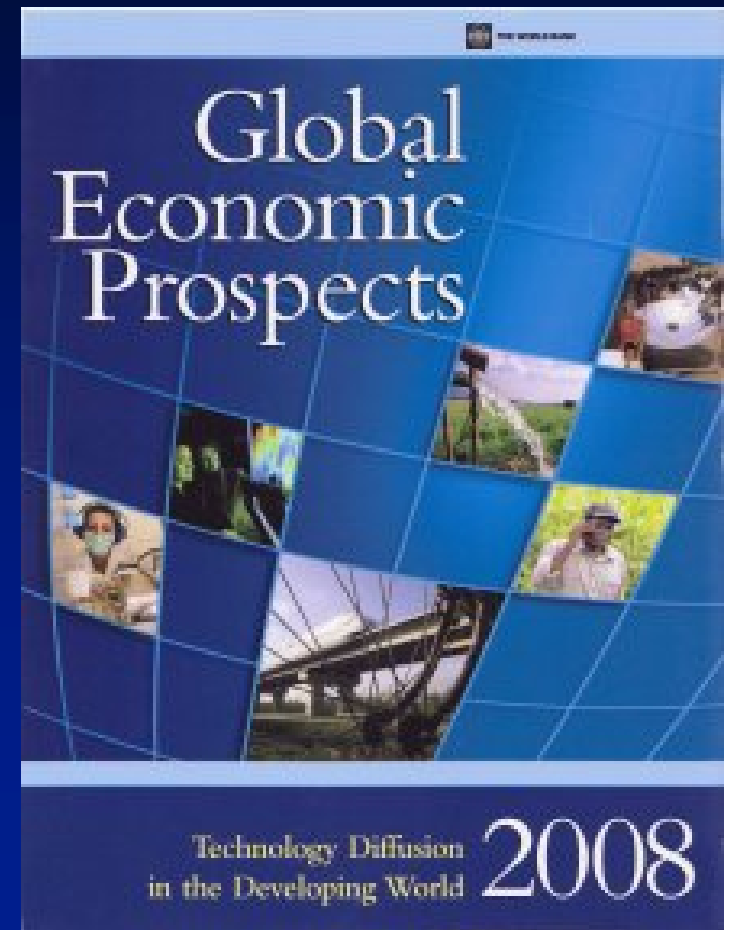


Technology diffusion in the developing world

Andrew Burns
Hans Timmer

World Bank
January, 2008



Prospects for developing countries

- U.S. sub-prime crisis has had limited effects on developing countries



Perceived riskiness of high-yield corporate bonds increased more than EM bonds

spreads, basis points



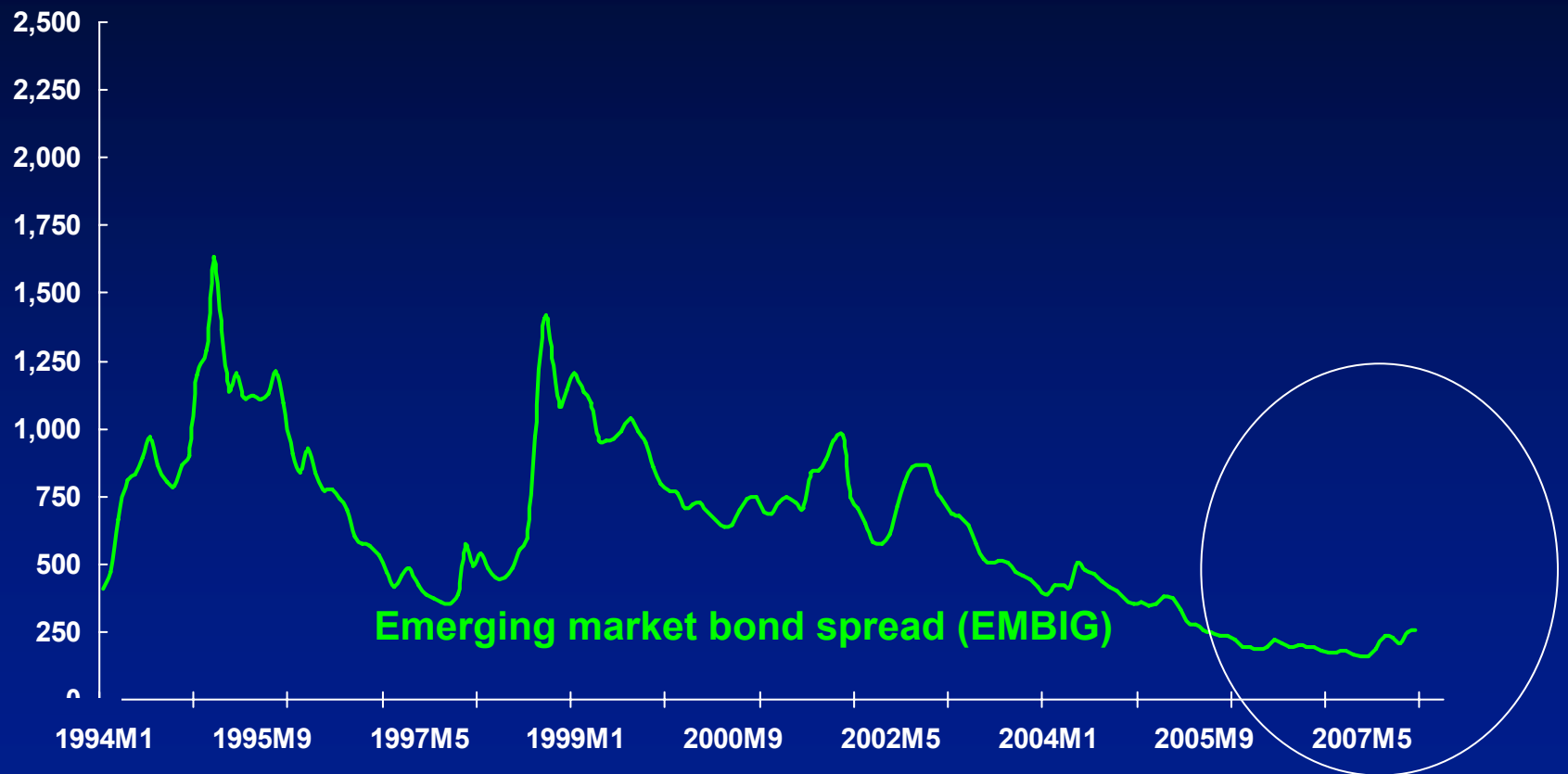
Source: Bloomberg, JPMorgan-Chase.



DEVELOPMENT PROSPECTS

...but in historical perspective
the present widening of spreads is modest

Bond spreads (basis points)



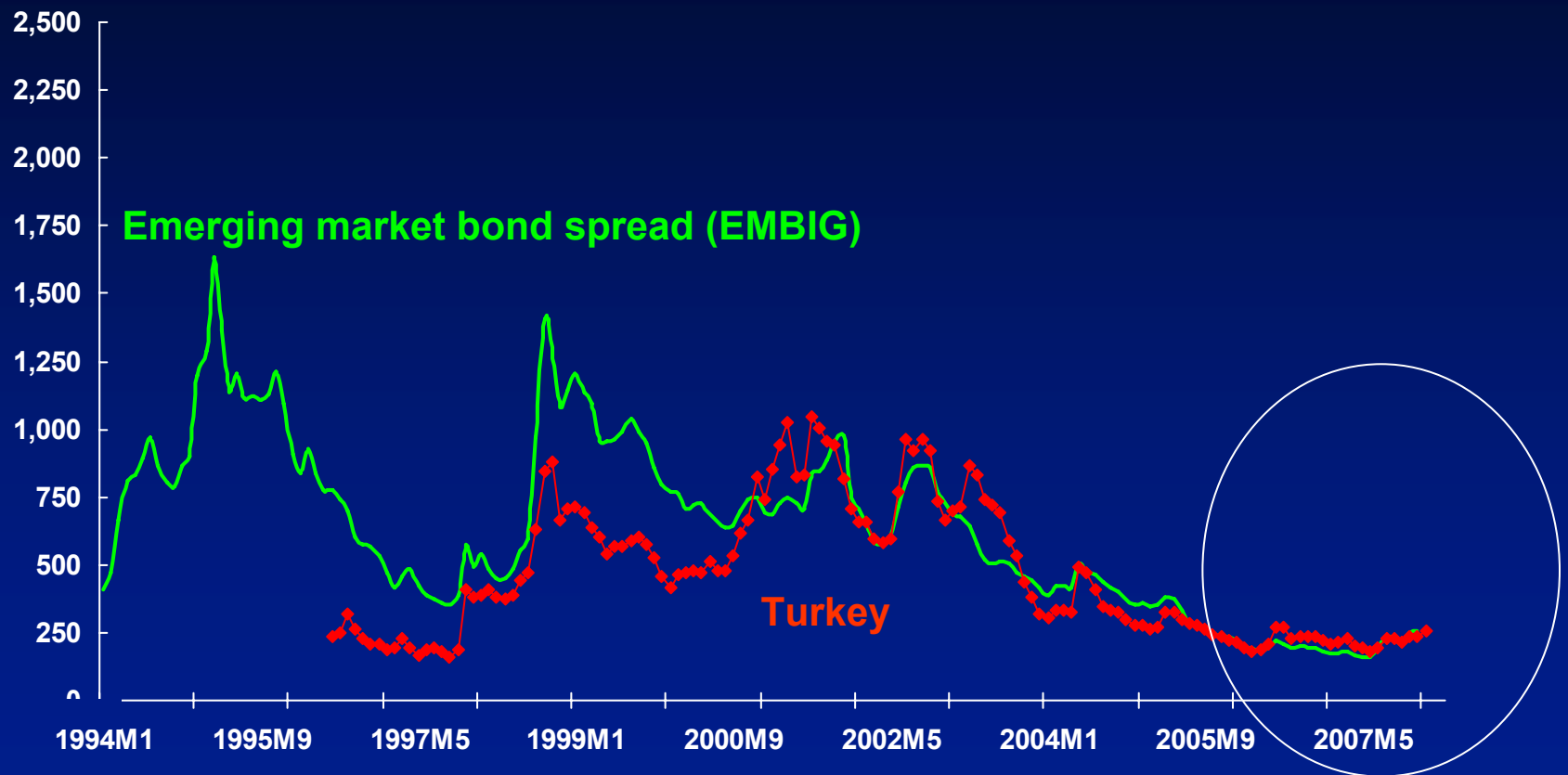
Source: JPMorgan.



DEVELOPMENT PROSPECTS

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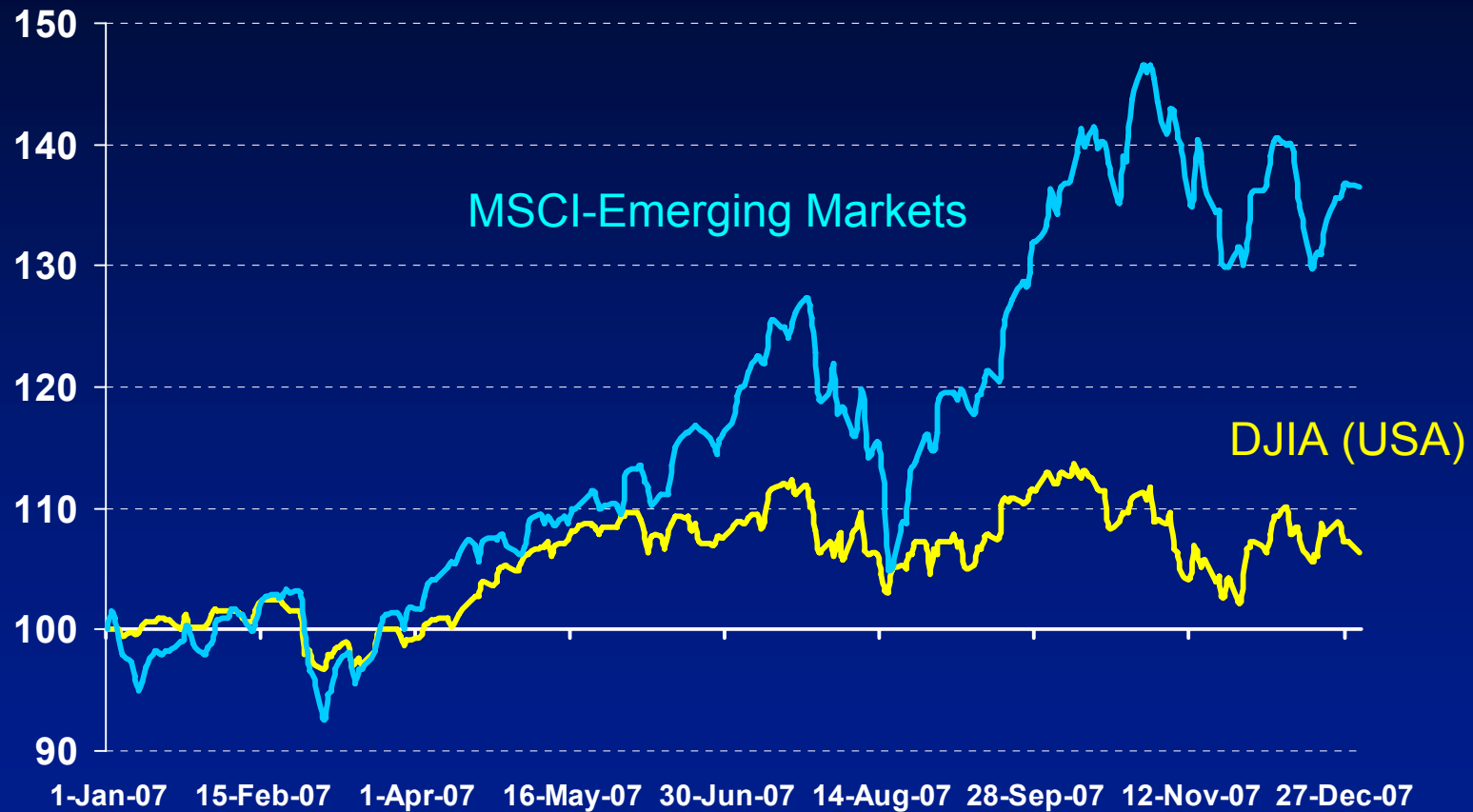
Source: JPMorgan.



DEVELOPMENT PROSPECTS

Emerging equity markets fell sharply but more-than recouped earlier losses...

equity market indices (USD): Jan-07 =100



Source: Morgan-Stanley, Thomson/Datastream.



DEVELOPMENT PROSPECTS

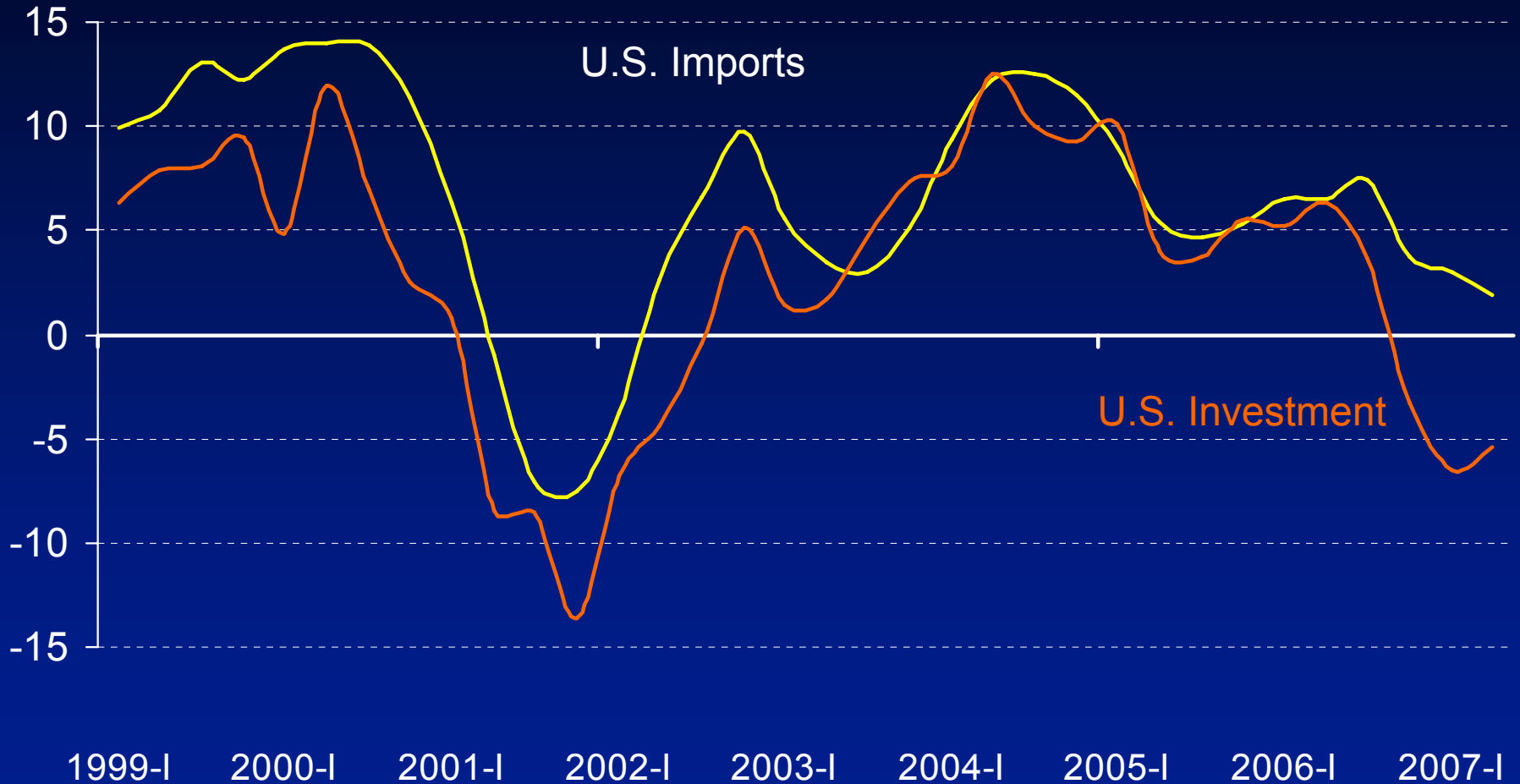
Prospects for developing countries

- U.S. sub-prime crisis has had limited effects on developing countries
- Resilience among developing economies mitigates the U.S. slowdown and helps adjust global imbalances



Weakening of U.S. domestic demand started well before financial turmoil

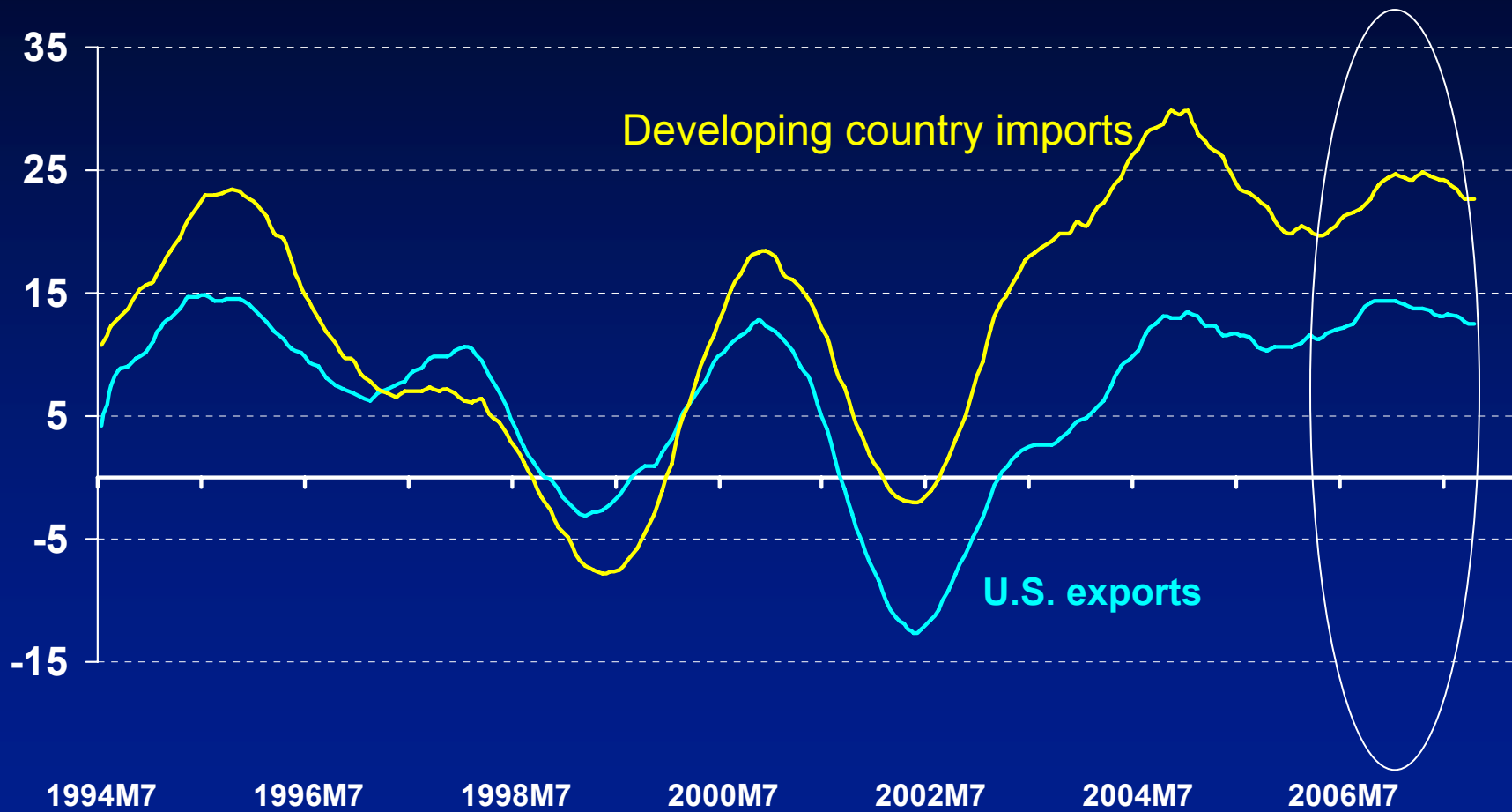
growth of investment and imports, 4-quarter moving average



Source: World Bank.

...with import demand from the developing world a support U.S. exports

nominal growth in US\$, 12m/12m ch%



Source: World Bank.

Gradual reductions in U.S. current account deficit likely to continue

U.S. current account balance, % of GDP



Source: U.S. Department of Commerce.



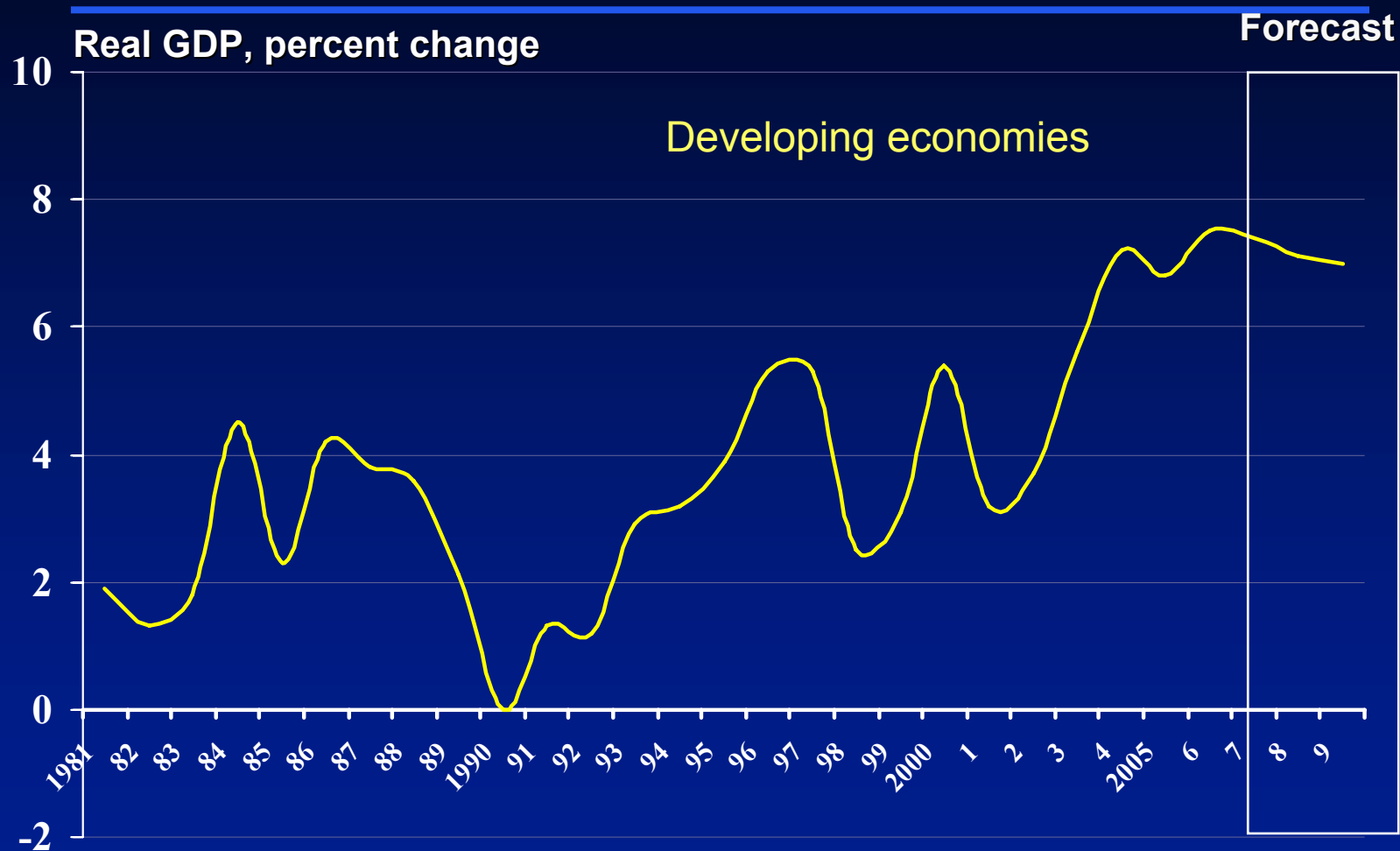
DEVELOPMENT PROSPECTS

Prospects for developing countries

- U.S. sub-prime crisis has had limited effects on developing countries
- Resilience among developing economies mitigates the U.S. slowdown and helps adjust global imbalances
- Growth in developing economies is expected to slow only modestly over the coming 2 years



Strong growth in developing countries

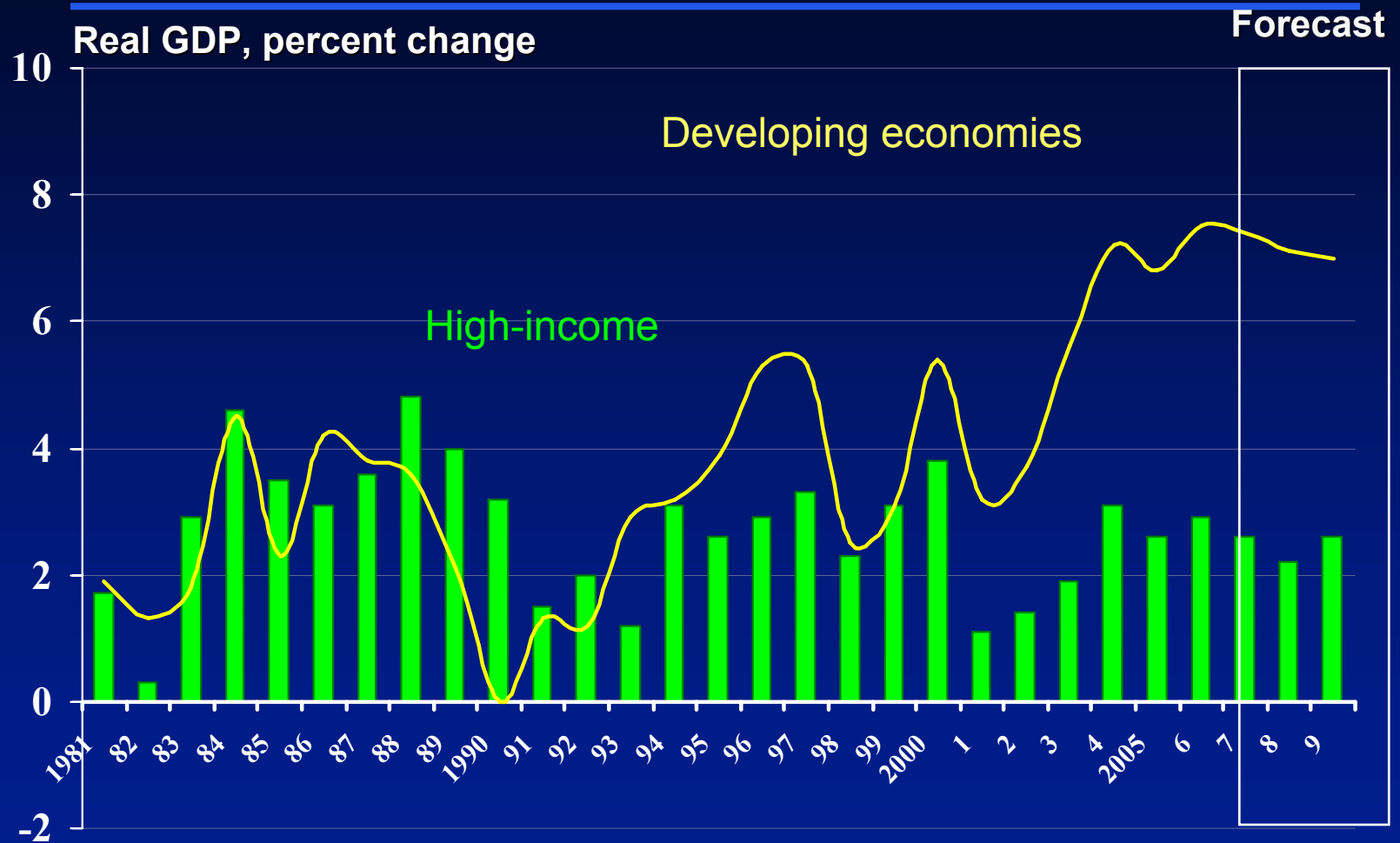


Source: World Bank.



DEVELOPMENT PROSPECTS

Strong growth in developing countries

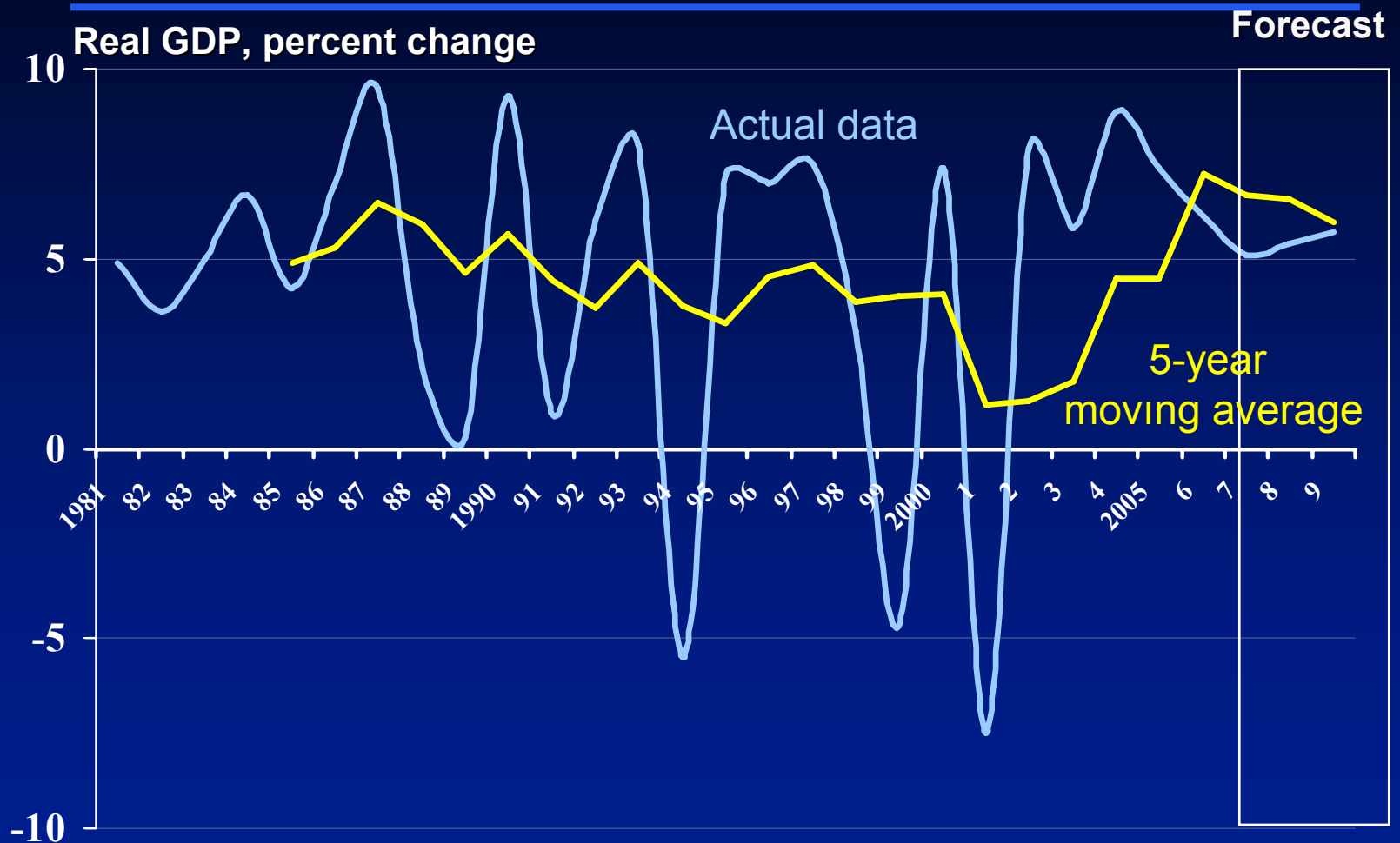


Source: World Bank.



DEVELOPMENT PROSPECTS

In Turkey stability is needed



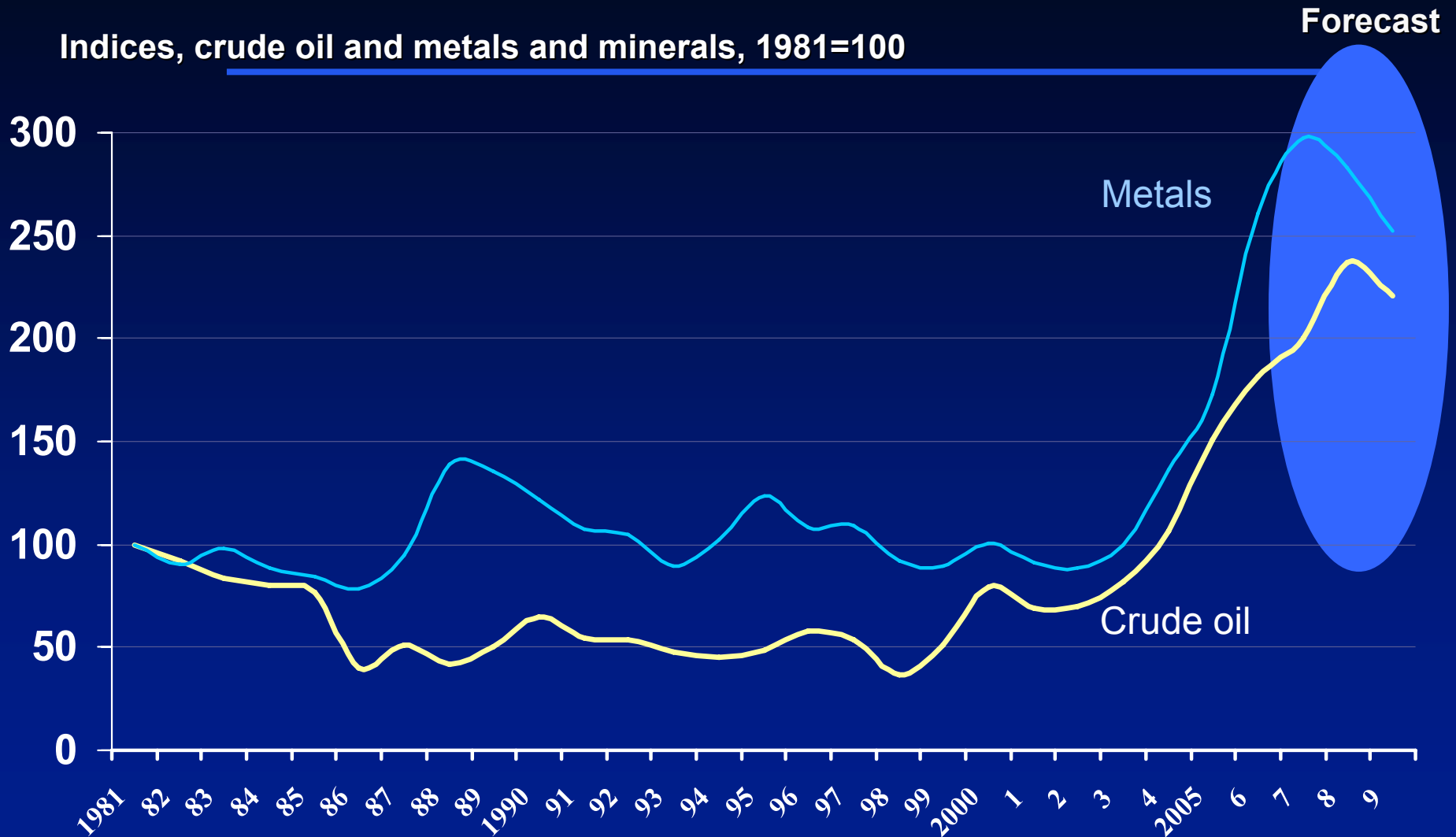
Source: World Bank.



DEVELOPMENT PROSPECTS

Commodity prices ease in tandem with demand growth in developing countries

Indices, crude oil and metals and minerals, 1981=100

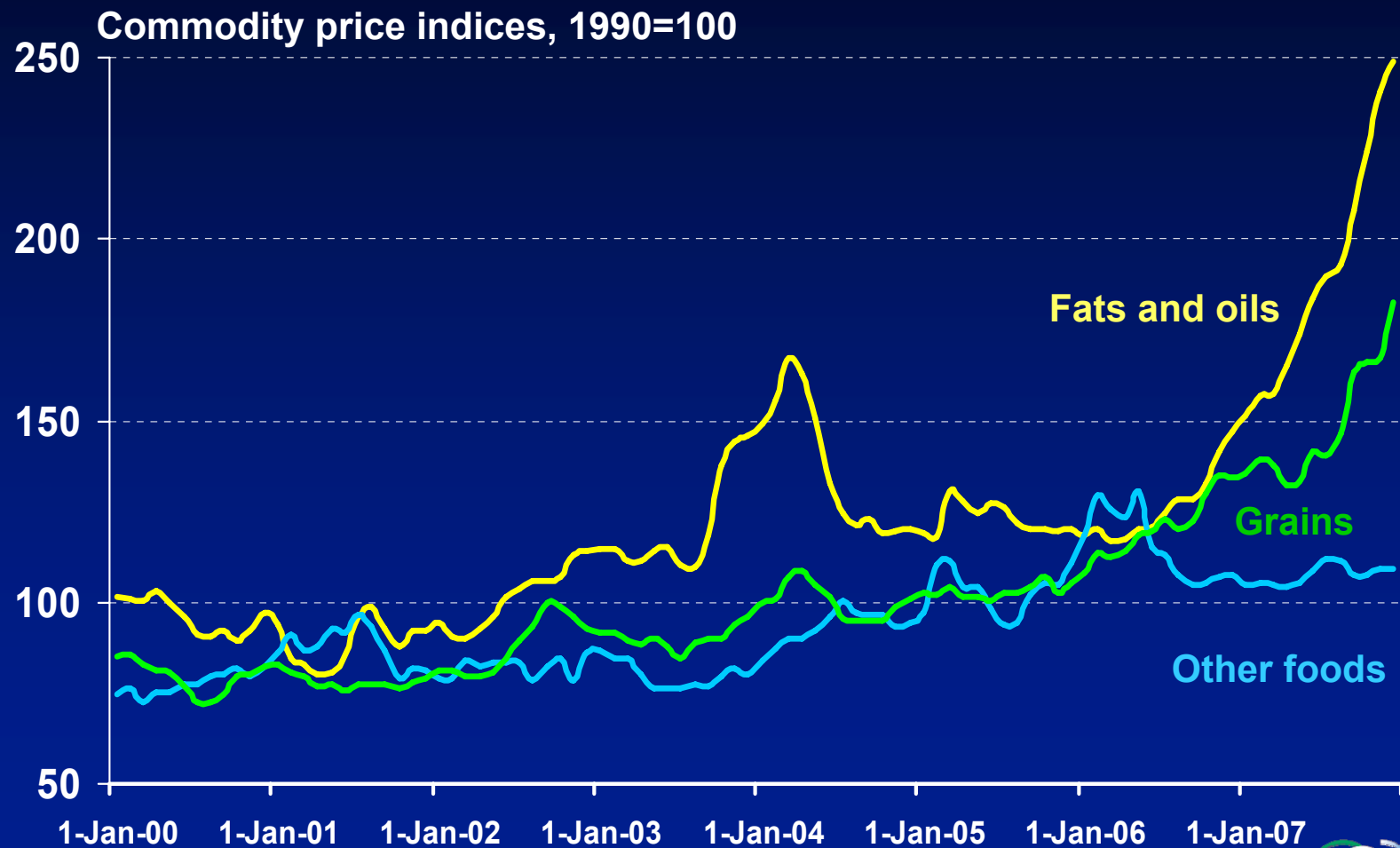


Source: World Bank.



DEVELOPMENT PROSPECTS

Food prices increased sharply in recent months



Source: DECPG Commodities Team.



DEVELOPMENT PROSPECTS

Two main risks for developing countries

- Worsening of the credit crunch and U.S. recession would affect developing countries quite adversely
- Lower global interest rates and increasing liquidity can create new bubbles and escalation in inflation pressures



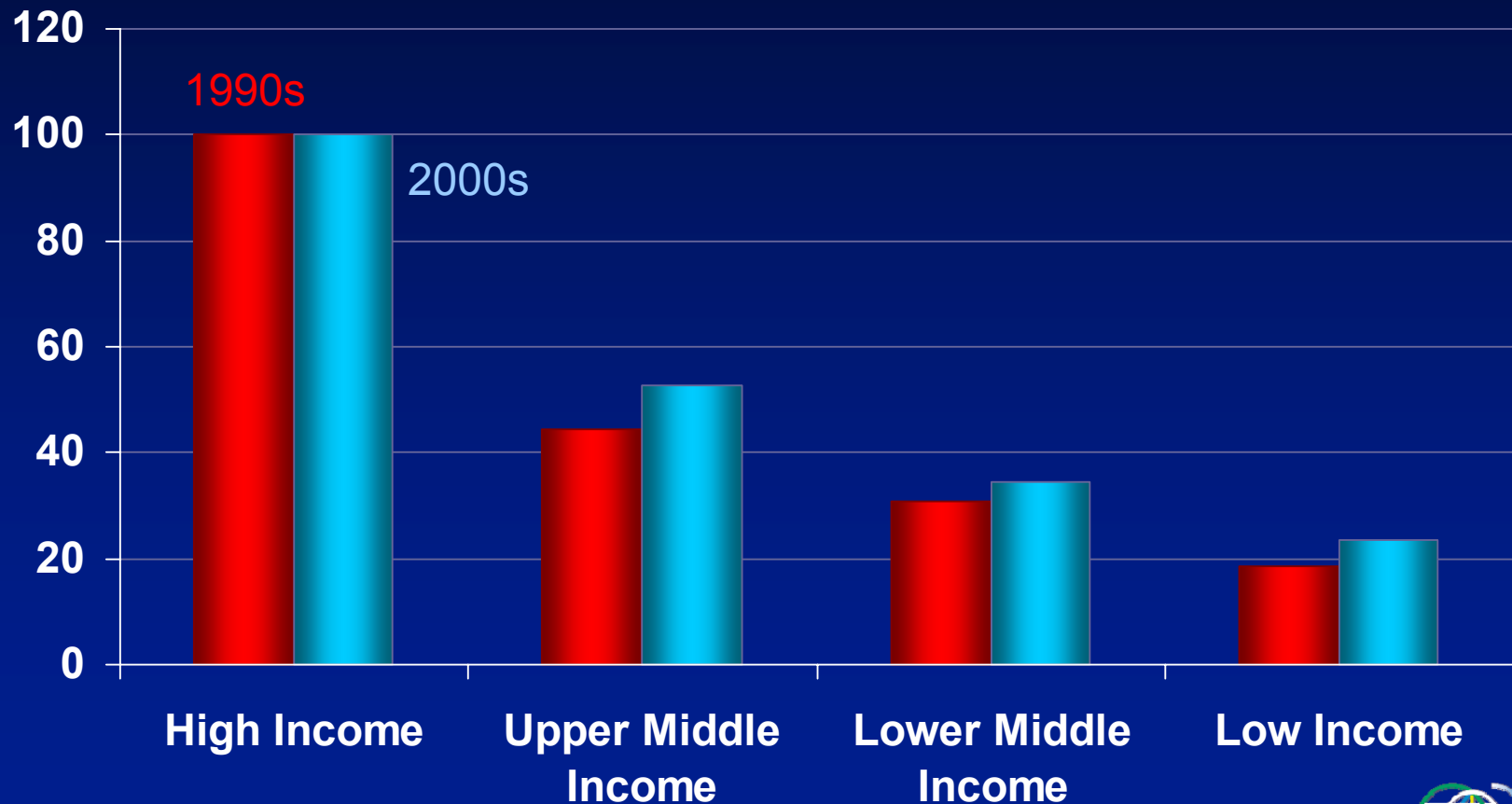
Technology diffusion in the developing world

- The technology gap between rich and poor countries has narrowed -- but remains large
- Progress in developing countries reflects the absorption of pre-existing technologies – not at-the-frontier inventions
- Globalization has been a main driver of technological progress
- Technology diffusion across countries has picked up, but diffusion within countries remains slow and penetration rates uneven
- Persistent weakness in technological absorptive capacity may constrain further technological progress



Technology gap: narrowing but still wide

Index of technological achievement



Source: World Bank, Global Economic Prospects (2008)



DEVELOPMENT PROSPECTS

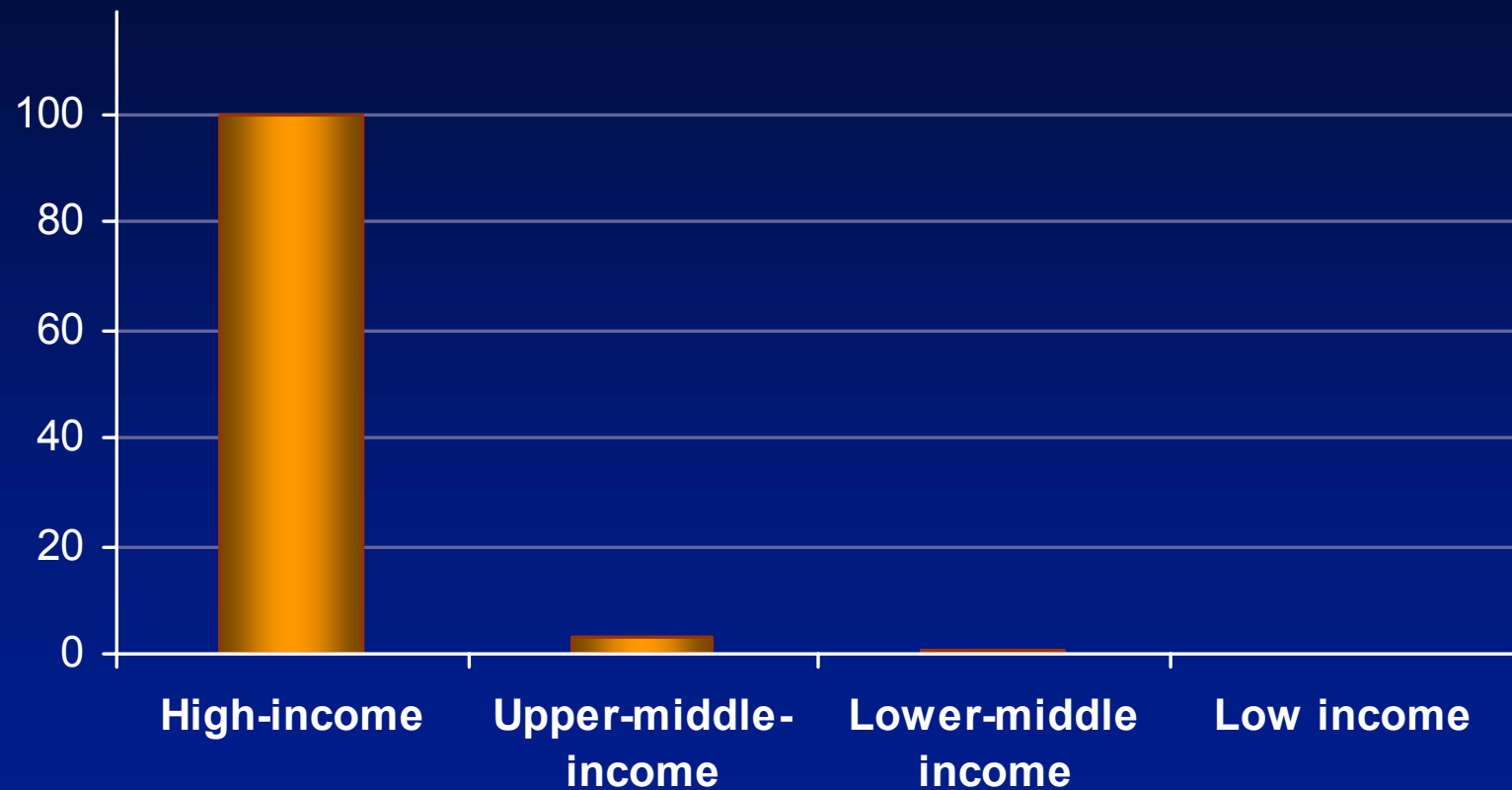
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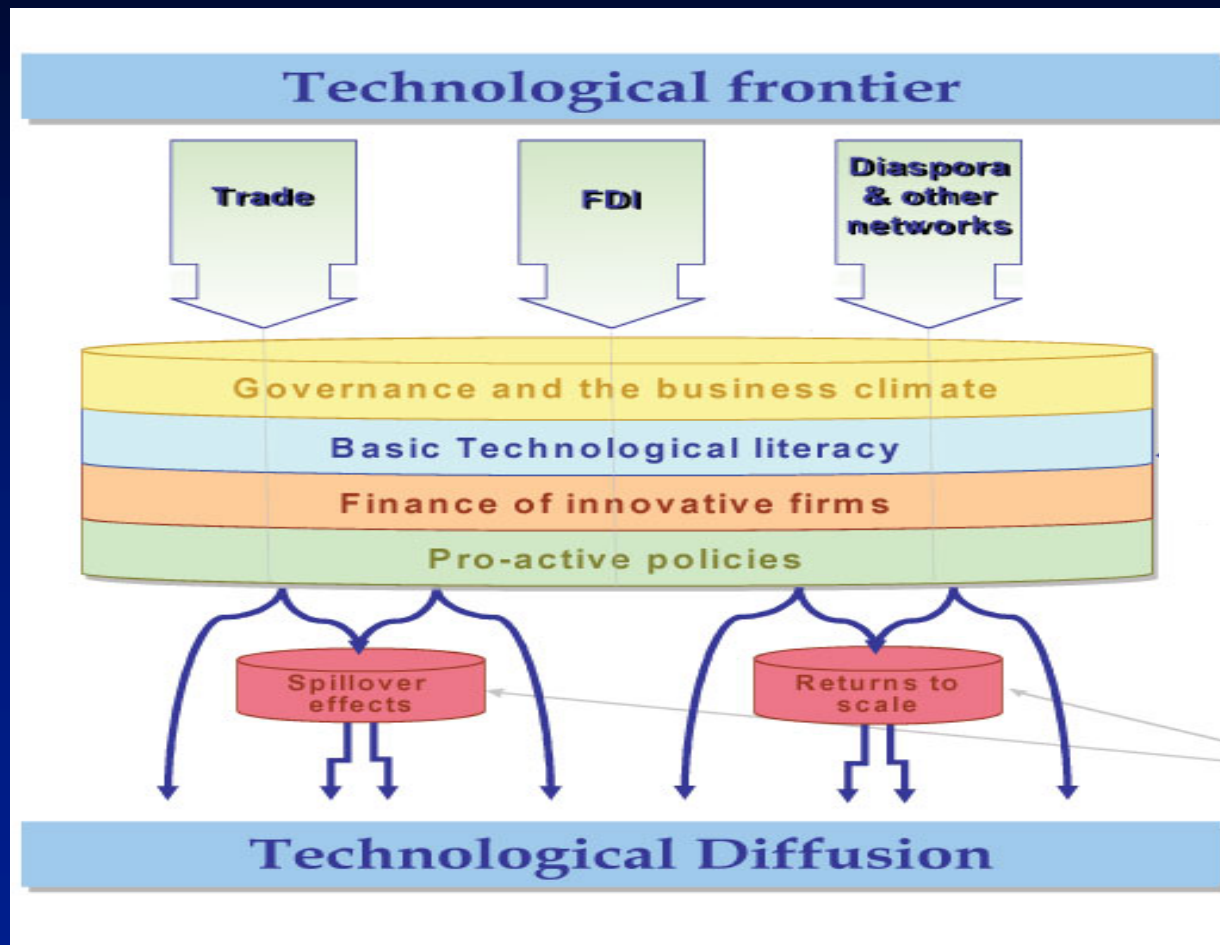
Developing countries are scarcely active at the global technology frontier

Intensity of scientific innovation and invention, High-income countries=100



Source: World Bank, Global Economic Prospects (2008)

Technology diffusion depends on exposure to foreign technology and absorptive capacity



Source: World Bank, Global Economic Prospects (2008)

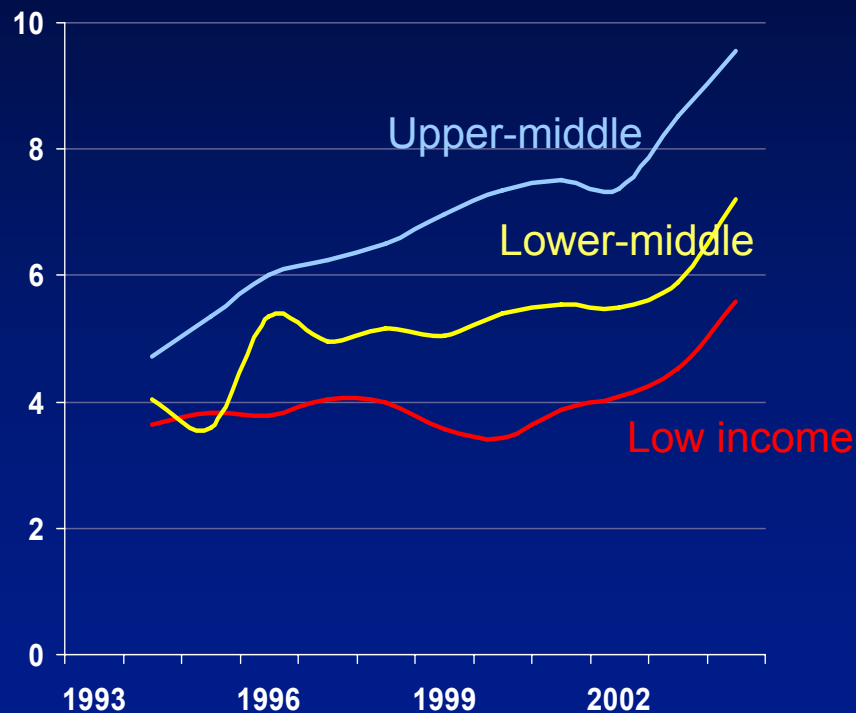
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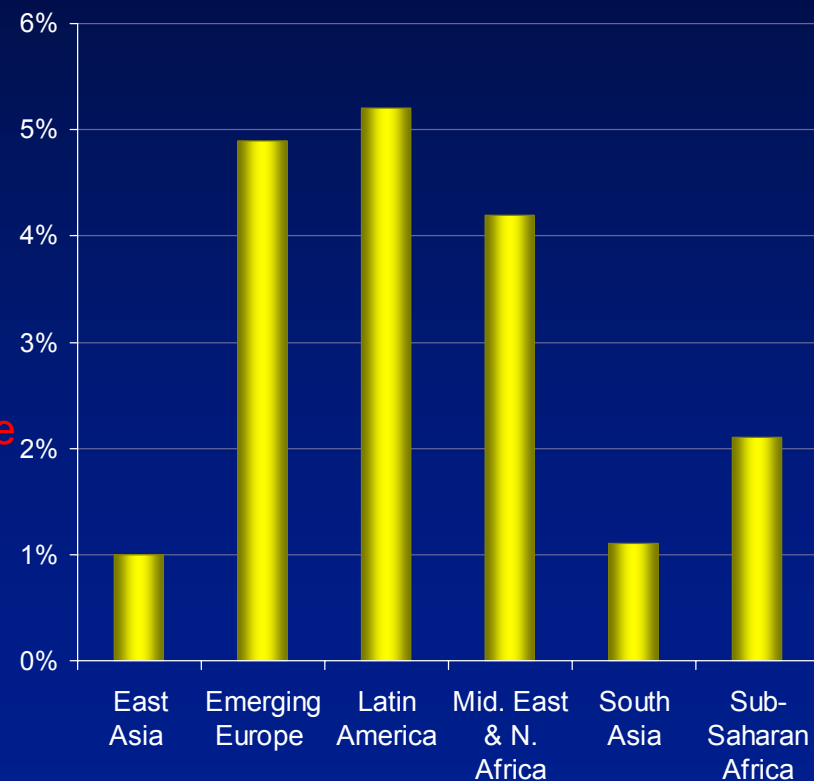


Market openness and contact with the diaspora stimulate technology transfer

High-tech Imports (% of GDP)



Size of diaspora (% of origin-country population)



Source: CEPII, BACI database; World Development Indicators



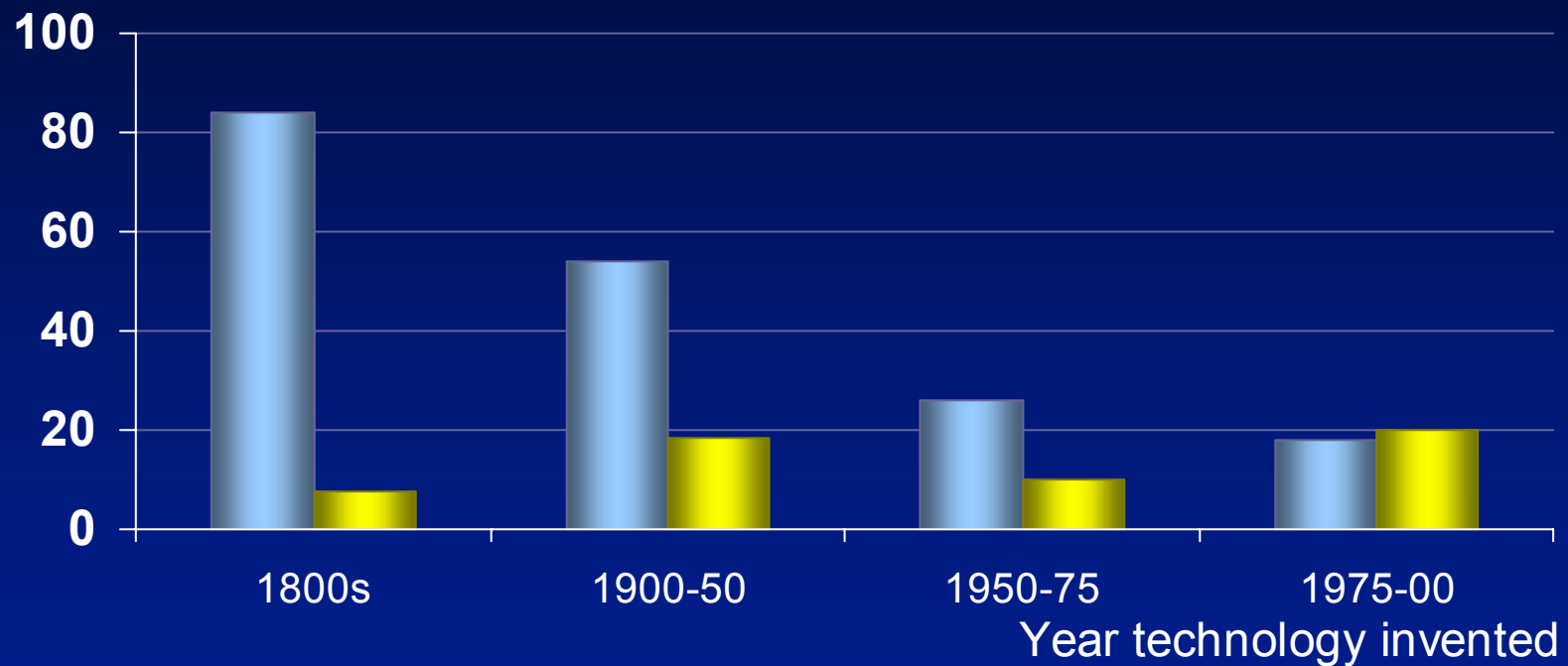
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Diffusion across countries has accelerated but penetration within countries remains weak

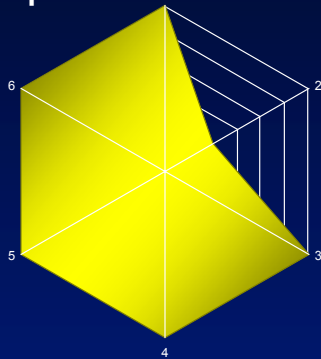


- Years for technology to reach country
- Percent of countries to reach 25% penetration threshold

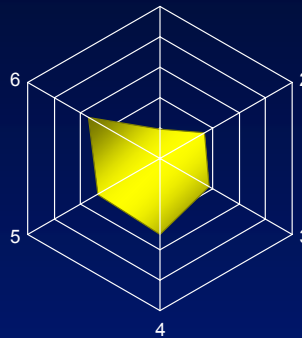


Intensity of use of some technologies in selected developing regions (early 2000s)

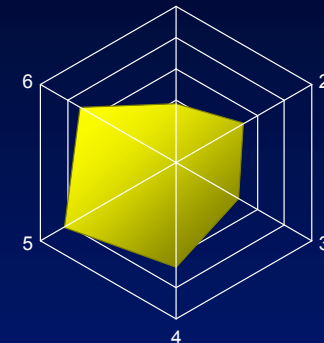
Europe & Central Asia



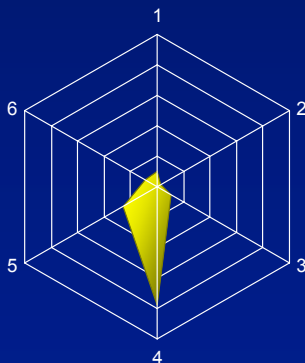
East Asia & Pacific



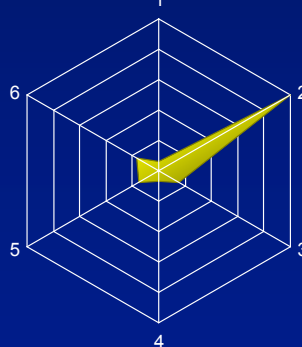
Latin America & Caribbean



South Asia



Sub-Saharan Africa

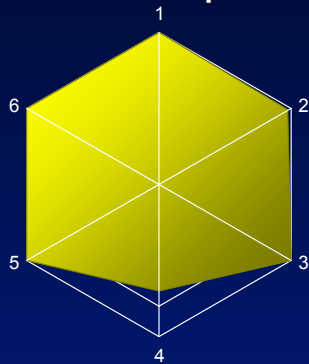


1. Scientific articles, per capita
2. Royalty and license fee receipts, % GDP
3. Electric power consumption, per capita
4. Tractors, per unit of arable land
5. Internet users, per 1,000 people
6. Cellular subscribers, per 100 people

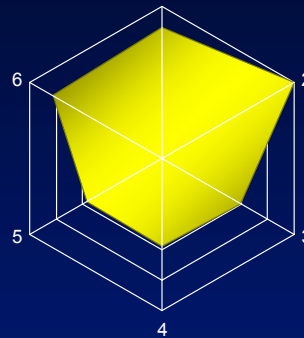
Source: World Bank, Global Economic Prospects (2008)

Intensity of use of some technologies in selected economies (early 2000s)

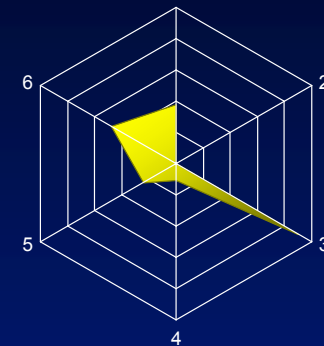
Czech Republic



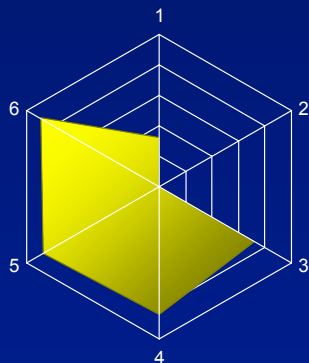
Hungary



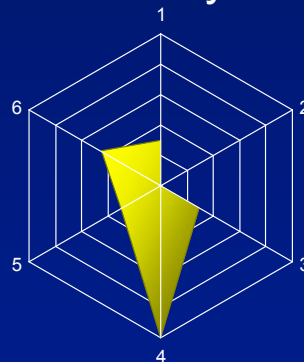
Russia



Romania



Turkey



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Progress in absorptive capacity

Substantial improvements

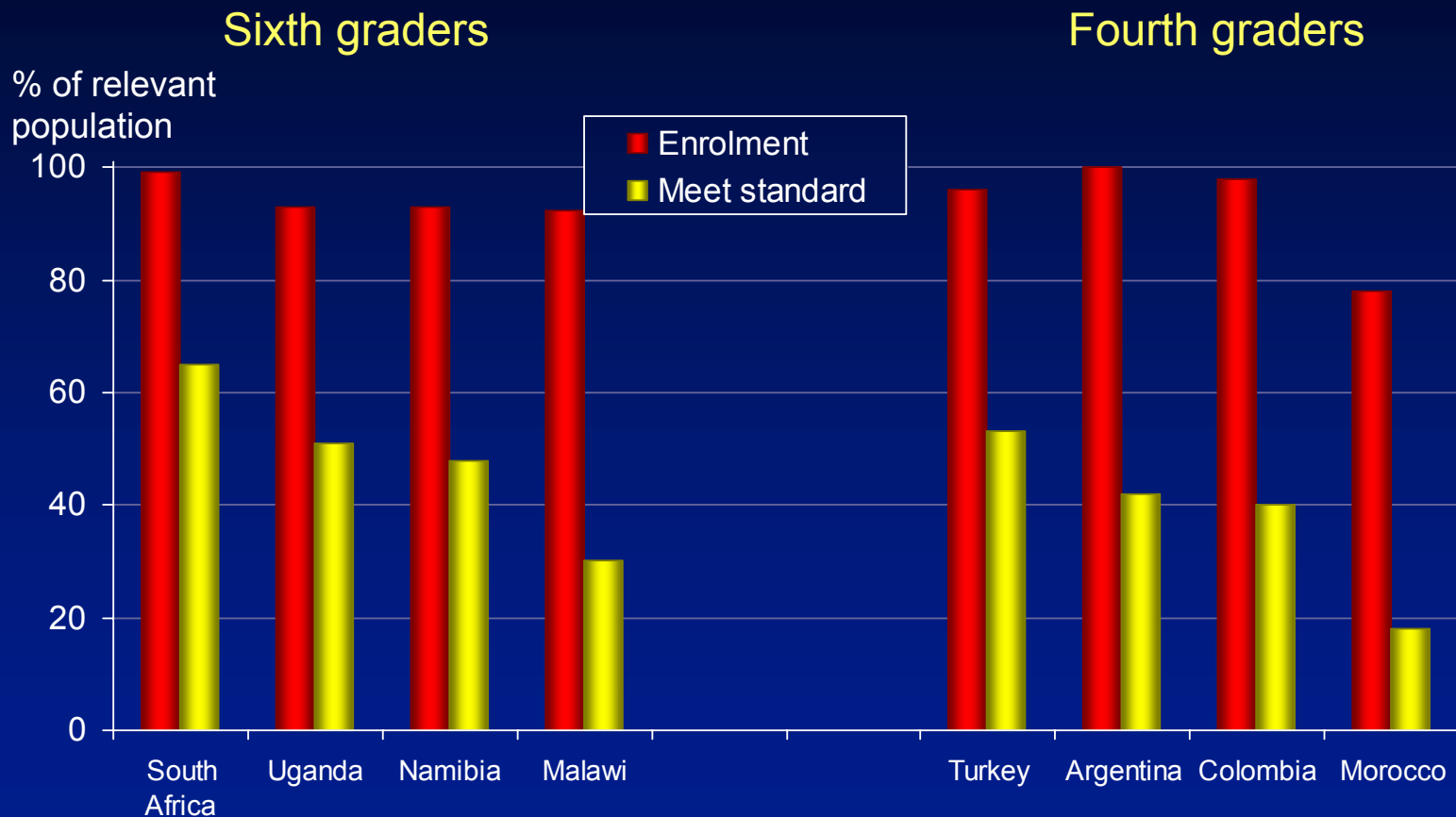
1. Macroeconomic environment
2. Financial structure and intermediation

Relatively weak improvements

1. Basic and advanced technological literacy
2. Regulatory environment and governance



Despite high enrolment rates, few students pass standardized tests (2000s)



Sources: SACMEQ II (2000), PIRLS (2001), and DHS



Key features of a pro-technology policy stance

- No detailed roadmap for promoting technological progress, but certain policy directions are indicated:
 - Maintain openness to trade, foreign direct investment and participation of diaspora
 - Further improve the investment climate so as to allow innovative firms to grow and flourish
 - Improve basic infrastructure (roads, electricity, telephony)
 - Raise the quality and quantity of education throughout economy not just major centers
 - Emphasize technology diffusion by reinforcing dissemination systems and the market-orientation of R&D programs



Technology diffusion in the developing world

For more info:

GEP: <http://www.worldbank.org/gep2008>

Forecast: <http://www.worldbank.org/GlobalOutlook>

Updates: <http://www.worldbank.org/GEM>

