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Currency Mismatch and Boom-Busts in Emerging Europe

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Currency Mismatch and Boom-Busts in Emerging Europe

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- Many countries in emerging Europe have been among the fastest growing countries in the world.

- However, most of them have been among the hardest hit by the current crisis.

- This boom-bust pattern has many aspects in common with other emerging economies

- The boom followed financial liberalization of the 1990s

- financial liberalization $->$ foreign capital inflows

- Key characteristic: "currency mismatches" and increase in leverage

- We document the degree of currency mismatch across emerging Europe

- The effects it has had on these economies.

- We present a model to help explain that currency mismatch:

  Optimally chosen by lenders and borrowers given the policy environment

  Relaxed financing constraints

  -> lending boom

  -> higher investment

  -> higher growth.

  Of course financial fragility was a by-product.

Lending boom and currency mismatch are generated by the interaction of two imperfections:

- Contract enforceability problems

   Generates borrowing constrains,

   which are necessary to explain why insolvency risk promotes growth and

   also why crises can happen.

- Systemic guarantees to bailout lenders in case of crisis.

   Provide an implicit subsidy that makes currency mismatch attractive.

- The model is based on Schneider and Tornell (Review of Economic Studies, 2004) and on Ranciere, Tornell and Westermann (Quarterly Journal of Economics, 2008).

Two sectors:

Tradables (T) sector that produces the consumption good.

H-sector that produces housing services or nontradables

The H-good is an intermediate good which is used as an input in the production of both T- and N-sector goods.

The T-good is the numeraire and the price of the H-good– i.e., the inverse of the real exchange rate–is denoted by p_t.

The only source of risk is endogenous relative price risk.

$$p_t = \begin{cases} \overline{p}_t & \text{with probability } u_t \\ \underline{p}_t & \text{with probability } 1 - u_t \end{cases}, \quad u_t = \{0, u\}$$

We will refer to $1 - u_t$ as the crisis probability.

p_t clears the H-sector market

$$C_t(p_t) + I_t(w_t, p_t) = q_t(I_{t-1})$$

To allow for the possibility of **currency mismatch** we assume that developers can finance themselves by issuing two types of one-period bonds:

H-bonds that have an interest rate ρ_t^H

and whose promised repayment is $p_{t+1}(1 + \rho_t^H)b_t^H$,

T-bonds that have an interest rate ρ_t

and whose promised repayment is not indexed, $(1+\rho_t)b_t$.

The investable funds of a young developer equal his internal funds w_t plus the debt he issues. Thus, the budget constraint is

$$p_t I_t \leq w_t + b_t + b_t^H.$$

Since currency mismatch implies that a firm can go bust, profits are $\max\{\pi_t, 0\}$, with

$$
\begin{aligned}
\pi_t &= p_t q_t - L_t, \\
L_t &= (1 + \rho_t)b_t + p_{t+1}(1 + \rho_t^H)b_t^H
\end{aligned}
$$

- **Borrowing constraints**

Aagency problems in credit markets.

By incurring a non-pecuniary cost $h[w_t + b_t + b_t^H]$, a young developer can engineer a scam that will allow him to divert the revenues to himself and not repay any debt in the next period, provided the firm has positive notional profits.

- **Systemic bailout guarantees**

In case a majority of H-firms defaults, the government pays lenders of non-diverting firms the promised debt repayment amount (L_t). However, in case of an isolated default the government does not bail out lenders.

The expected payoff of a young developer is

$$E_t(u_{t+1}\pi_{t+1}c[1-\delta_t]) + E_t(cp_{t+1}q_{t+1} - h[w_t + b_t + b_t^n])\delta_t,$$

where $\delta_t = 1$ indicates that the developer adopts a diversion scheme.

A safe equilibrium: one where there is no currency mismatch

- Since lenders are risk neutral and the opportunity cost of capital is $1 + r$,

- The interest rate that they require satisfies $[1 + \rho_t^n]E_t(p_{t+1}) = 1 + r$.

- To avoid diversion by the firm, lenders impose a borrowing constraint: $(1 + r)b_t^n \leq h(w_t + b_t^n)$.

- If investment yields a return that is higher than the opportunity cost of capital, the firm will borrow up to an amount that makes the credit constraint binding. Thus, the budget constraint implies that credit and investment are:

$$b_t^n = [m^s - 1]w_t \qquad I_t = m^s \frac{w_t}{p_t}, \qquad (1)$$

$$\text{where } m^s = \frac{1}{1 - h\delta}, \quad \delta \equiv \frac{1}{1 + r}. \qquad (2)$$

A Risky equilibrium where there is currency mismatch.

- T-debt is risky and it might lead to insolvency: $\pi(\underline{p}_{t+1}) = \beta\underline{p}_{t+1}q_{t+1} - (1 + \rho_t)b_t < 0$.

- A firm might choose T-debt and risk insolvency because risky T-debt is cheaper than safe N-debt.

- Suppose that tomorrow's real exchange rate can take on two values.

- With probability u, $p_{t+1} = \bar{p}_{t+1}$ that leaves every firm solvent,

- With probability $1 - u$, $p_{t+1} = \underline{p}_{t+1}$ that makes all H-sector firms go bust.

- Lenders constrain credit to ensure that borrowers will repay in the no-crisis state −>

  1. in the no-crisis state debt is repaid in full and there is no bailout.

  2. In crisis state there is bankruptcy and each lender receives a bailout equal to what he was promised. Thus, the interest rate on T-debt is

  $$1 + \rho_t = 1 + r.$$

  Meanwhile that on H-debt is

  $$1 + \rho_t^n = \frac{1 + r}{u\bar{p}_{t+1} + (1 - u)\underline{p}_{t+1}}$$

- Choosing T-debt over H-debt reduces the cost of capital from $1 + r$ to $[1 + r]u$.

- **Lower expected debt repayments $->$ ease borrowing constraint**

$$u[1 + r]b_t \leq h[w_t + b_t]$$

as lenders will lend up to an amount that equates . Therefore, credit and investment are:

$$b_t = [m^r - 1]w_t \qquad I_t = m^r \frac{w_t}{p_t}, \qquad m^r = \frac{1}{1 - u^{-1}h\delta}$$
(3)

By comparing

$$b_t^n = [m^s - 1]w_t \qquad I_t = m^s \frac{w_t}{p_t}, \qquad \text{where } m^s = \frac{1}{1 - h\delta}, .$$
(4)

$$b_t = [m^r - 1]w_t \qquad I_t = m^r \frac{w_t}{p_t}, \qquad m^r = \frac{1}{1 - u^{-1}h\delta}$$
(5)

In the presence of systemic bailout guarantees, taking on credit risk allows agents to reduce the expected value of debt repayments, which eases borrowing constraints and increases the investment multiplier: $m^r > m^s$.

- **This increase in leverage** is possible because systemic guarantees mean that in a crisis lenders expect to be bailed out.

The fact that T-debt is cheaper than H-debt does not imply that agents will always be willing to issue T-debt. This is because with probability $1 - u$ T-debt will result in bankruptcy for a borrower. One can show that it is individually optimal to choose T-debt if crises are rare events and there is enough real exchange rate variability:

$$\frac{\beta\theta\bar{p}_{t+1}}{p_t} \geq \frac{1}{\delta} > h > \frac{\beta\theta\underline{p}_{t+1}}{p_t} \tag{6}$$

Capital inflows ($ million), emerging Europe, 2003-2007

Legend:
- Bank loans
- Portfolio investment: bonds
- Portfolio investment: equity
- Direct investment
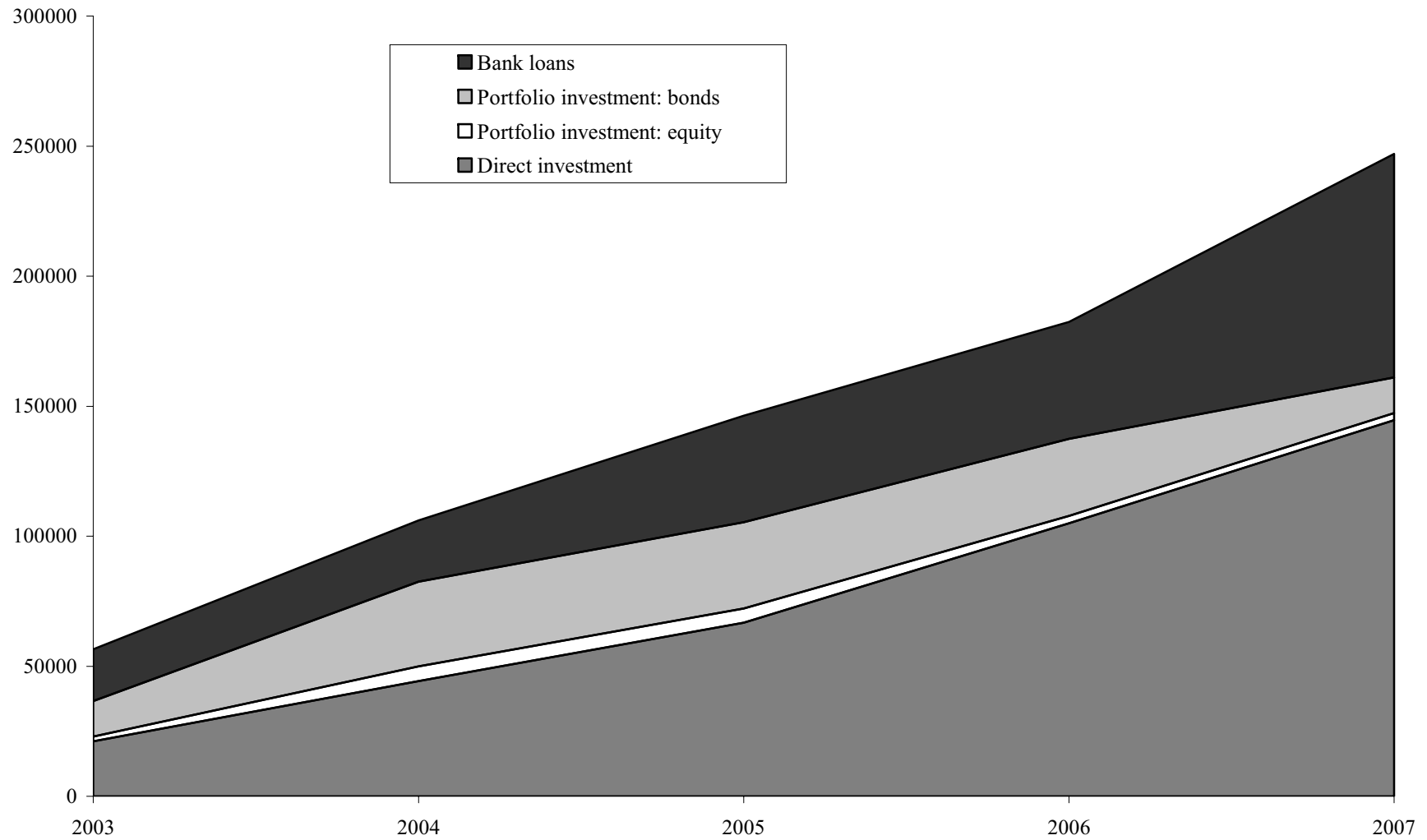
Source: IMF, International Financial Statistics

Private sector credit growth, 2004-07
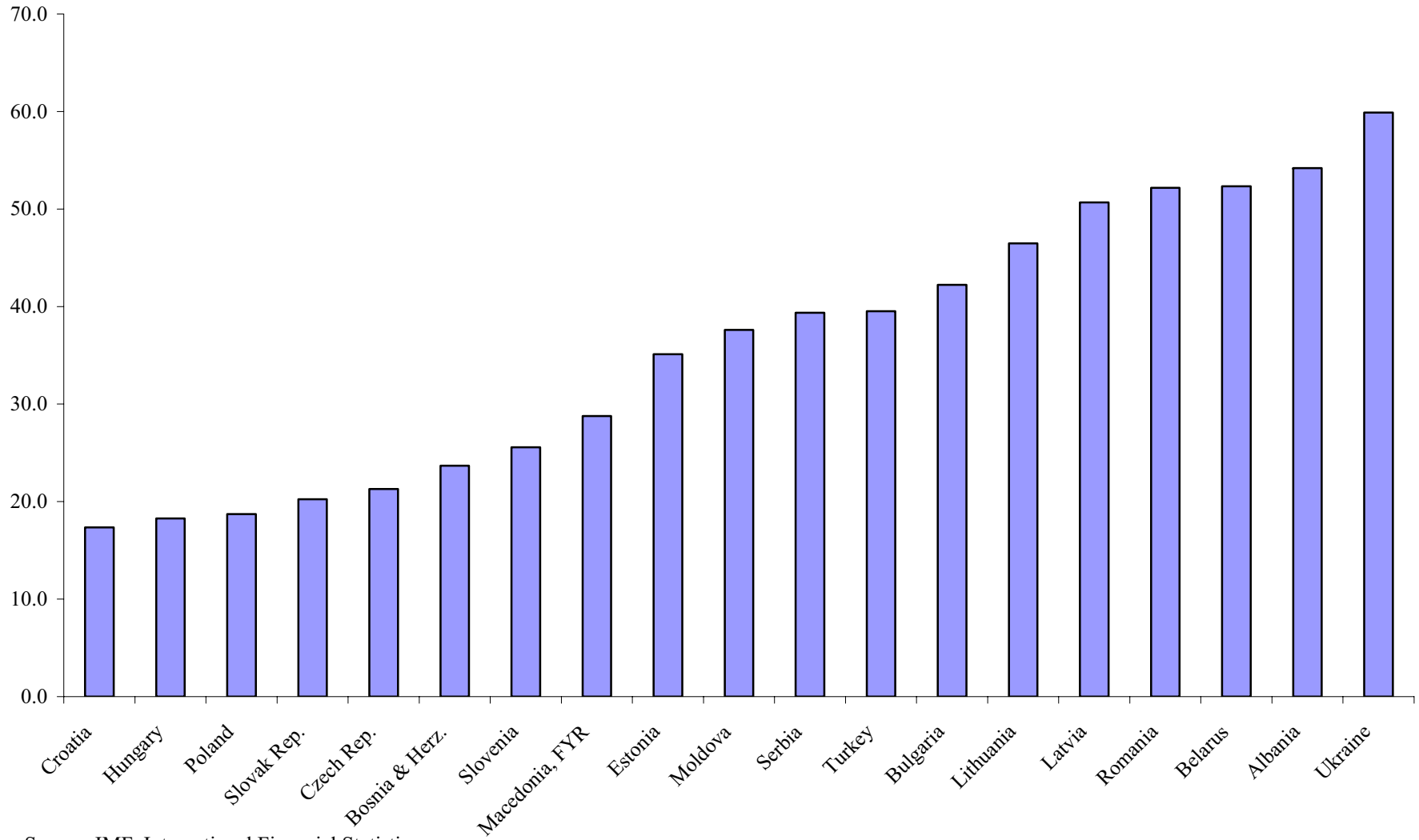
Source: IMF, International Financial Statistics

Real per capita GDP growth in emerging economies, 2004-2014
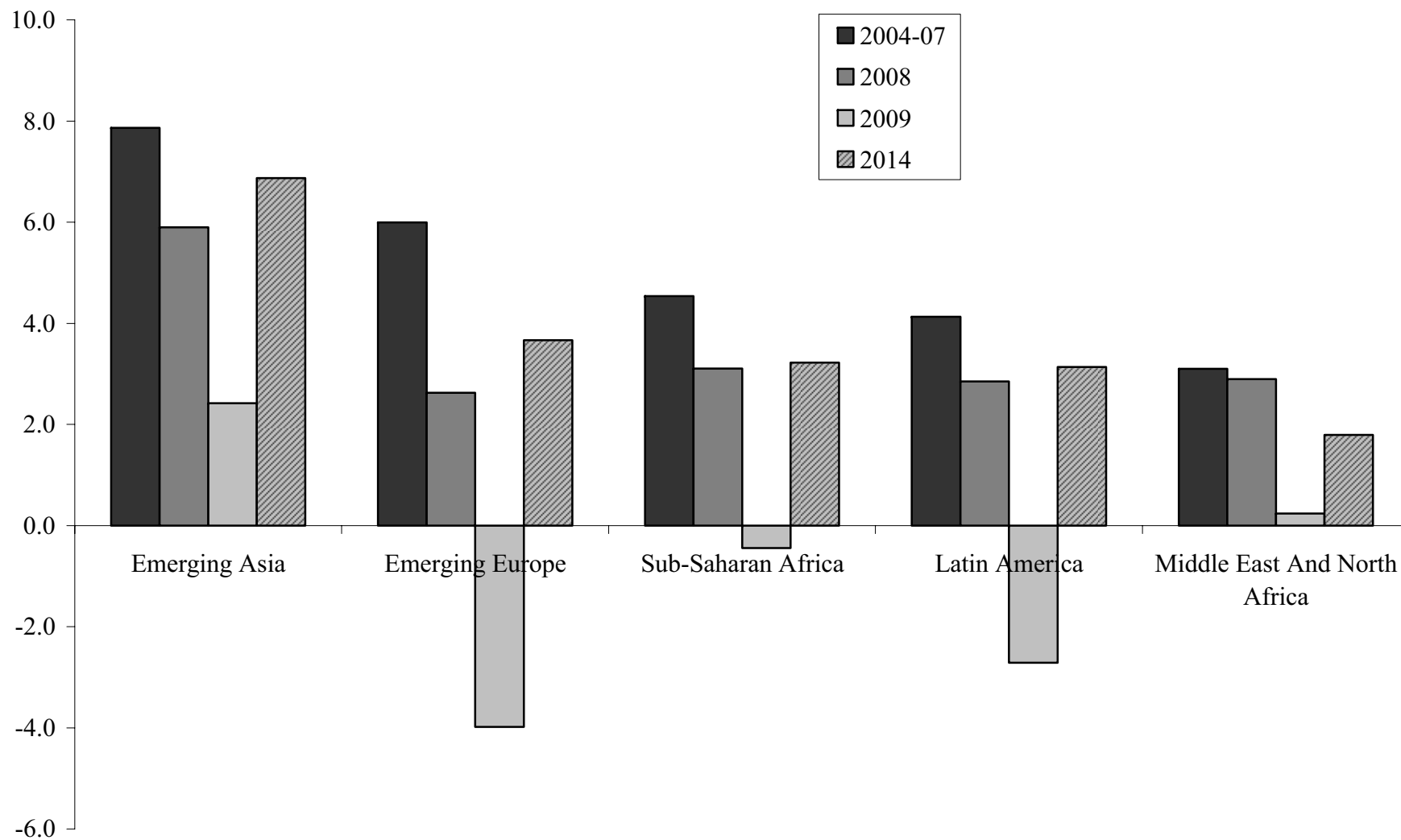
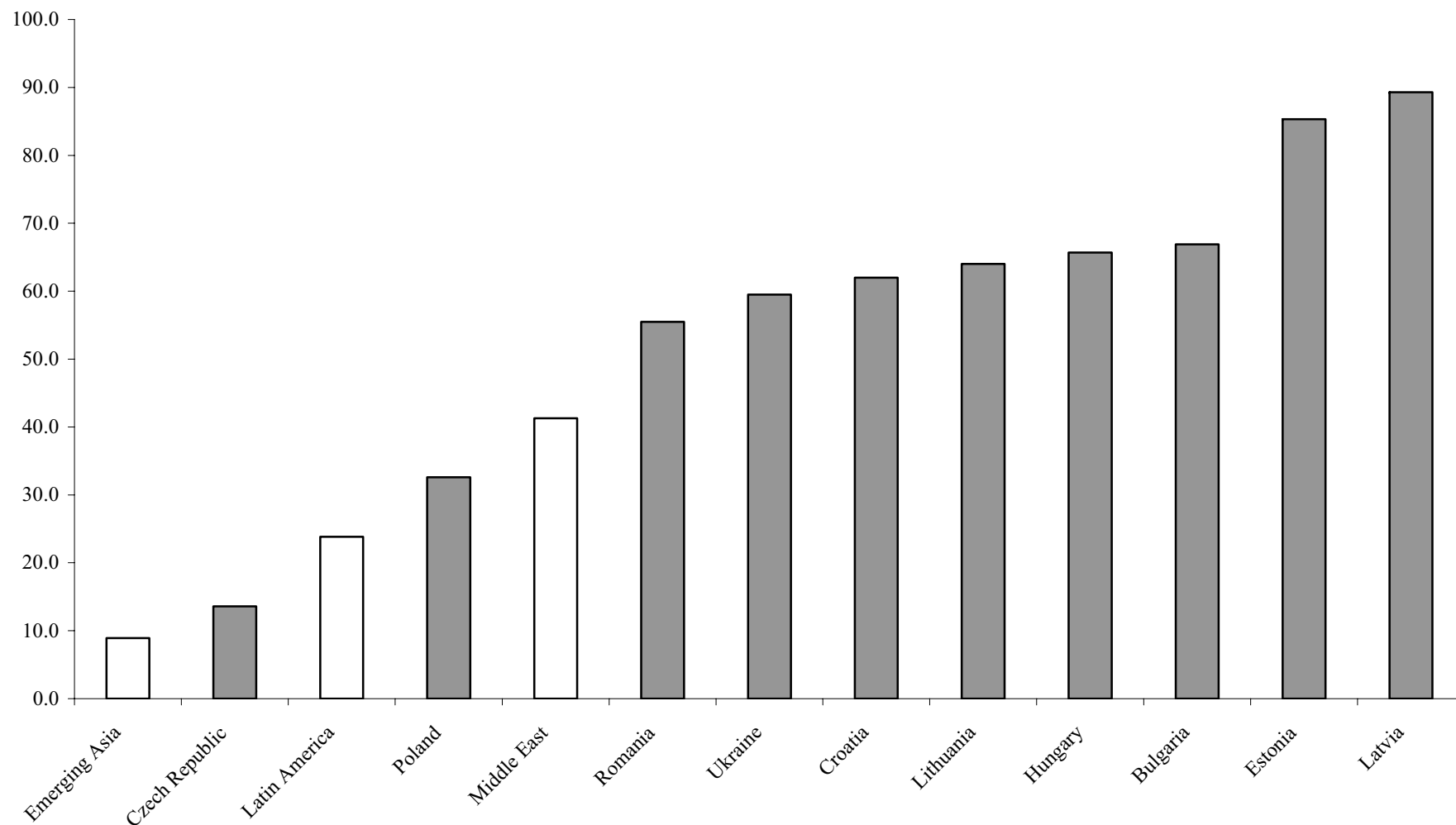Current account deficit/GDP: emerging economies 2007 and east Asia 1996
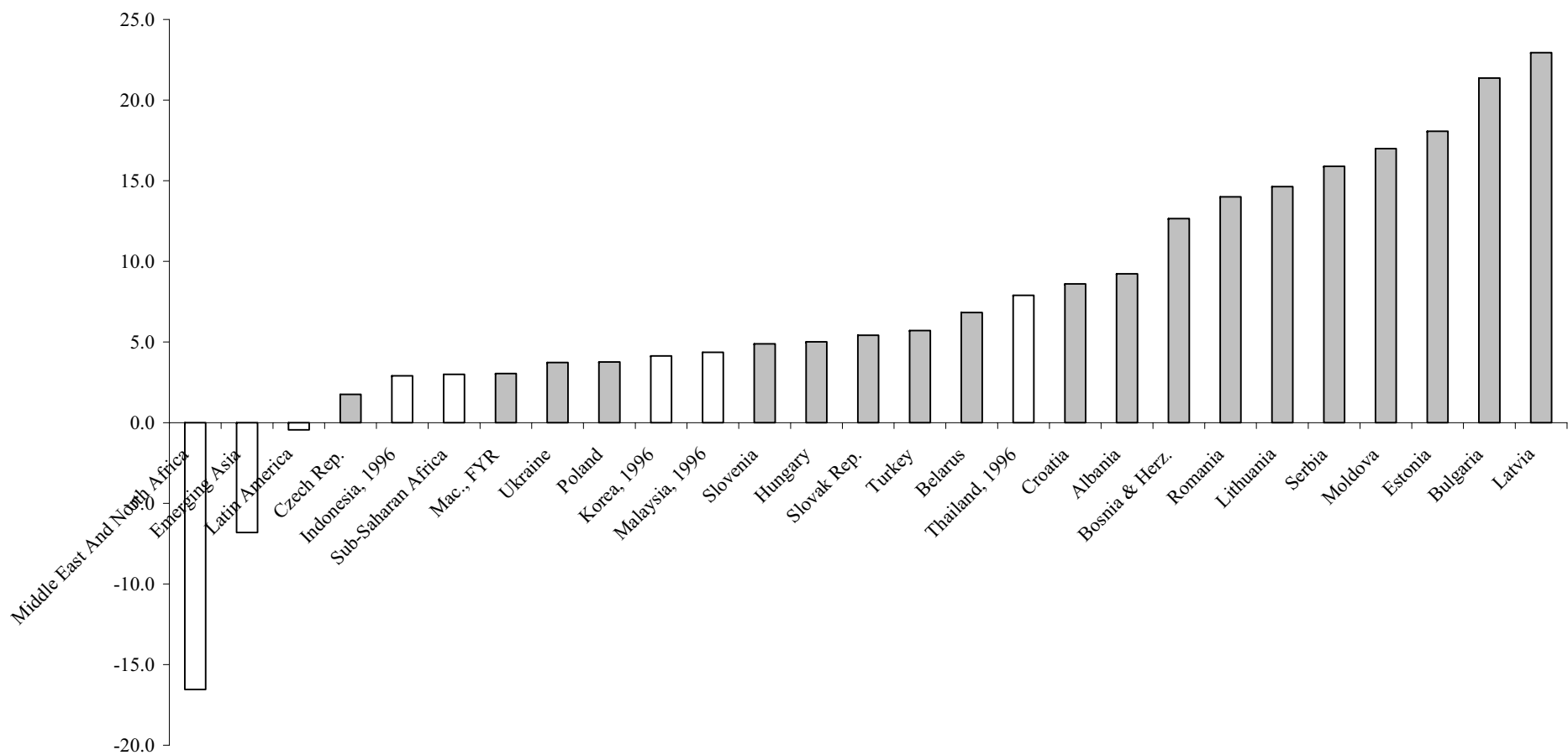
Difference between local and foreign currency lending rates (in percent), 2007
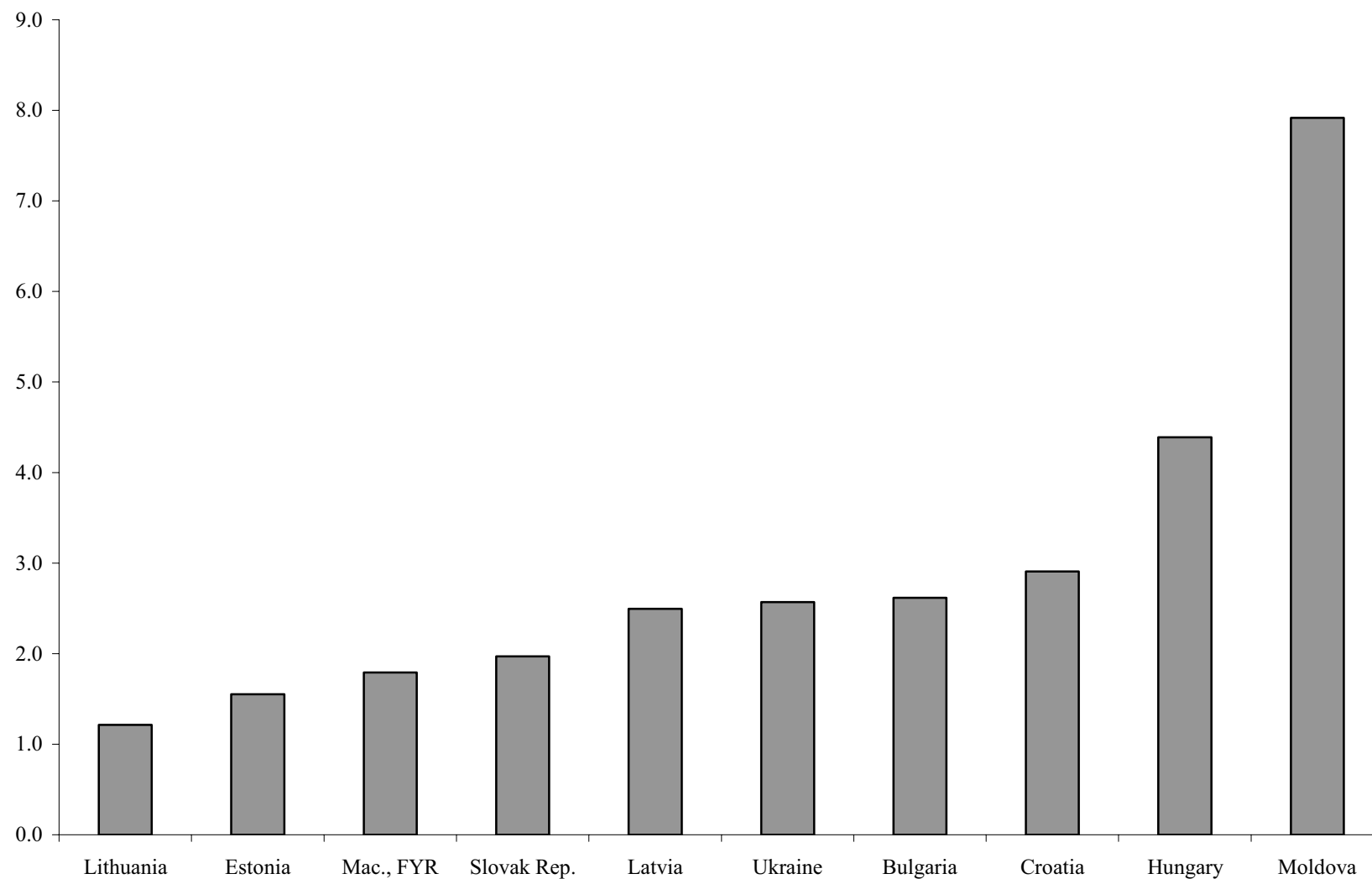
Bank loans in foreign currency in percent of total bank loans, emerging Europe, 2007

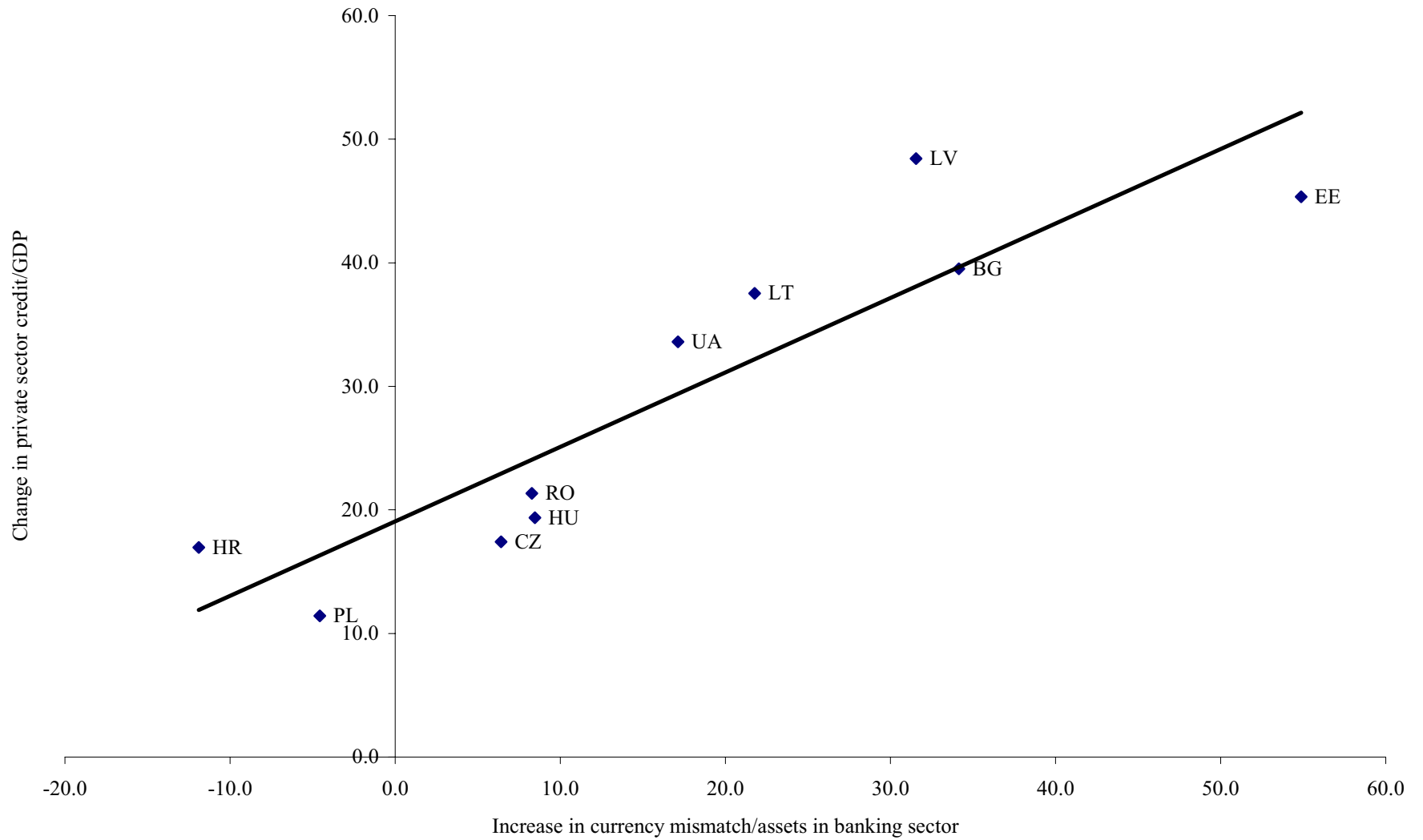Source: IMF, Database of Vulnerability Exercise for Emerging

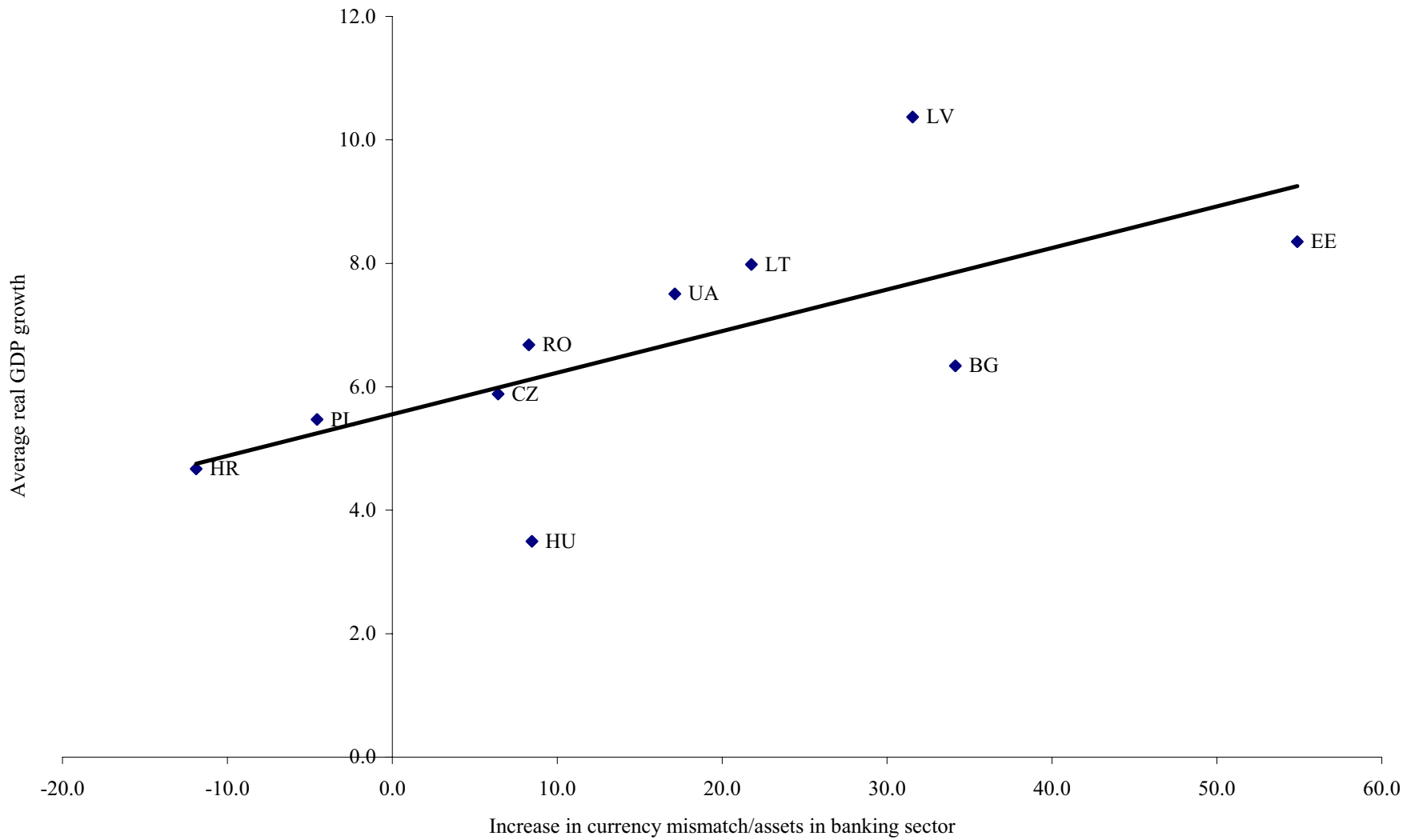Currency mismatches in emerging Europe, with and without adjustment for unhedged lending, 2007
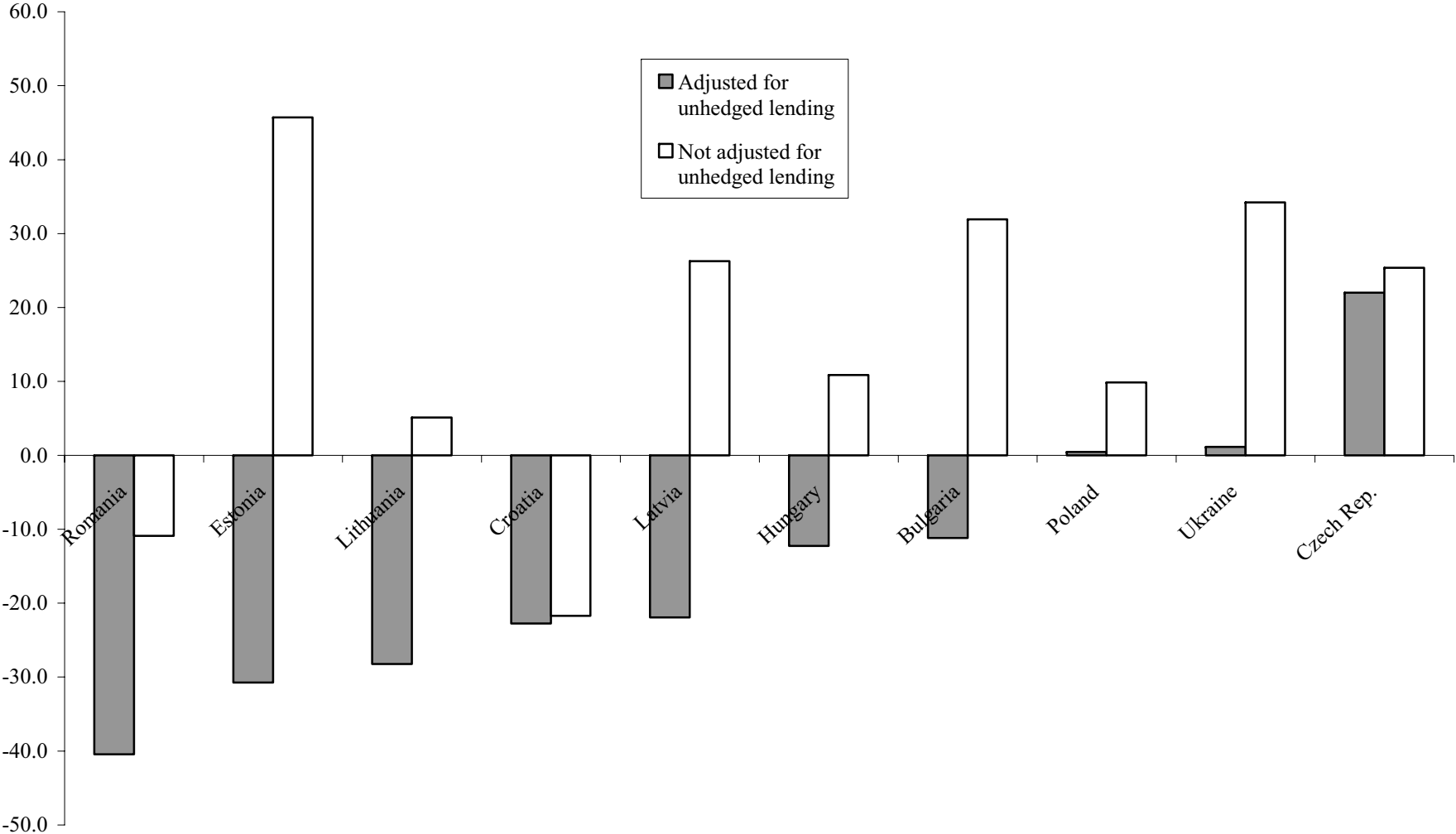
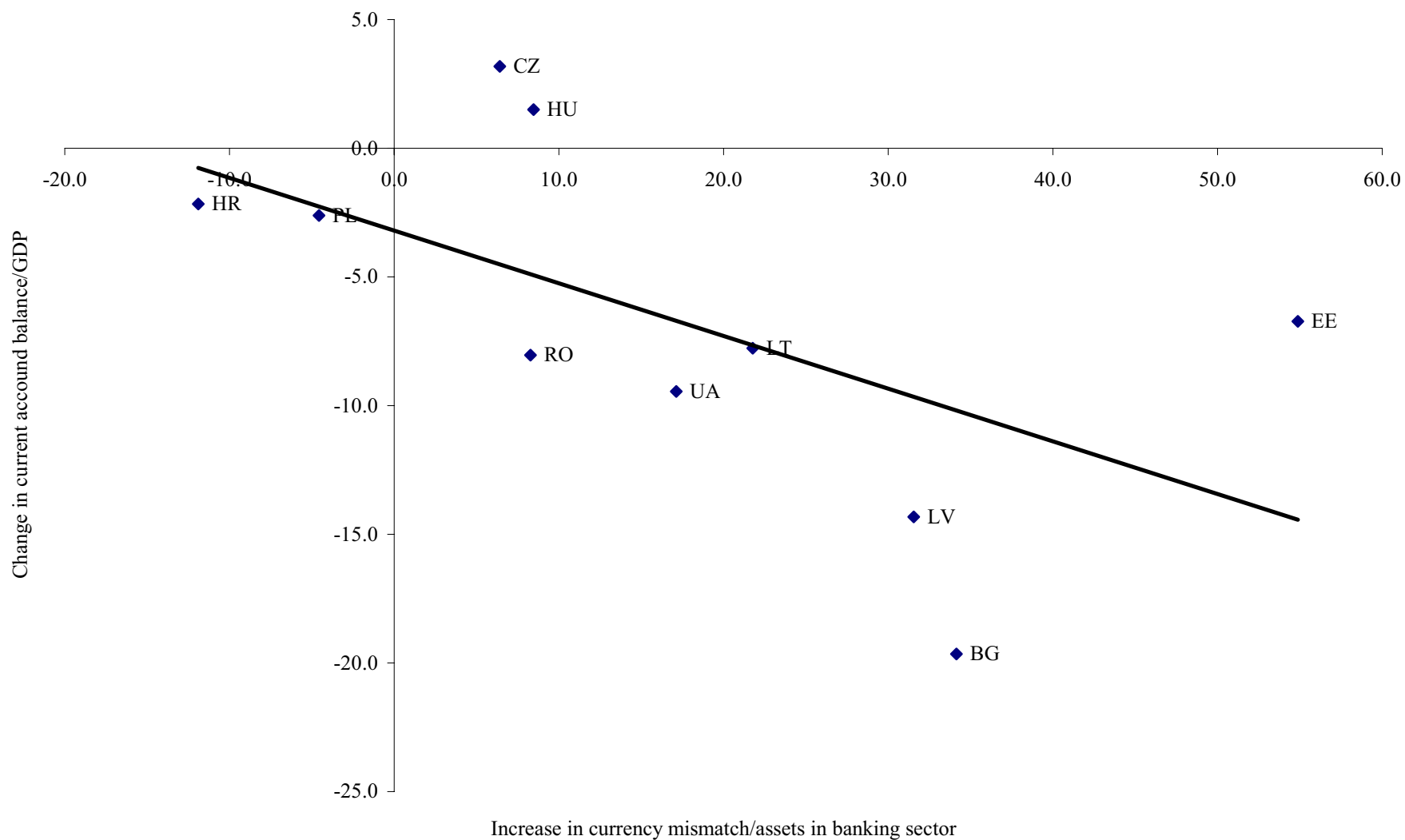# Currency mismatch in percent of bank assets, emerging Europe, 2003-07

Source: Auhors' calculations
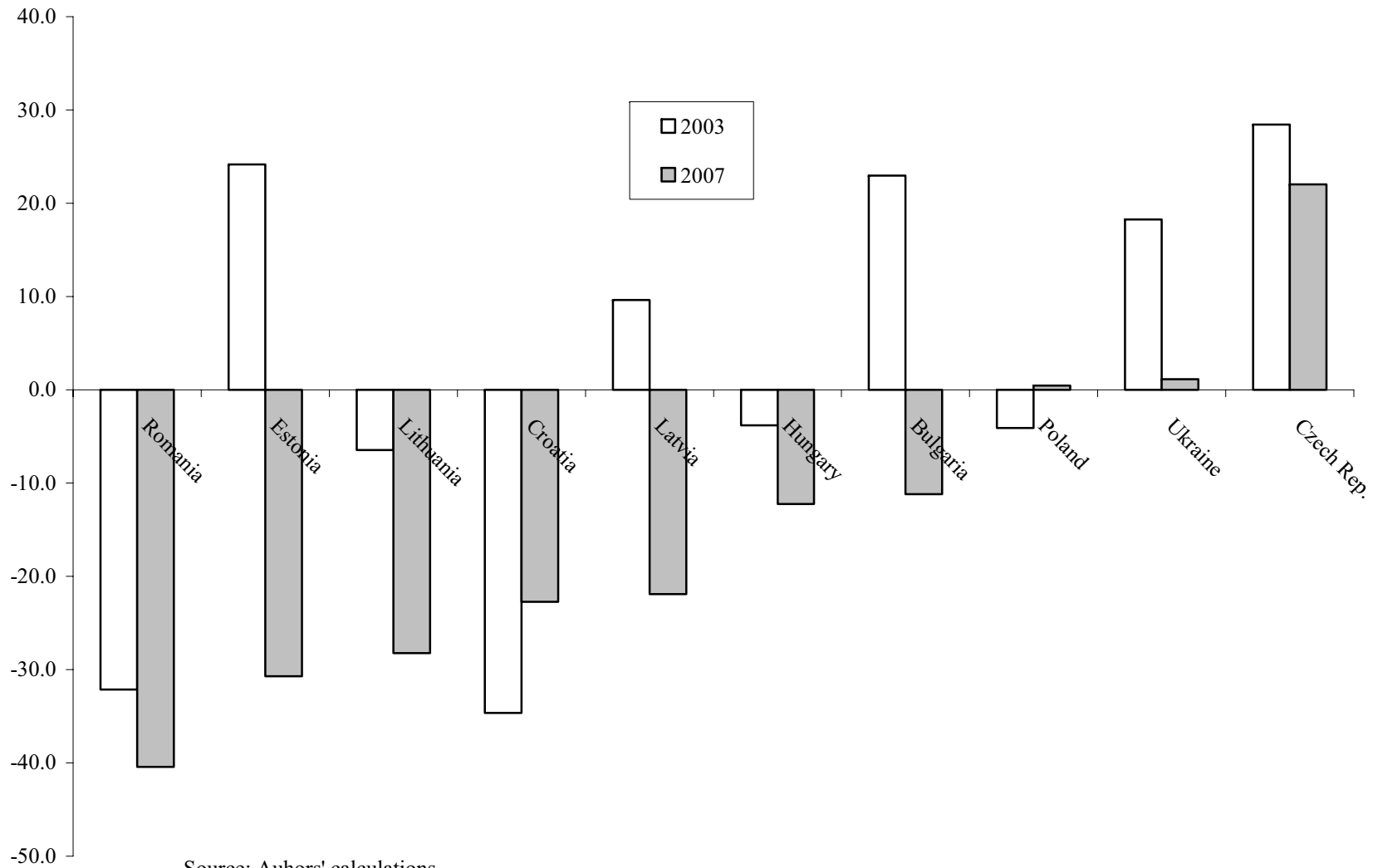
Currency mismatch and private sector credit, emerging Europe, 2004-07

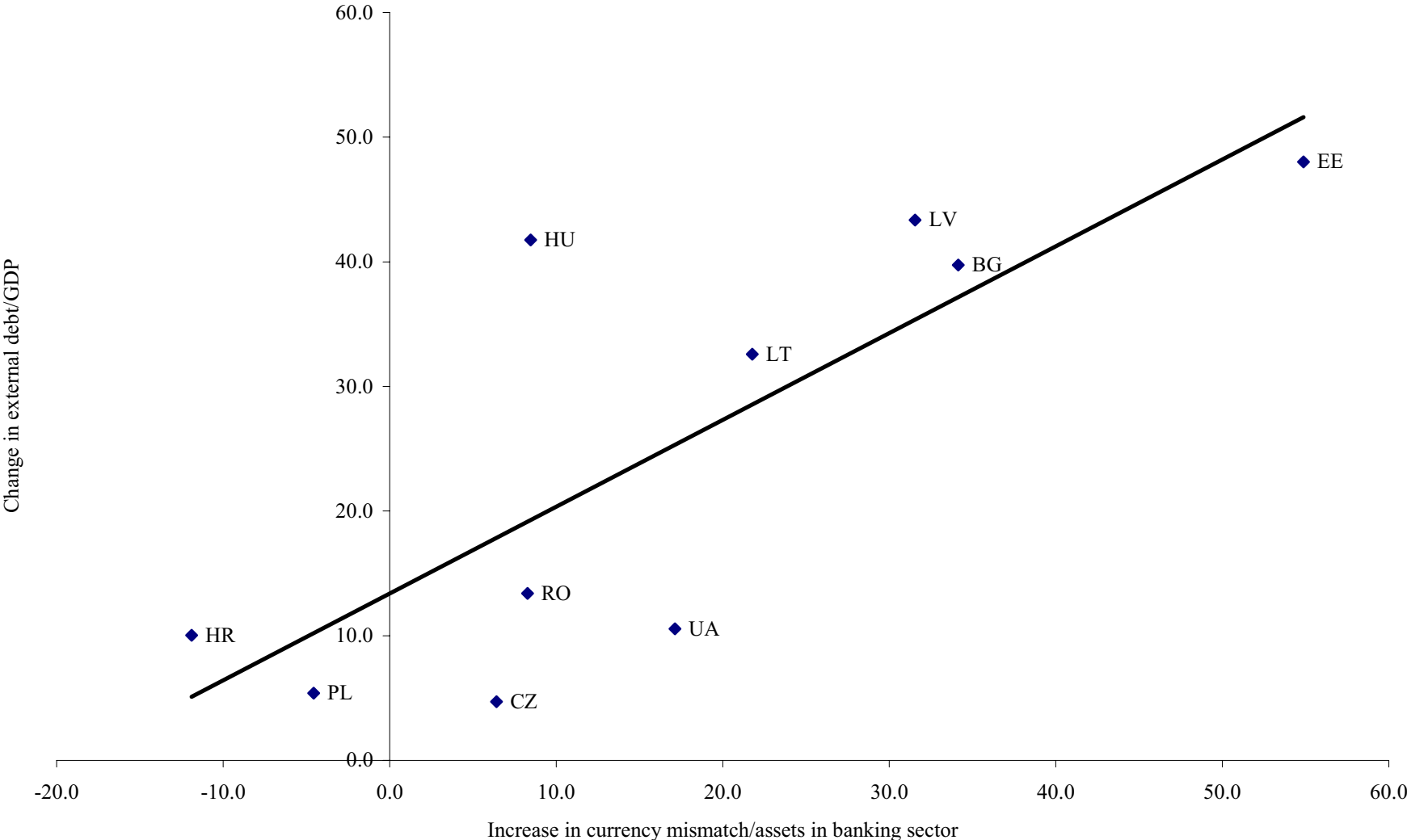# Currency mismatch and real GDP growth, emerging Europe, 2004-07

Currency mismatch and current account balance, emerging Europe, 2004-07

Currency mismatch and external debt, emerging Europe, 2004-07

Currency mismatch and growth during the crisis in emerging Europe

Real GDP growth, 2009

Increase in currency mismatch/assets in banking sector, 2004-07

Currency mismatch and current account reversal in emerging Europe

Change in current account balance/GDP, 2007-2010
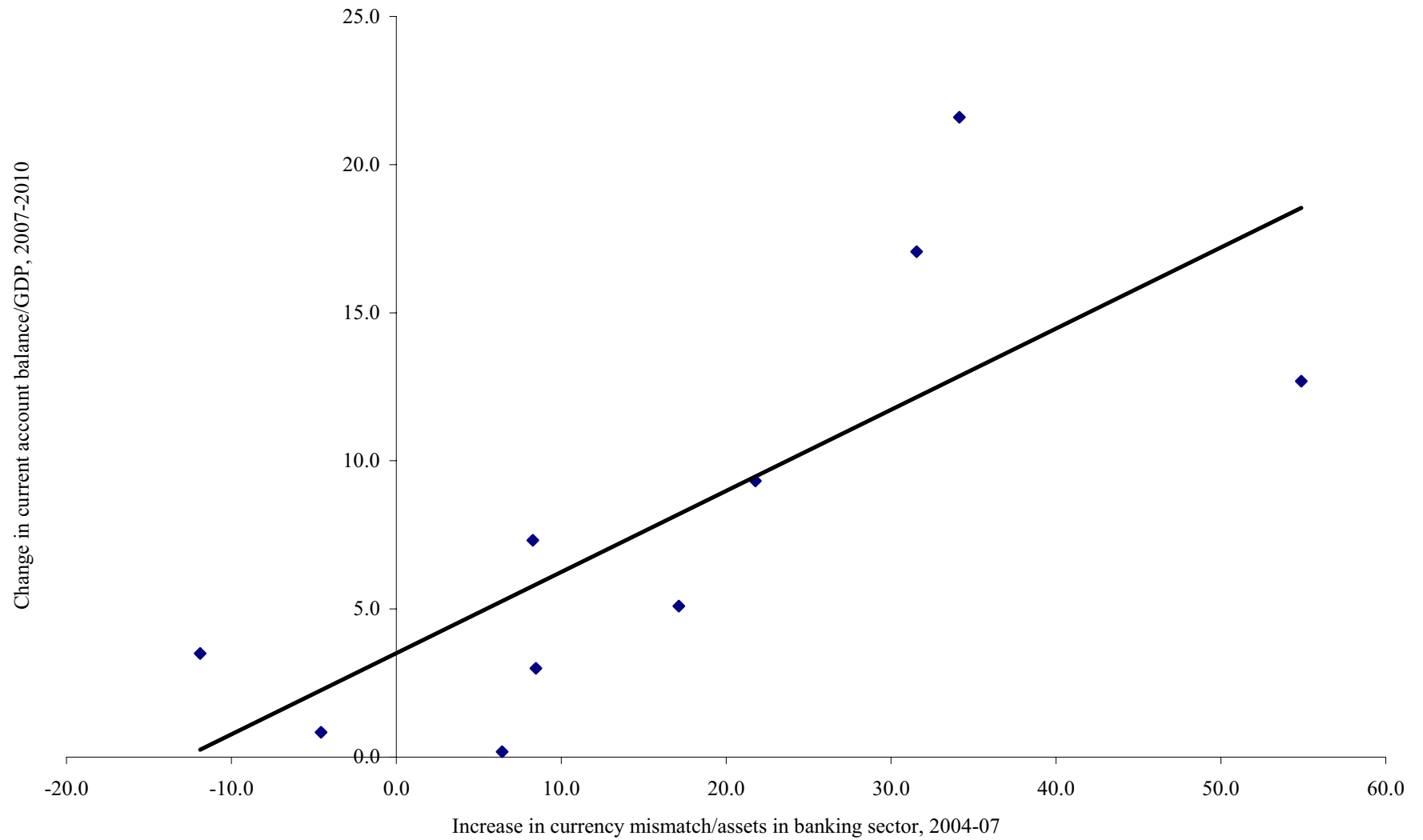
Increase in currency mismatch/assets in banking sector, 2004-07

Figure 1. Risky vs. safe growth paths for different realization of crisis risk
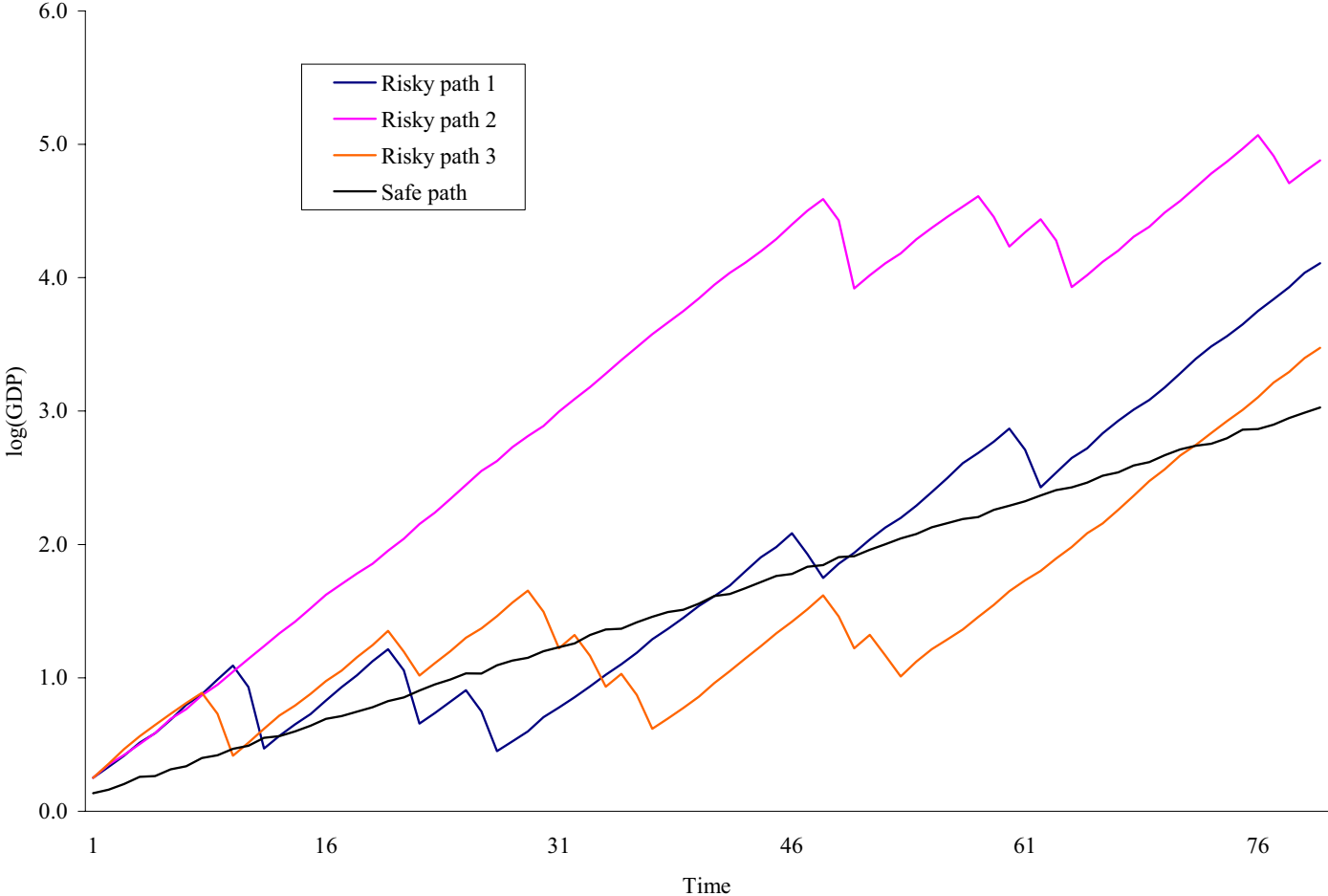
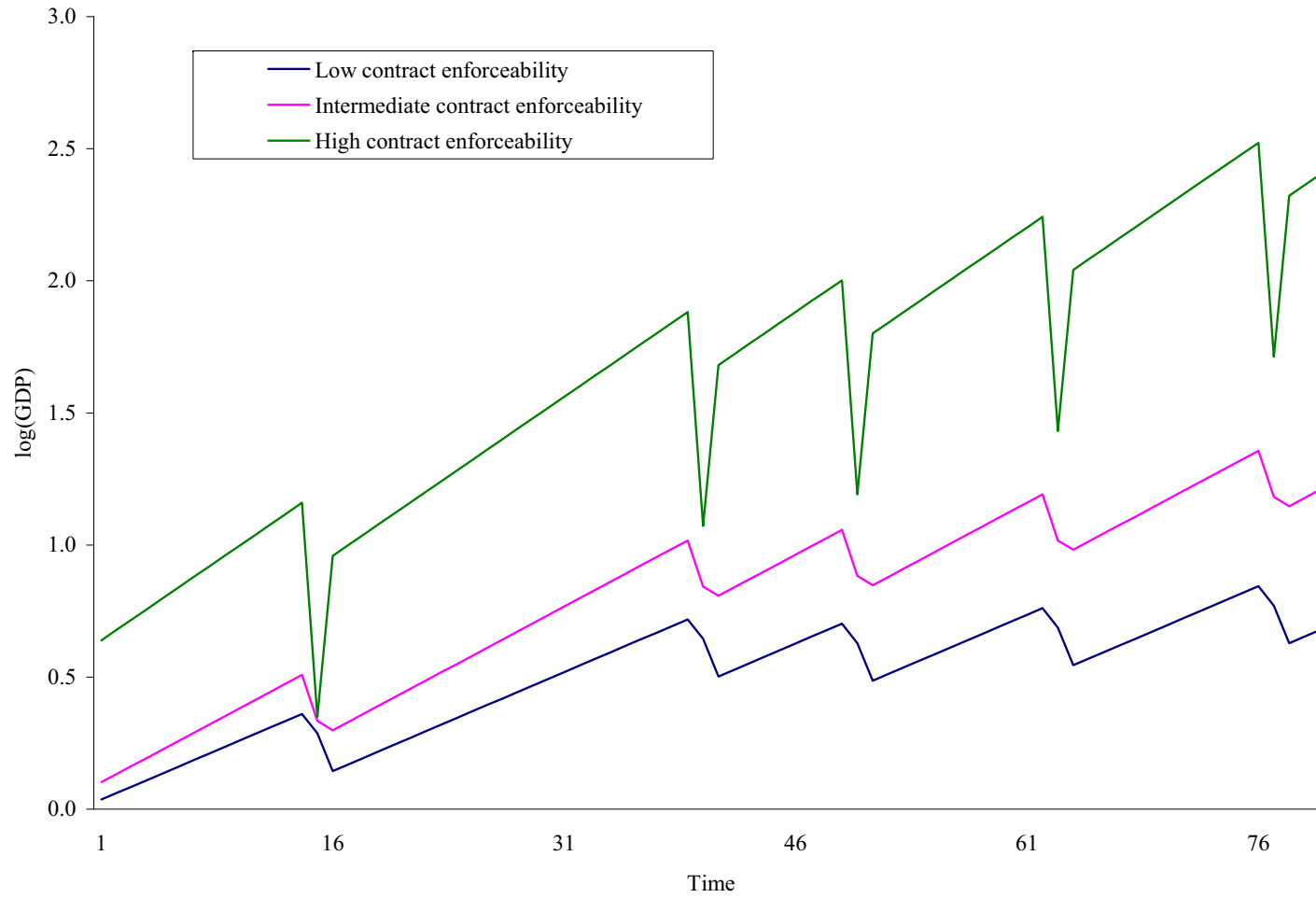Figure 2. Risky growth paths and contract enforceability

FIgure 3. Risky growth paths and the intensity of nontradables in the production of tradables