies are normally expected to be able to control these outcomes, but their effectiveness is limited in small economies facing strong capital flows. Hence, overheating can be associated with a loss of competitiveness and inflated asset prices. Subsequently, debt-service problems may arise when exchange rates or asset prices adjust, especially if they do so abruptly, as recent emerging market crises have illustrated.

The financial sector may exacerbate these vulnerabilities in several ways:

- The financial sector can raise an economy's *volatility* through the "financial accelerator" (Kiyotaki and Moore, 1997). Financial intermediaries typically require collateral for lending. Rising asset prices and collateral values, "accelerate" the capacity of borrowers to obtain credit. However, it may well be that lending was behind the increase in the asset's price in the first place. The feedback between lending and collateral values implies that the volatility of prices increases, as the regional comparison between credit growth and housing prices suggests (Figure 12).

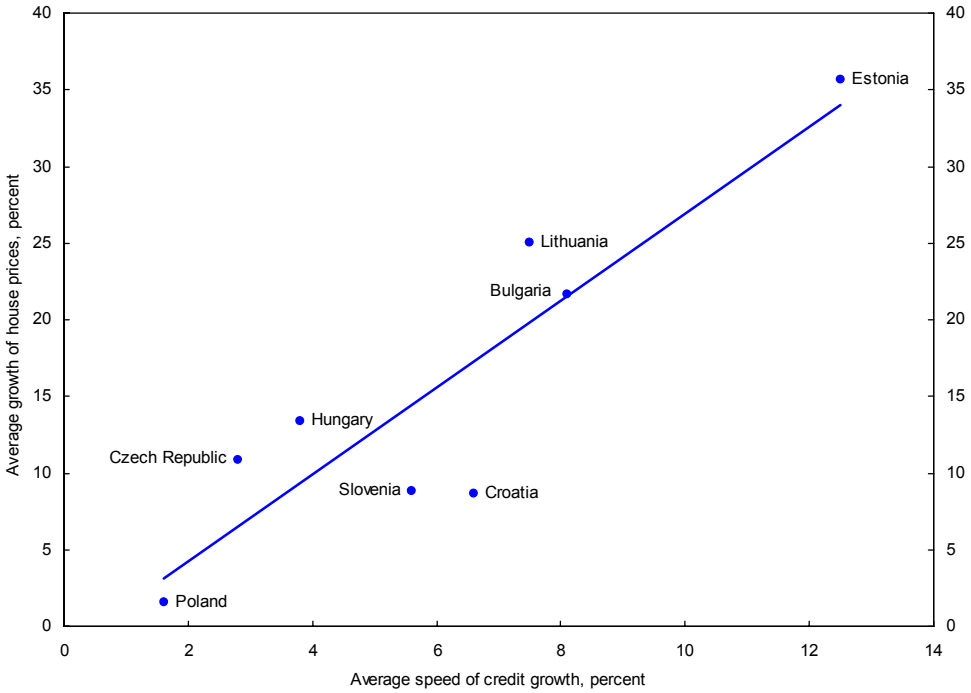
- As financial institutions compete for market share, *lending standards* may deteriorate. Households and corporations could end up with too much debt, or with too much risk, for example by lending in foreign currency or exclusively at variable interest rates. This behavior played an important role in the subprime mortgage crisis in the U.S. In emerging Europe, the main concern is the large share of liabilities outstanding in foreign currency (Figure 13).

- *Overconfidence* may lay the groundwork for a boom-and-bust cycle. Overconfidence may be fuelled by the prospect of adopting the euro or joining EU. Agents may have inflated views about productivity and income. The financial sector may allow overoptimistic agents to borrow, driving prices above fundamental levels (Figure 14). However, if the expectations are not validated, the bust will be even bigger.

- *Foreign bank contagion* raises additional concerns. Certainly, foreign bank presence (Figure 15) contributed to the availability of credit and financial development more generally. And, support from well-capitalized parents may reduce the vulnerability to local financial conditions. Yet, the concentrated number of international players and the similarity of their activities create exposure to common-lender contagion risks (Table 3), where strategic shifts at the parent level could amplify foreign-sourced shocks and create ripple effects throughout the region.

- *Sudden changes in market sentiment* provide a further risk, especially in countries where external imbalances are high. Lack of access to capital markets have the potential to disrupt the convergence path. As illustrative model simulations show, the consequences for consumption growth could be significant (Figure 16).

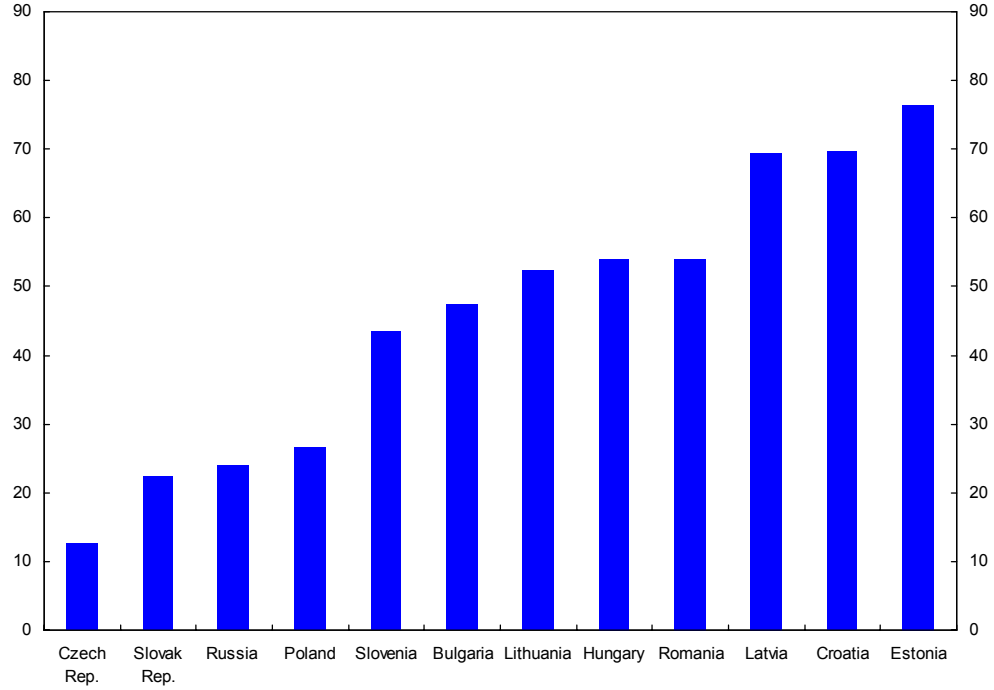
Figure 12. Speed of Credit Growth and House Prices, 2002-2006



Source: Égert (2007); and IMF staff calculations.

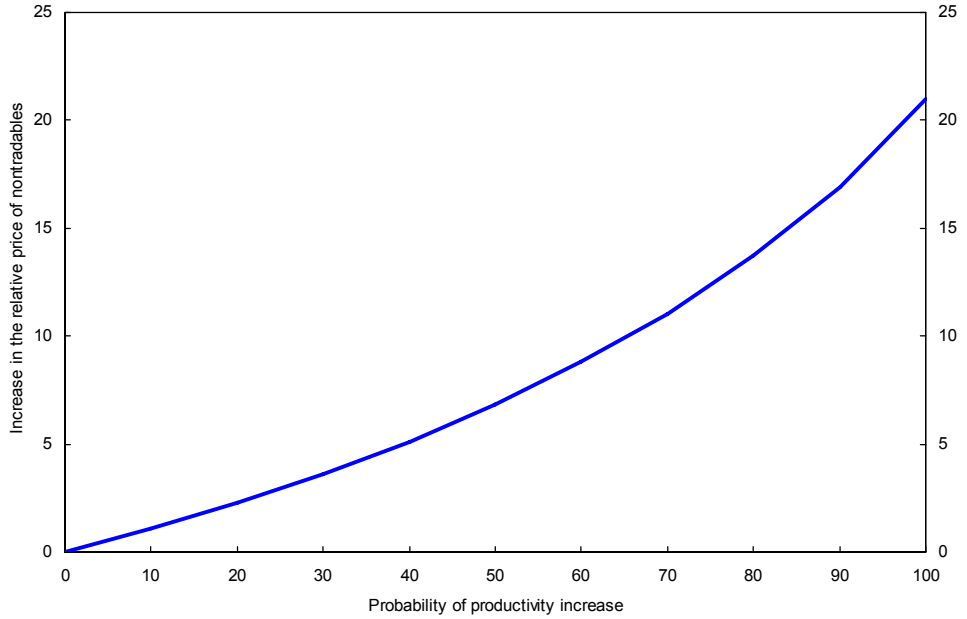
Note: The speed of credit growth is defined as the annual percentage-point increase in the credit-to-GDP ratio, averaged over the period 2002-2006. Credit measure includes direct cross-border credit and refers to households and nonfinancial corporations.

Figure 13. Share of Foreign Currency Loans in Total Loans, 2006
(percent)



Source: ECB; and National Authorities.

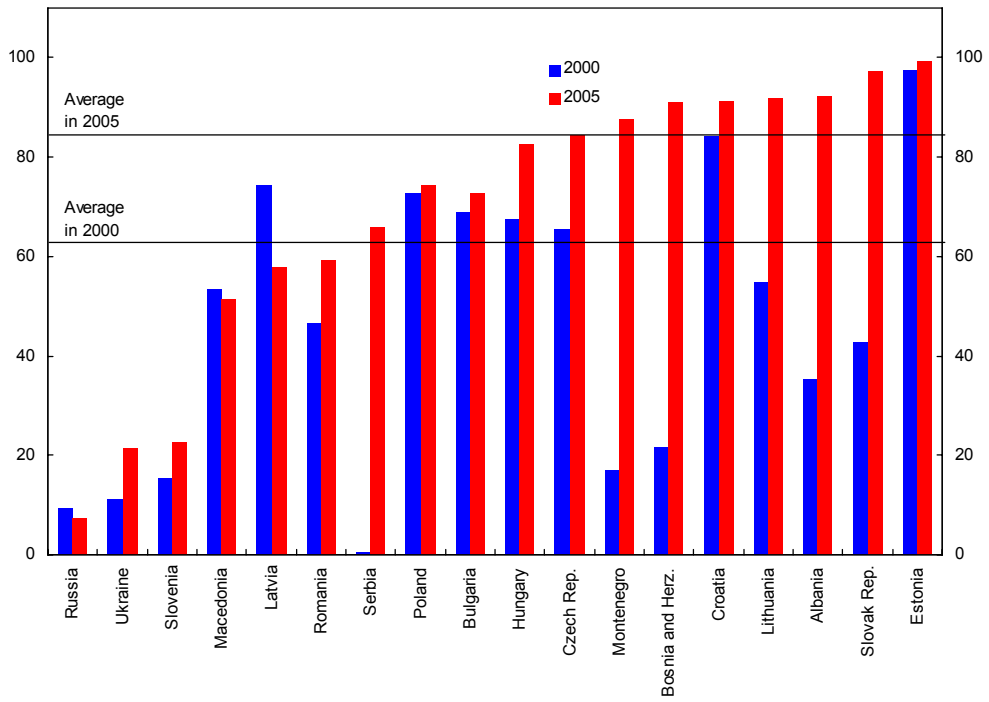
Figure 14. The Impact of Confidence on the Relative Price of Nontradables
(percent)



Source: IMF staff simulations.

Note: Probability measure refers to the probability of a productivity increase taking place eventually. The increase in the relative price of nontradables is the percentage increase relative to pre-shock steady-state values. Model parameterization as presented in Section III.C, with φ=+∞ and ώ=0.

Figure 15. Asset Share of Foreign Owned Banks, 2000 and 2005
(percent)



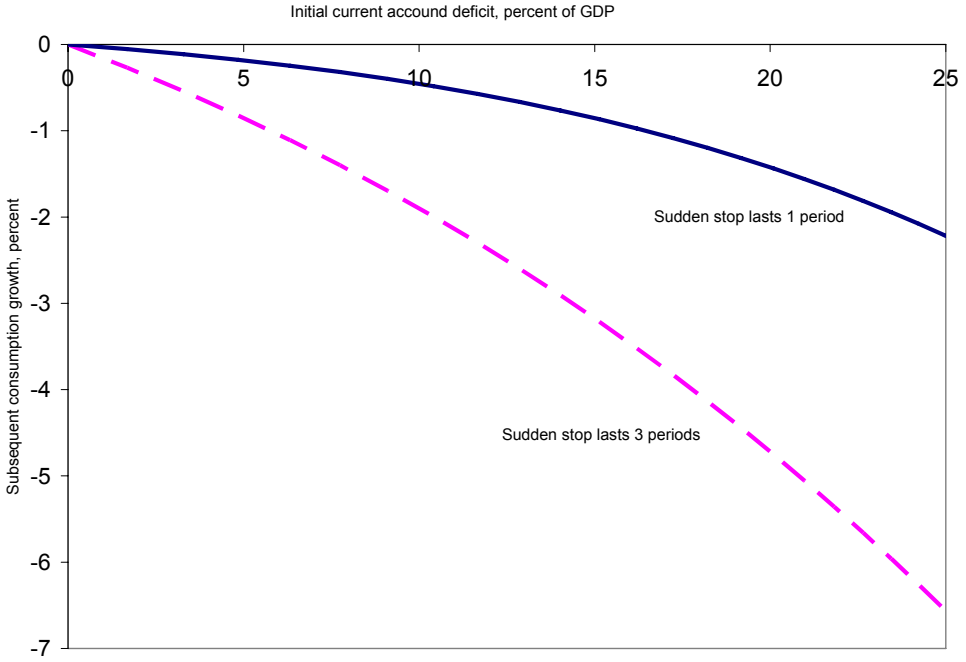
Source: European Bank for Reconstruction and Development; and IMF staff calculations.

Table 3. Banks' Exposure to Emerging Economies, 2006
(percent of total exposure)

	Austria	Belgium	Sweden	Germany	France	Italy	Portugal	Finland
EU-10	34.7	5.6	10.3	2.6	1.9	11.4	6.6	9.9
Bulgaria	0.9					0.5		
Czech Republic	8.9	2.6		0.2	1.0	0.6	0.1	
Estonia	0.1		3.6					3.9
Hungary	6.2	1.2	0.0	0.7	0.2	2.6	0.3	
Latvia	0.1		3.3	0.1				2.6
Lithuania	0.1		2.9	0.1				3.2
Poland	2.8	1.0	0.5	0.8	0.2	4.8	6.2	0.1
Romania	8.7			0.5	0.4	0.8		
Slovak Republic	5.6	0.6		0.1		2.5		
Slovenia	2.2	0.2		0.1	0.1	0.1		
Other EM Europe	14.6	1.0	0.4	1.7	1.2	7.0	1.0	0.5
Other EM	1.0	0.6	0.5	1.6	1.6	1.0	4.1	0.4
Rest of the world	49.6	92.8	88.7	94.1	95.3	80.5	88.3	89.2

Source: Bank for International Settlements

Figure 16. Sudden Stops, Consumption and the Current Account



Source: IMF staff simulations.

Note: Fully open economy version of model. Parameterization as presented in Section III.C, with π=0.5, φ=+∞. Sudden stop is defined as an unexpected constraint of the form bt>=0 for t=3 or t=3,4,5, imposed one period after the initial productivity shock. Measured consumption growth is for the period when the sudden stop hits the economy. Variation in current account deficits is induced by gradually increasing the size of the initial productivity shock.

Reducing Vulnerabilities and Building Buffers

Faced with considerable uncertainties about speed limits but relative consensus about the potential cost of vulnerabilities policymakers in most countries have taken concrete measures to address vulnerabilities. They have undertaken macroeconomic tightening: raising interest rates or reserve and liquidity requirements, and reducing fiscal deficits or building up surpluses. Prudential and supervisory regulations have also been tightened, and monitoring has been stepped up to make sure banks uphold sound loan granting standards. In a few cases, marginal reserve requirements have been imposed on foreign borrowing (Hilbers and others, 2007).

While these measures have helped dampen credit growth in some countries, rapid credit growth remains a concern in most countries. Countries with tight fiscal policies are still experiencing very large capital inflows and current account deficits (such as in Bulgaria and Estonia). Rapid deposit growth or easy access to funding by the parent bank has limited any impact that policies might have had on banks' cost of funds. Significantly tightening reserve requirements seems to have had at best a transitory impact on credit growth, as borrowers and banks have found ways to circumvent these controls (as has happened, for example, in Croatia and Latvia). Where controls result in direct borrowing from abroad, prudential concerns may arise. Finally, the literature shows that capital controls, apart from being largely infeasible in EU member states, may not make a lasting impact (International Monetary Fund, 2007).

What else can be done? With the boom a reality and policies largely ineffective in stemming the tide, it will be key to focus efforts on further reducing vulnerabilities and building in safety margins. Policymakers will need to be pragmatic and take into account the worse-case scenario. Such an approach would be consistent with strengthening or maintaining the following measures (selective country examples where the IMF has advocated these measures are provided in parentheses):

- *Tightening macroeconomic policies***:** tightening fiscal policy, to cool off or not to add to existing demand pressures (the Baltics); eliminating fiscal incentives contributing to the nontradables boom (Latvia); and conducting incomes policies that promote wage restraint supported by productivity growth (Romania); tightening monetary policies (Ukraine); and increasing reserve requirements (Bulgaria).

- *Raising prudential standards*: directing prudential efforts to remove distortions in bank lending associated with, for example, risky sectoral allocations, unhedged currency borrowing, imprudent funding behavior by banks, or real estate bubbles; identifying bank-specific capital requirements and raising them where necessary; and establishing risk-based and forward-looking supervision (Bulgaria, Latvia, Romania, and the Slovak Republic).

- *Upgrading supervisory cooperation and coordination*: guaranteeing the effective implementation of prudential and supervisory measures by ensuring an adequate enforcement capacity, cross-border cooperation between home and host supervisors, and coordination among supervisors of nonbank financial institutions to avoid loopholes (the Czech Republic, Estonia, Lithuania, Poland, and the Slovak Republic).

- *Enhancing risk disclosure*: supporting a better disclosure and understanding of risks by conducting public awareness campaigns and strengthening market discipline for banks by tightening disclosure requirements of risk management and internal control policies and practices (the Baltics, Croatia, Hungary, Poland, and the Slovak Republic).

B. Medium-Term Challenges

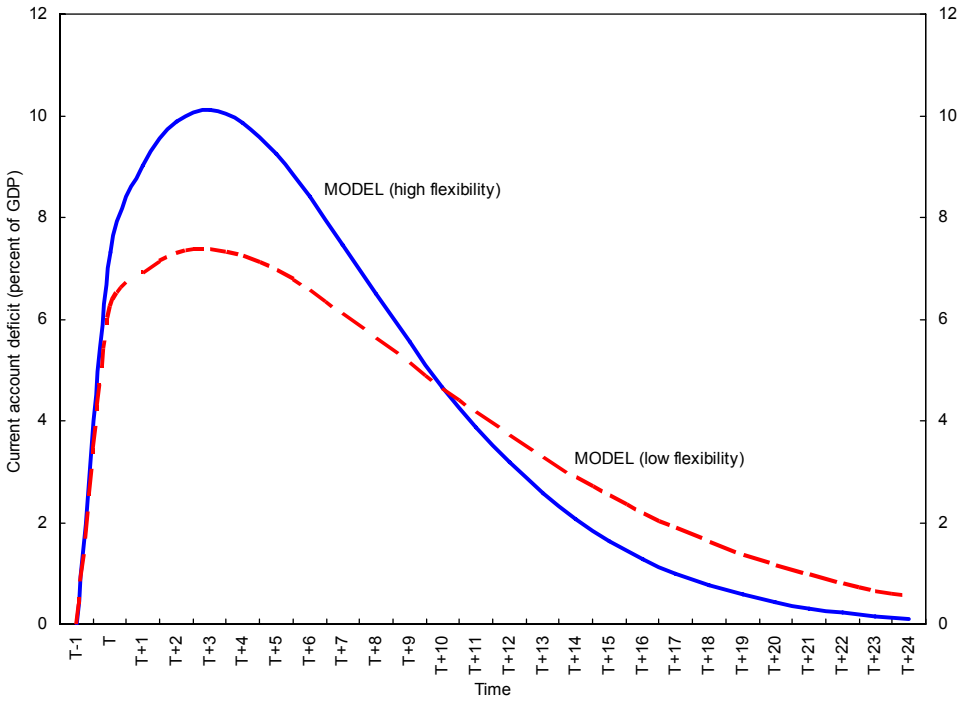
Reversing the Current Account Imbalances

Even if driving fast is safe, policymakers will need to take curves carefully to avoid accidents. Converging economies inevitably face the requirement to service their debt and turn around their current account imbalances (Figure 17). The larger the current account deficits, the greater this challenge will be. And the larger the extent to which the inflow of resources has fed the boom in nontradables, the greater the reorientation in the structure of production will have to be. Thus, tradable output will need to rise again relative to nontradable output.

An equally vital policy challenge will be to deliver on the expectations of higher productivity. It is on these expectations that consumption, investment, and borrowing decisions have been made. If they turn out to be invalid, the rebalancing of the current account and the reorientation of production will prove even more difficult and painful. Instructive in this regard is the experience of Portugal, which experienced a large credit boom on the back of expectations that failed to materialize.

With the credit-driven expansion of the nontradables sector a reality, and the rebalancing of growth toward exports an eventual necessity, the main issue is how to equip the economies and financial systems of emerging economies with the tools to support such a turnaround. Inevitably, the growth in credit to households will need to slow, in relative terms, and more financial resources will need to flow to productive investments. A key concern is that countries are not implementing sufficient reforms to facilitate these developments. Besides generally pursuing sound macroeconomic policies, bringing supervision and regulation in line with best practice and avoiding microeconomic distortions, what else can policymakers do?

Figure 17. Two Stages of Convergence



Source: IMF staff simulations.

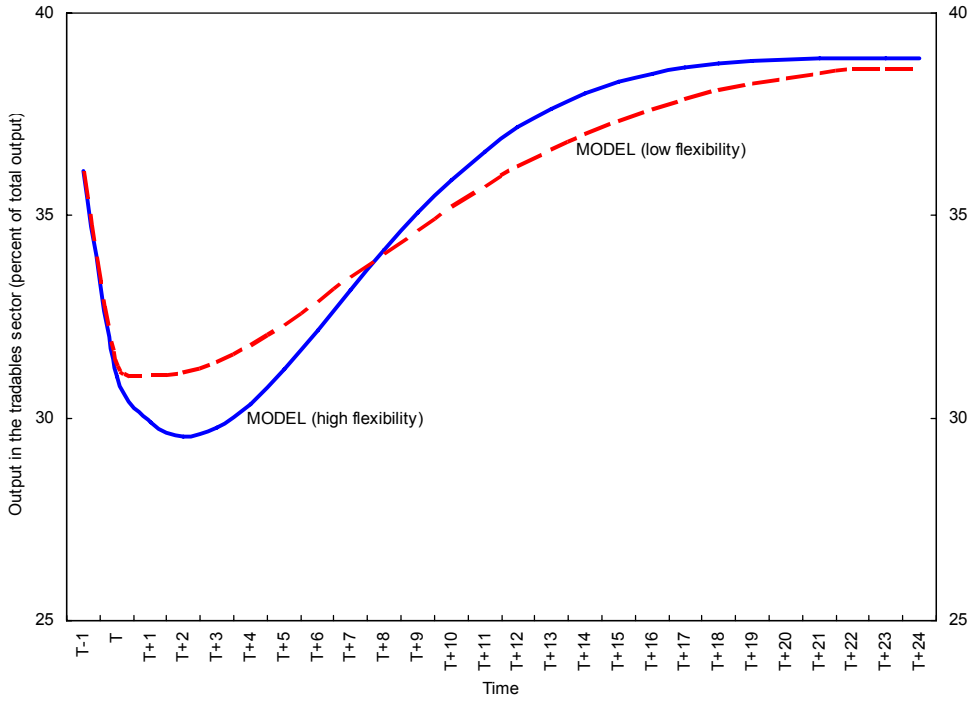
Notes: Flexibility refers to capital and labor market flexibility. Time intervals are expressed in years. Model parameterization as presented in Section III.C, with λ=20 and η=0.97 and λ=1 and η=0.97 for the low and high-flexibility cases, respectively. In addition, π=1 and φ=+∞.

Fostering Factor Market Flexibility

Flexible labor and capital markets are key to support the unencumbered flow of resources from nontradables to tradables (Figure 18). As Portugal's experience exemplifies, running large current account deficits is an undesirable proposition when factor markets lack sufficient flexibility.

There is especially scope for improving labor market flexibility —a particularly pressing objective given that the countries where credit grew quickly also seem to have more rigid labor markets (Figure 19). Against this background, it would certainly be very risky for countries converging rapidly to advanced economy income levels to also aspire to match the generosity of advanced-economy welfare states. The labor market rigidities often associated with a more generous welfare state may inhibit the smooth transition of resources to the tradables sector, thereby making unnecessarily protracting the reorientation stage.

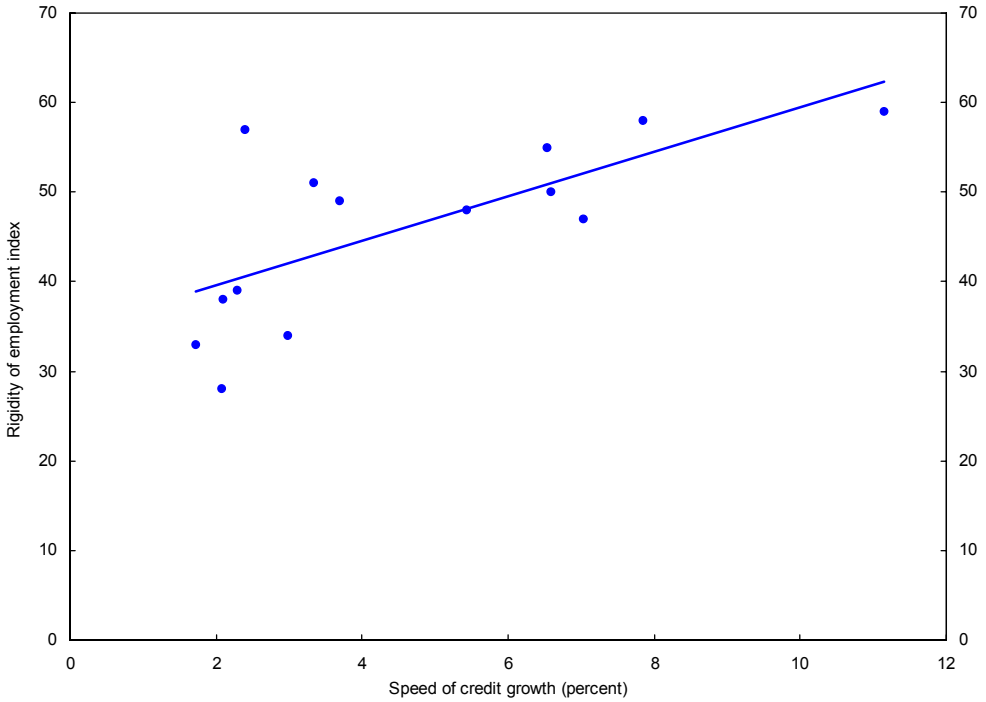
Figure 18. The Changing Composition of Production



Source: IMF staff simulations.

Note: Flexibility refers to the capital and labor market flexibility. Time intervals are expressed in years. Model parameterization as presented in Section III.C, with λ=20 and η=0.97 and λ=1 and η=0.97 for the low and high-flexibility cases, respectively. In addition, π=1 and φ=+∞.

Figure 19. Labor Market Rigidity and Speed of Credit Growth



Sources: Doing Business Database; BIS; national authorities; and IMF staff calculations.

Note: The index is based on 2006 survey on difficulties in hiring and firing and rigidities in hours. The speed of credit growth takes the annual percentage point increase in the credit-to-GDP ratio, averaged over the period 2001-2006. Credit is to households and nonfinancial corporations, and includes direct cross-border credit. The sample includes: Bulgaria, Croatia, the Czech Republic, Estonia, Latvia, Hungary, Lithuania, Poland, Romania, Serbia, the Slovak Republic, Slovenia, Turkey, and Ukraine.

The need for flexible labor and capital markets is particularly important where exchange rate flexibility is limited. With such limited flexibility, domestic factor prices, in particular wages, will need to carry the burden of the price adjustment. Factor market flexibility may alleviate this burden by ensuring that labor and capital are sufficiently responsive to price signals.

Furthermore, the diversification of financial systems in emerging economies will make capital markets more flexible. As these economies catch up and integrate further with the advanced economies of Europe, the financing options provided by their financial systems will broaden. More diversified financial systems are able to identify and support rapidly rising industries more quickly, which will improve the flexibility of capital markets.

Improving Financial Infrastructure

To allow financial systems to provide more resources to the corporate sector, building a supportive, enabling financial infrastructure will be essential. Creditors need good protection, provided through strict enforcement of bankruptcy and insolvency laws that meet international best practice standards. Improving corporate governance is essential in a number of emerging economies, and will require changes in legislation and enforcement. In addition, providing more and better credit information will help financial institutions channel resources to the corporate sector. In this context, fostering the development of credit registries is crucial.

Other parts of the financial system need to be developed as well, especially to fill in missing market segments. This would benefit the mobilization of domestic savings and thereby help rebalance the current account. Under proper safeguards, the development of securitization and asset-backed securities markets continues to have an important role to play. The development of basic derivatives markets would also be critical in this respect, helping to deepen markets in underlying securities and better allocate risks.

V. CONCLUSION

Finance and convergence have greatly contributed to raising the wealth and welfare in the countries of emerging Europe. The rapid inflow of capital, which has sparked a rapid, if not blistering, pace of financial deepening, has allowed countries to fast forward the convergence process. Convergence to higher income levels, in combination with improvements in infrastructure and institutions, have supported the inflow of capital. Thus, in mutually reinforcing ways, finance and convergence have generated significant benefits to consumers, producers, and investors alike.

These benefits notwithstanding, short-term risks and medium-term challenges have emerged. Where the speed limits appear to have been broken, macroeconomic imbalances and microeconomic distortions have resulted—for example, in the form of overheating and lax risk management. These in turn have created exposure to short-term risks, such as the

disruptive reversal of capital inflows. In addition, where convergence has been fuelled by ballooning current account deficits, the medium-term challenge coming into sight is to turn these deficits around in a growth-supportive way. This will require that resources can flow without hindrance to productive investments, particularly in the tradables sector.

In addressing the question of "What's Ahead For Emerging Europe?", the paper has offered pragmatic directions for policymakers who wish to address these short-term risks and medium-term challenges:

- Even if the speed limits may be hard to determine, the costs of breaking them are likely substantial. Therefore, to ensure "safe driving" and avoid a disruption of the convergence process, policymakers ought to build buffers and reduce vulnerabilities. This will require emphasizing, where possible, macroeconomic tightening, raising prudential standards, upgrading supervisory cooperation and coordination, and enhancing the disclosure of risk.

- Equally important, yet often overlooked, is the need to "prepare for the curve ahead"—the reversal of external current account imbalances. Where these have been large, the challenge will be to turn them around without painful adjustment. To meet this challenge, flexible factor markets and strong financial systems will be more important than ever.

Finally, by considering the general equilibrium context of these risks and challenges, this paper has also offered a critical perspective on the ongoing debate about whether the economies of emerging Europe have been breaking speed limits. First, empirical assessments need to incorporate country-specific elements, since the speed limits are neither unique across countries nor fixed over time. Second, to evaluate a country's speed of convergence, the relevant metric should be welfare, not growth, so that aspects related to risk can be properly accounted for. Third, assessments should consider the entire convergence path. Even if most economies are still in the expansion stage of convergence, they will be entering the reorientation stage before long. As the paper has argued, the challenges countries are likely to face at that time have an important bearing on the present course of action.

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