In Search of a Dramatic Equilibrium: Was the Armenian Dram Overvalued?

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Outline

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2. Why was dram devaluation necessary?
3. Equilibrium real exchange rate estimates
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4. New IMF Program for Armenia

- Stand-By Arrangement (SBA)
- Approved by IMF Board on March 6, 2009
- $540 million for 28 months
- First $240 mln was disbursed this week
- Remaining US$300 will be disbursed in 8 quarterly installments, subject to good performance
- Interest rate: first $270 mln at 1.56%, second $135 mln at 2.56%, third $135 mln at 3.56%
- Grace period: 3 years
- Maturity: 5 years

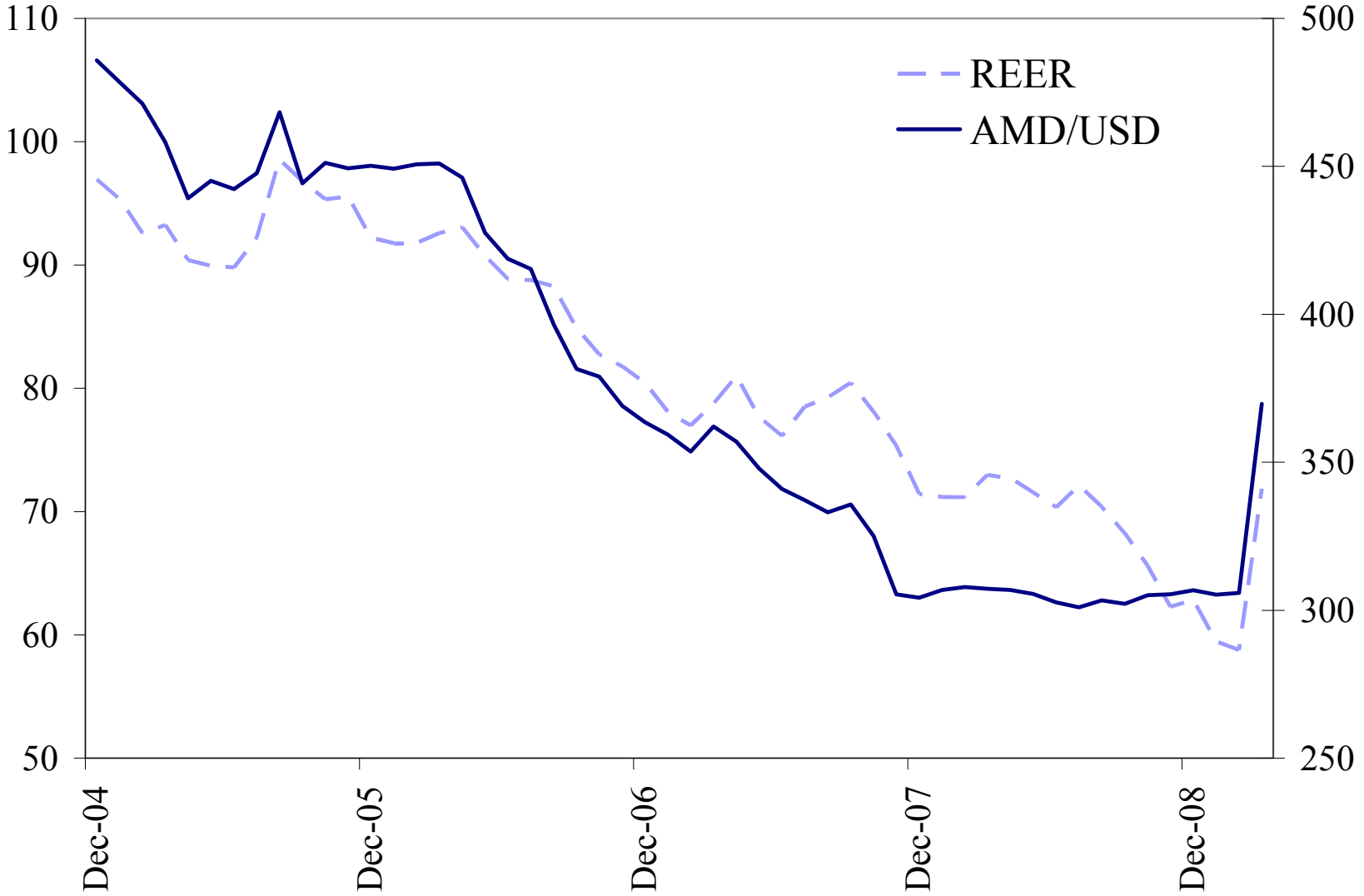
Main measures under the government's IMF program

- **Return to a flexible exchange rate regime**
- Strengthening the financial sector to maintain stability
- **Target a fiscal deficit of around 3 percent, while protecting social spending and public investment**
  - The program allows for an increase in social spending by 0.3 percent of GDP to protect the poor
  - If additional external financing becomes available, the program allows for a $200 mln increase in public investment and SME lending, bringing the deficit to around 5 percent
- **Continued reforms in tax administration:**
  - No more delays in VAT refunds during 2009
  - Interest payments on late VAT refunds from 2010
  - No more unnecessary advance tax payments

2. Why was dram devaluation necessary?

- Armenia's real effective exchange rate has appreciated rapidly in recent years
- During 2005-2007, real appreciation was accompanied by nominal appreciation.
- This appreciation was mostly the result of large foreign exchange inflows (notably remittances and FDI) as well as high export prices (notably for copper and molybdenum).
- During 2008, the Central Bank of Armenia (CBA) kept the nominal AMD/USD rate within a very tight band.
- To do this, the CBA had to increasingly sell large amounts of dollars, especially in the last few months, which led to a significant loss in CBA reserves.

Real and nominal exchange rate



2. Why was dram devaluation necessary?

- Because of the global financial crisis, there has been a significant reduction of foreign currency inflows into Armenia.
  - Export prices have fallen significantly (copper and molybdenum prices lost about 2/3 of their value), leading to lower export revenues for exporters.
  - Global demand for Armenian exports has fallen, meaning a further reduction in export revenues.
  - The Russian economy is experiencing serious problems, meaning a reduction in remittances and foreign direct investment
- In addition:
  - The USD appreciated significantly against most other currencies
  - Many of Armenia's trade partners (e.g., Russia, Ukraine, Georgia) had already devalued against the dollar.

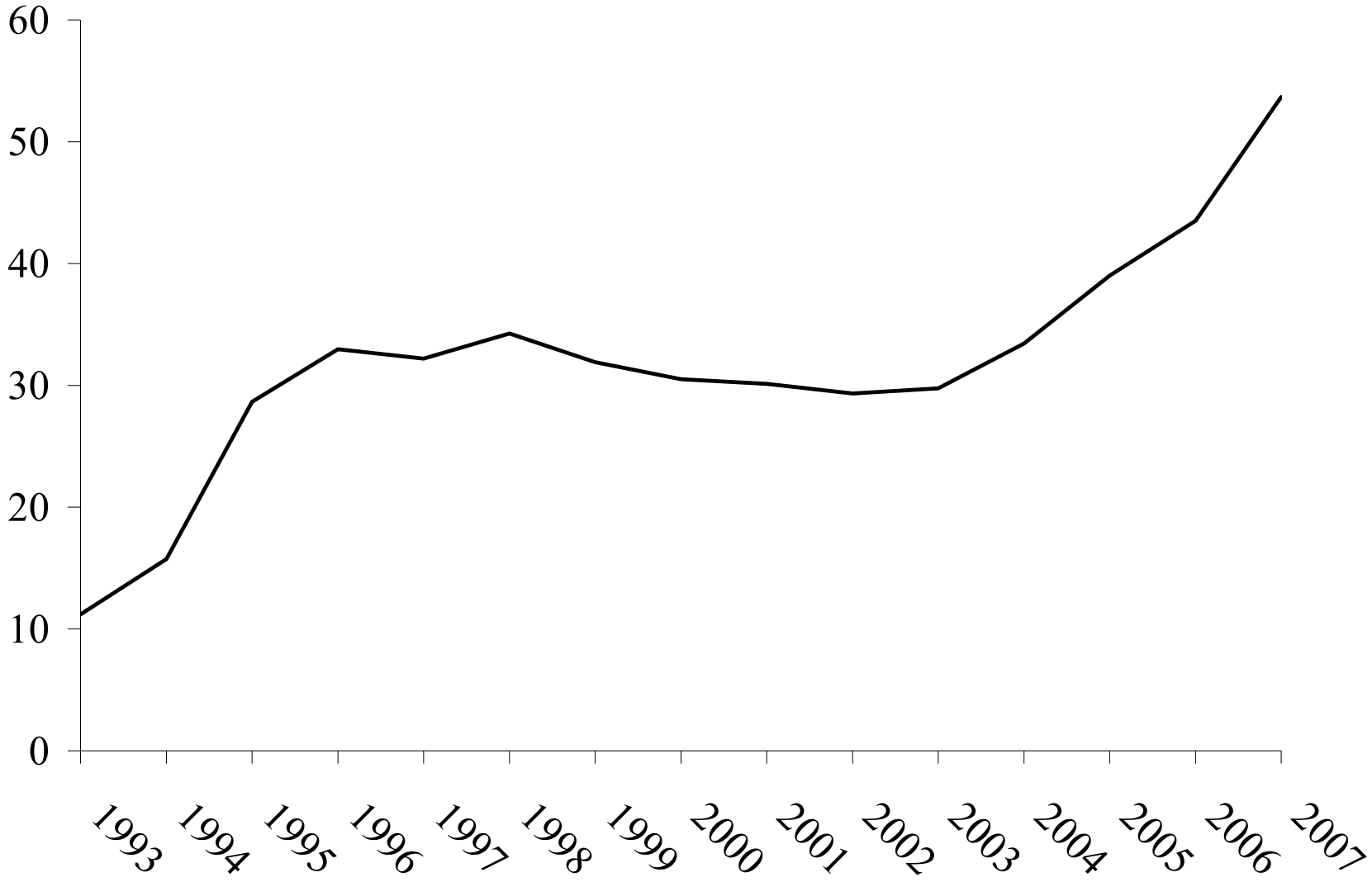
3. Equilibrium Exchange Rate Estimates

- We estimate the equilibrium real exchange rate by using 3 different approaches:
  - the purchasing power parity (PPP) approach
  - the behavioral equilibrium exchange rate (BEER) approach
  - the external sustainability (ES) approach
- All three approaches suggest that the dram was overvalued by about 20–30 percent prior to the devaluation of the dram in March 2009.
- Now that the dram has depreciated by about 20 percent, the dram should be back to equilibrium

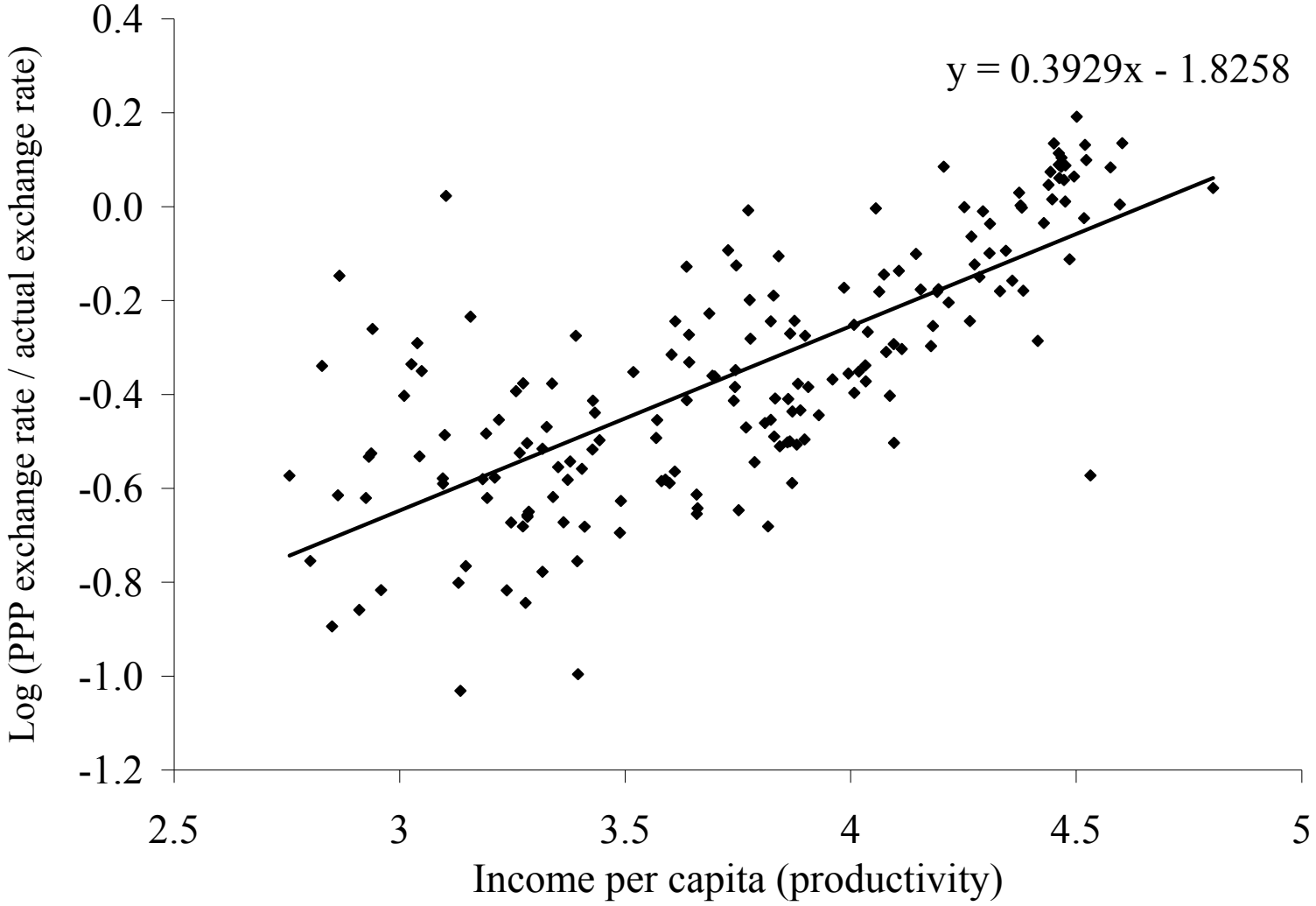
3 (a) Equilibrium real exchange rate: PPP approach

- PPP: prices of identical goods should be the same when expressed in the same currency.
- In practice, PPP does not hold for nontradables (e.g., haircuts)
- Balassa-Samuelson effect: Nontradables prices tend to be higher in countries with higher productivity (→higher wages→higher nontradables prices)
- As countries catch up with richer trade partners in terms of productivity, they also catch up in terms of nontradables prices, either through inflation or through nominal appreciation
- As prices get closer to PPP, the real exchange rate appreciates

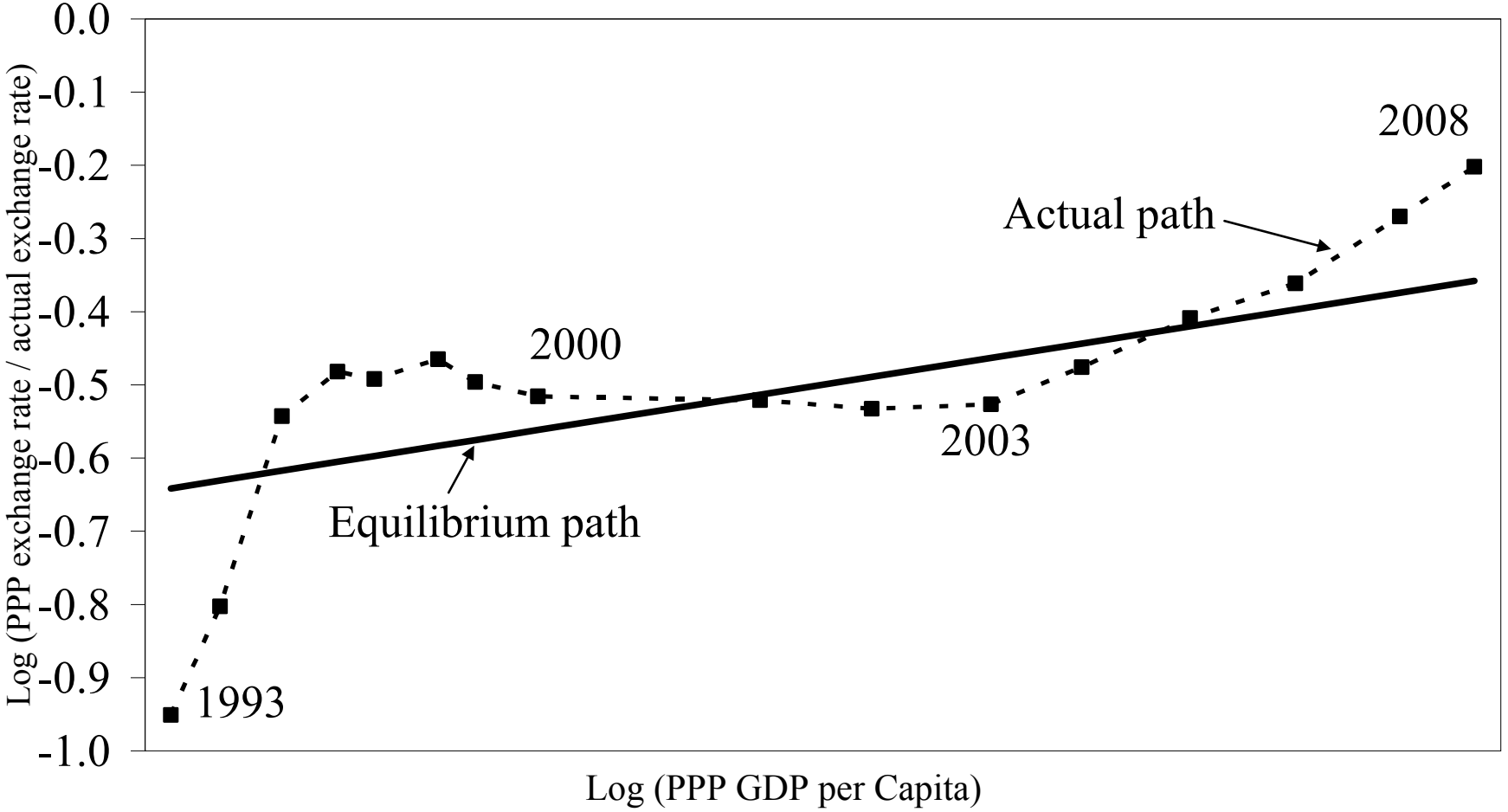
Armenian prices are about 2/3 of U.S. prices



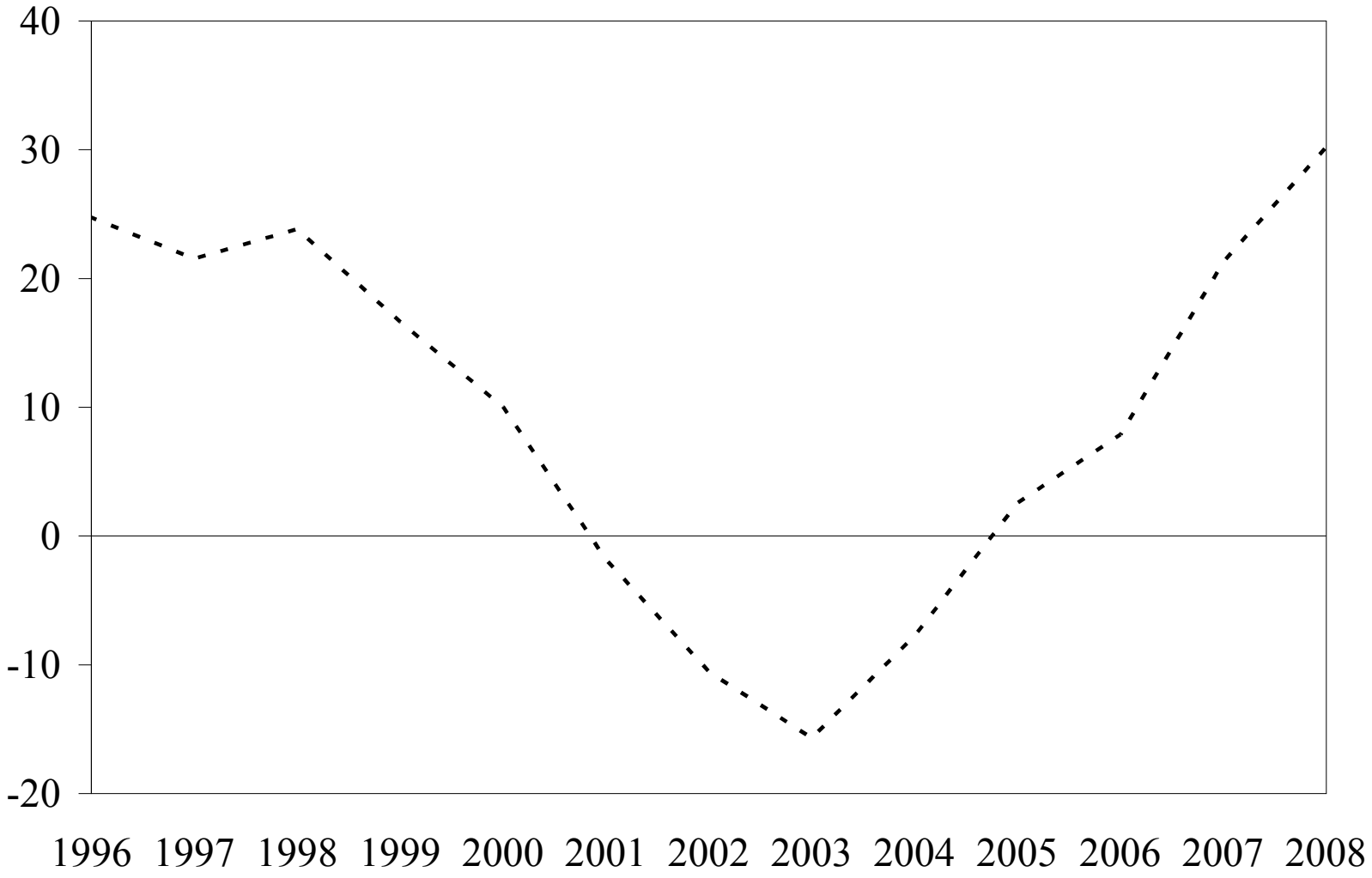
As productivity grows, actual XRs approach PPP XRs (real appreciation)



PPP approach: actual exchange rate appreciated faster than equilibrium exchange rate



PPP approach: 30% overvaluation in 2008



Drawbacks of PPP approach

- GDP per capita is a very rough proxy for the relative productivity differential variable suggested by Balassa-Samuelson.
- The estimated equilibrium relationship between the real exchange rate and productivity is based on a large cross-section of countries that may not necessarily be representative of Armenia.
- The estimated equilibrium relationship is a historical average for a large number of countries, which implicitly assumes that all exchange rates are on average in equilibrium.
- Does not correct for other equilibrium exchange rate determinants besides productivity.

3 (b) BEER Approach

- Estimates the statistical long-run relationship (cointegrating vector) between the real effective exchange rate (REER) and its long-term determinants.
- Includes multiple variables besides productivity
- Based on time-series data for Armenia alone
- Uses cointegration techniques

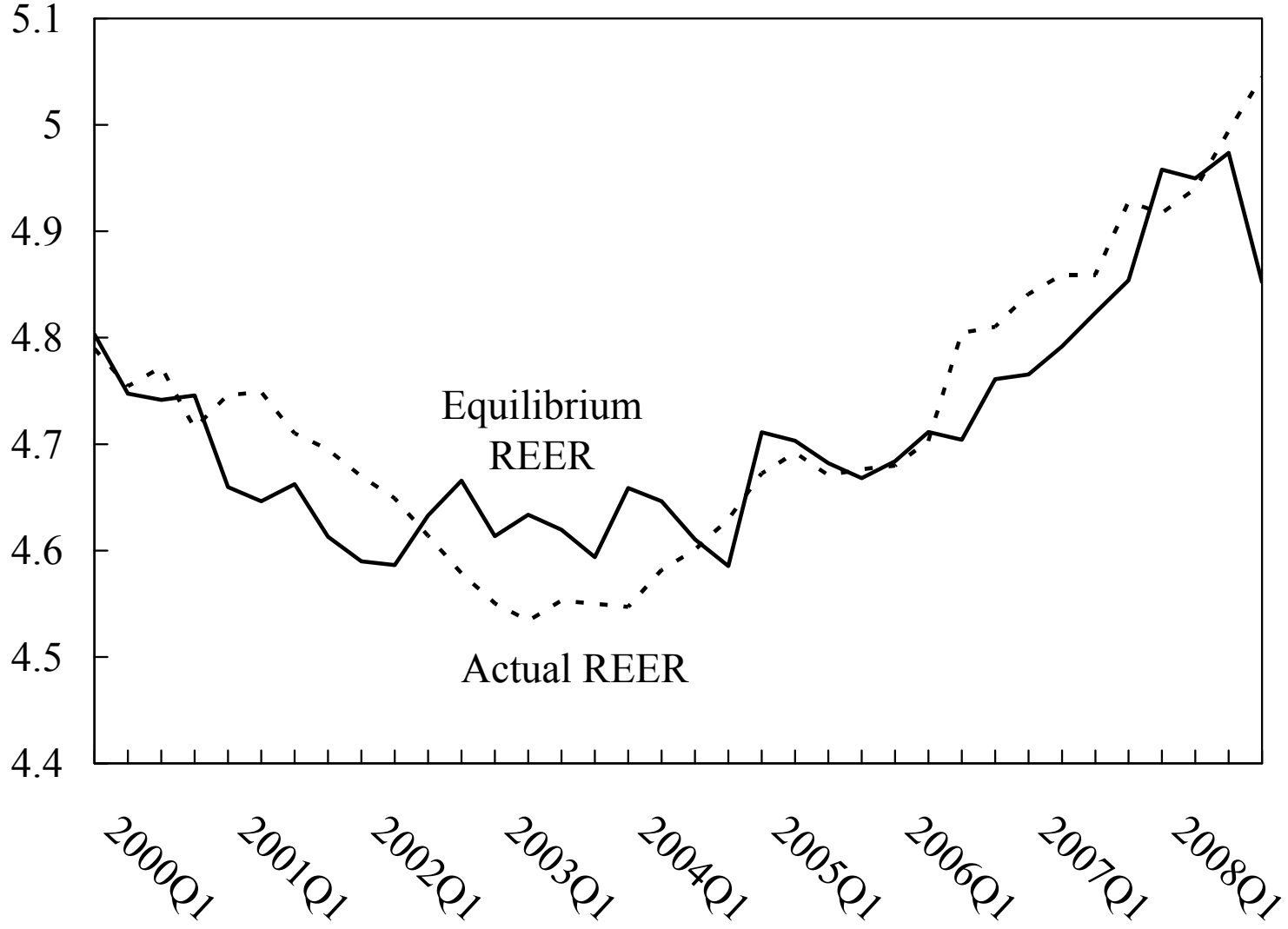
BEER determinants

- Terms of trade (+)
  - Export deflator divided by import deflator
- Remittances (+)
  - Compensation of employees, migrant's capital transfers, workers' remittances, and other private transfers.
- Net international reserves (NIR) (+)
  - Summary measure of net balance of payments inflows
- Relative productivity differential (+)
  - Relative productivity = productivity in the tradable sector minus productivity in the nontradable sector
  - Relative productivity differential = relative productivity in Armenia and relative productivity in the EU

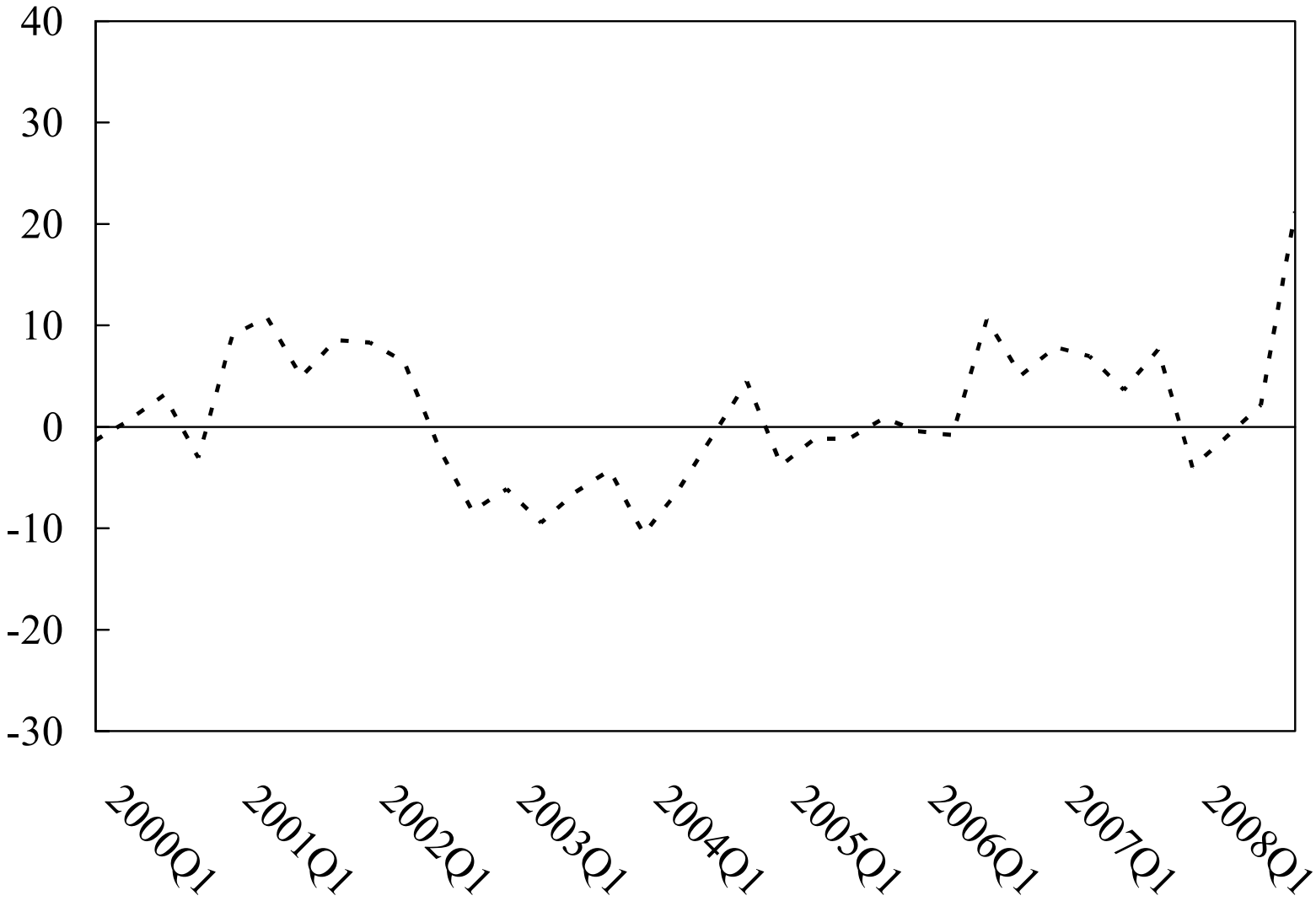
Estimated cointegrating vector

Terms of Trade	**0.09**
t-statistics	9.17
Remittances	**0.20**
t-statistics	20.25
Net International Reserves	**0.42**
t-statistics	49.82
Relative Productivity Differential	**0.07**
t-statistics	3.44
Trend	**-0.05**
t-statistics	-78.30
Constant	**1.86**

BEER results: Equilibrium REER depreciated in 2008Q4, while actual REER appreciated…



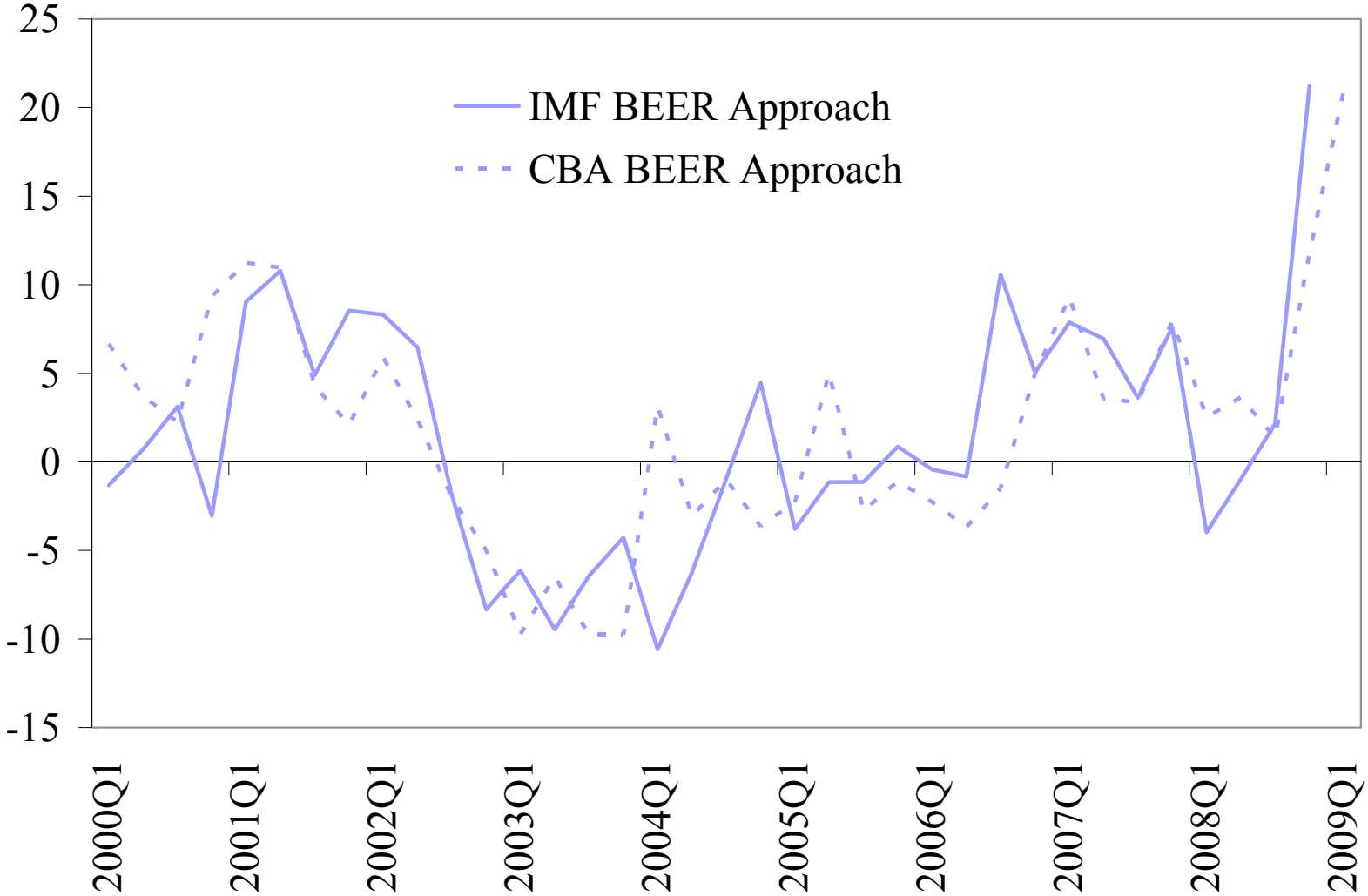
...implying about 20 percent overvaluation at the end of 2008



Drawbacks of BEER assessments

- Short sample (32 observations)
- Quarterly data are volatile and may not be appropriate for eq. exchange rate assessment
- No correction for structural breaks
- Cointegration techniques assume by definition that misalignment is zero on average during the sample period
- Difficult to get robust results: sensitivity to choice of variables, treatment of construction (as tradable or nontradable), and number of lags

Nevertheless, the CBA's BEER approach yields similar results



3 (c) External Sustainability (ES) Approach

- Focuses on relation between
  - sustainability of external stock position
  - current account balance (CA)
  - real effective exchange rate (REER)

- Three steps:
  - Determine the CA/GDP level that stabilizes the NFA position at a certain level
  - Compare this with the actual (or expected medium term) CA/GDP
  - Assess the adjustment in REER needed to close the gap

ES approach: theory

- Accumulation equation for NFA:

$$NFA_t - NFA_{t-1} = CA_t + KG_t + KT_t + E_t$$

- Denoting ratios to GDP by lower cases:

$$nfa_t - nfa_{t-1} = ca_t + kg_t + kt_t + e_t - \frac{g_t + \pi_t}{(1+g_t)(1+\pi_t)} nfa_{t-1}$$

- Assuming *kg* = *e* =*0*, the CA/GDP level that stabilizes NFA at nfa* is given by

$$ca^* = \frac{g + \pi}{(1+g)(1+\pi)} nfa^* - kt^*$$

Baseline scenario

- Inflation rate of net foreign assets: 2.5% (consistent with projected U.S. inflation)
- Armenia's long-term GDP growth rate: 3%
- NFA/GDP benchmark: -24.2 percent (2006)

Required Exchange Rate Adjustment

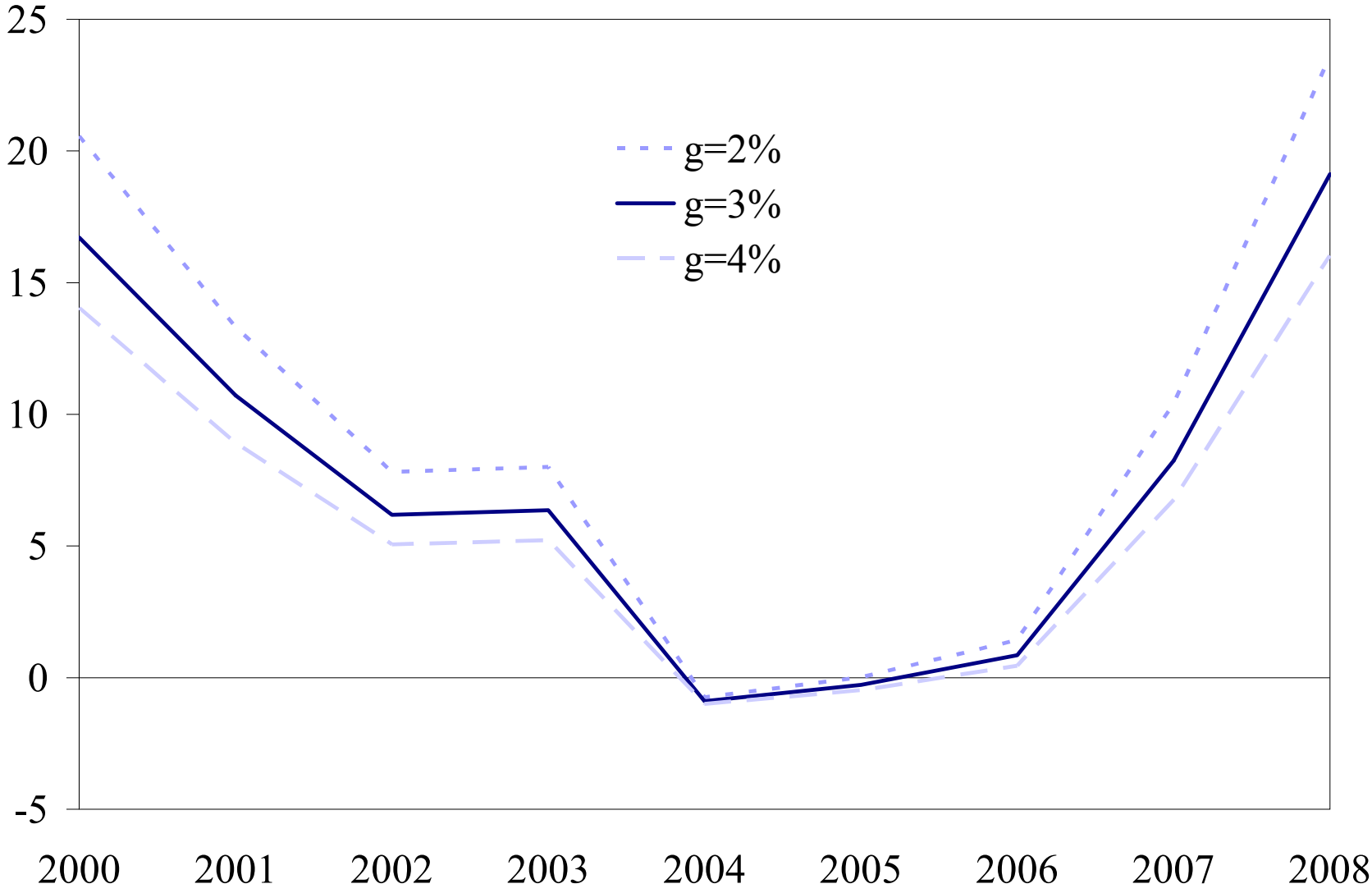
- Elasticity of the CA balance to the REER:

$$\varepsilon_{CA} = \varepsilon_X \frac{X}{GDP} + (\varepsilon_M - 1)\frac{M}{GDP}$$

- REER change needed

$$\varepsilon_{CA} = \frac{\Delta CA/CA}{\Delta RER/RER} \Rightarrow \frac{\Delta RER}{RER} = \frac{\Delta CA}{CA}\frac{1}{\varepsilon_{CA}}$$

ES Approach: estimated overvaluation



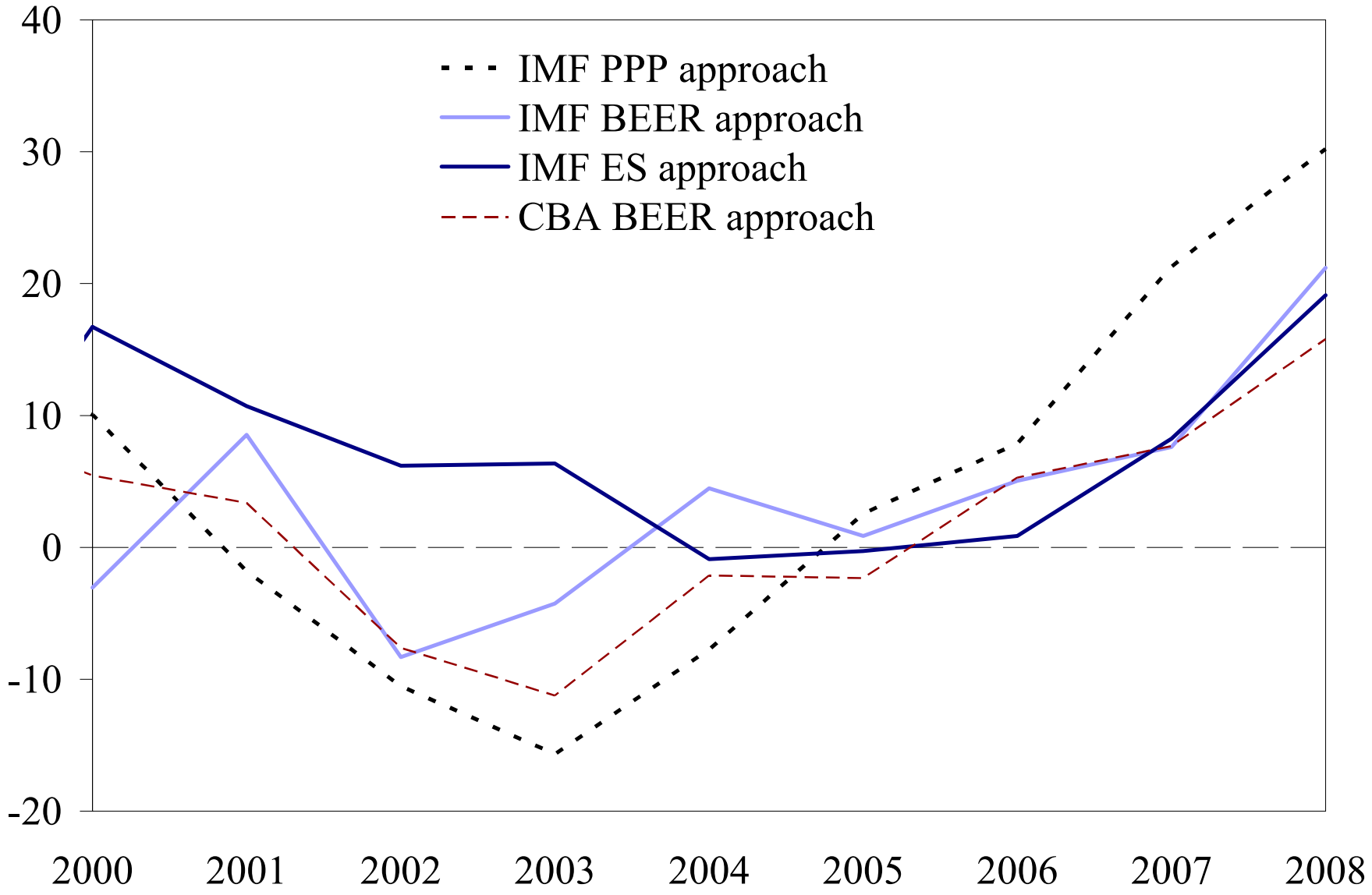
Drawbacks of ES Approach

- Subjective choice of parameters (*nfa*, π)*
- Some parameters (ε_x, ε_m) difficult to estimate
- Results are sensitive to parameter choices

4. Conclusions

- Each approach for assessing the equilibrium exchange rate has a number of shortcomings
- However, all three approaches indicate that the dram was overvalued by 20–30 percent prior to the devaluation of the dram in March 2009.

Summary of results



But devaluation is not sufficient

- Competitiveness in Armenia should be improved by implementing structural reforms aimed at
  - boosting productivity and innovation
  - increasing domestic competition
  - making tax and customs administration more transparent and fair
  - reducing corruption
  - improving the business environment more generally