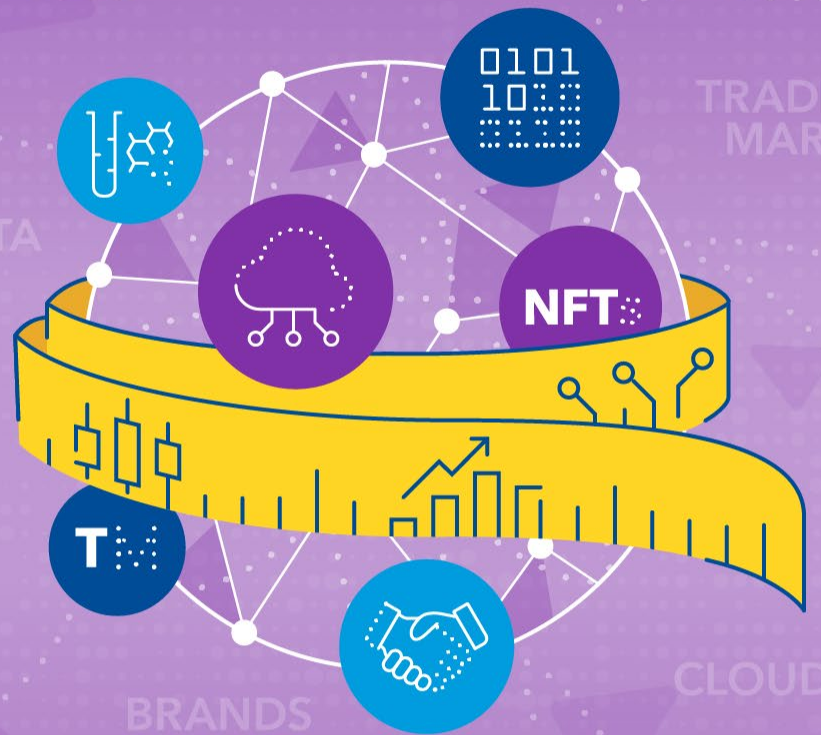


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MEASURING THE TANGIBLE BENEFITS OF INTANGIBLE CAPITAL



Intangible Capital, Aggregate Supply, and Inflation Challenges

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Disclaimer: The views expressed in the presentation are those of the authors and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

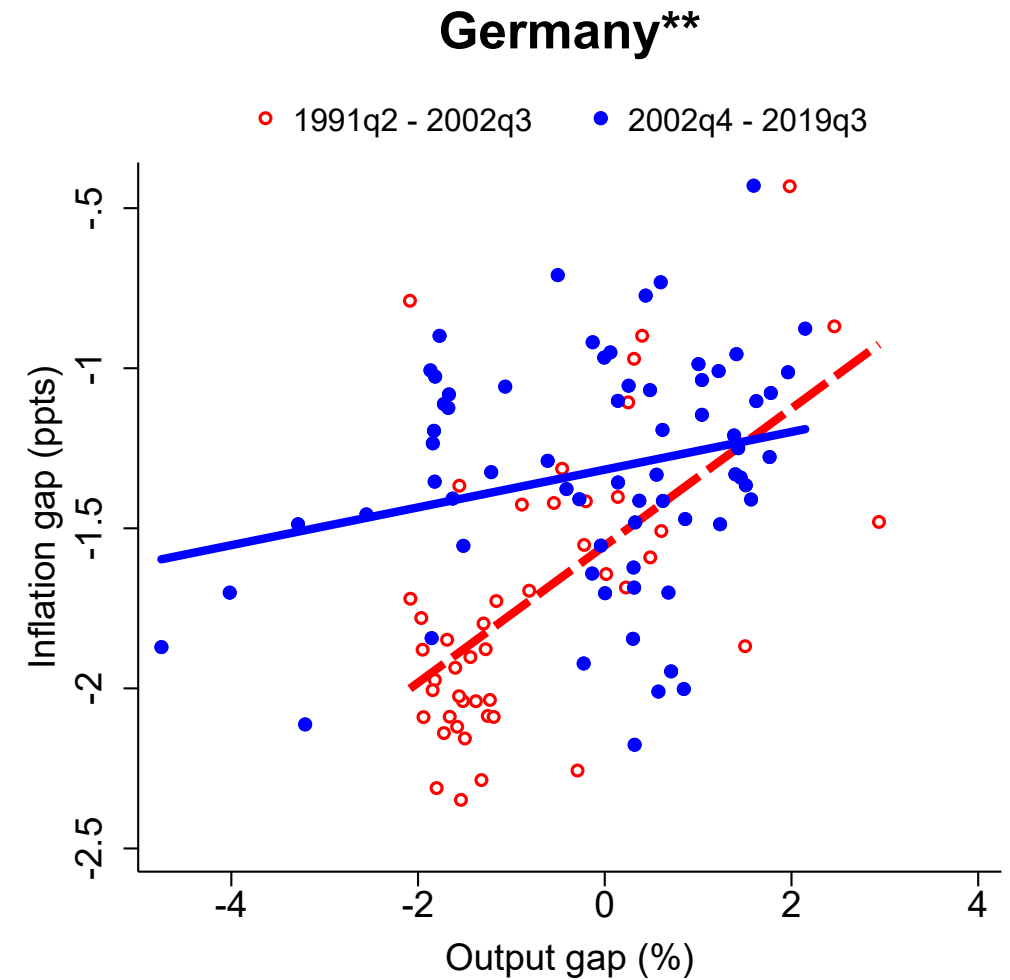
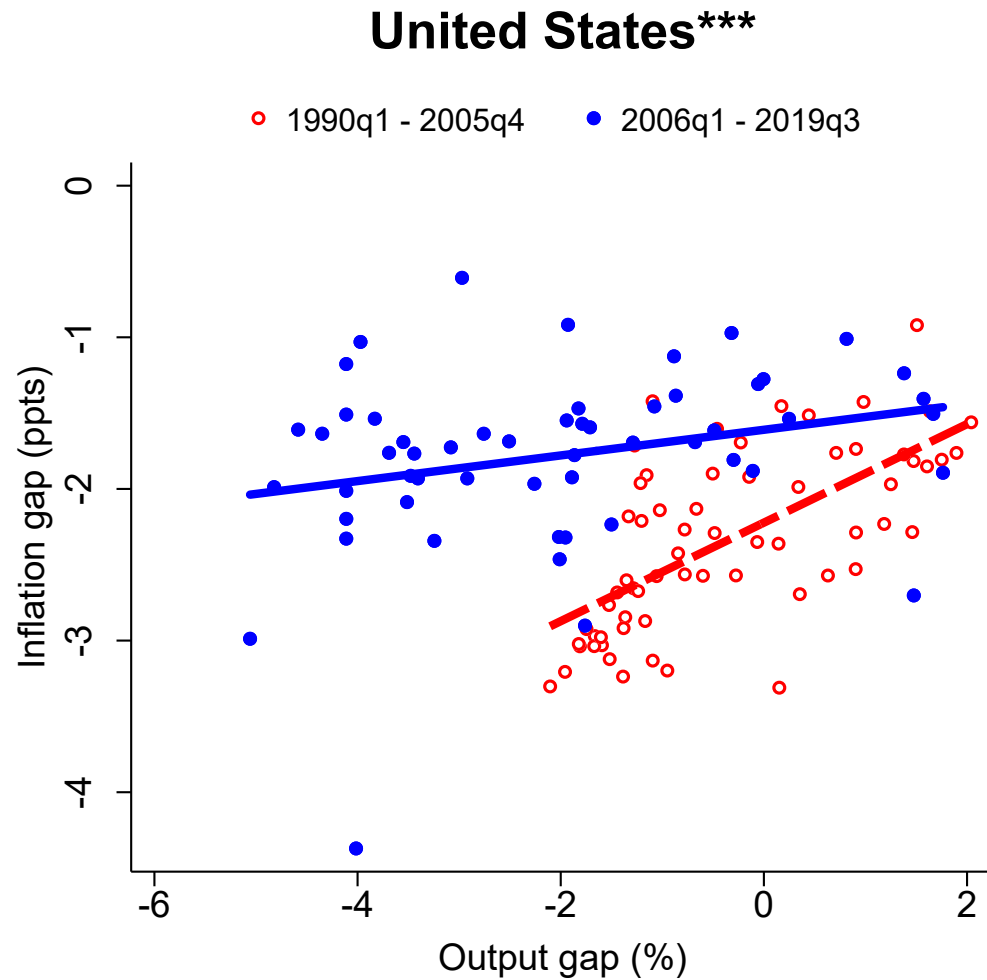
Intangible Capital, Aggregate Supply, and Inflation

- *Intangible Investment and Low Inflation: A Framework and Some Evidence*

S. Lall and L. Zeng, 2020, IMF Working Paper 20/190

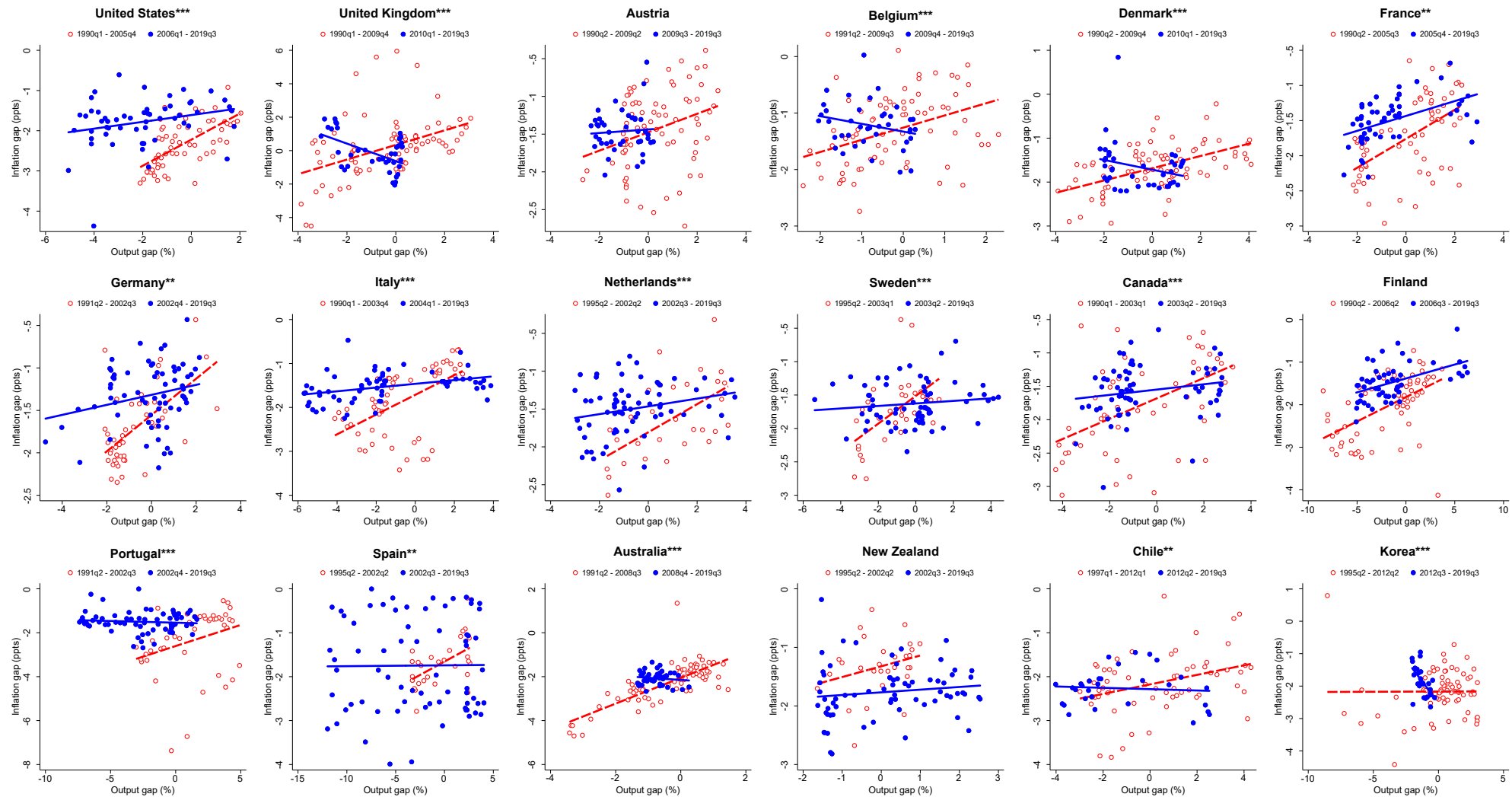
- ◆ Rising importance of intangible capital, together with globalization, has led to more elastic aggregate supply in many economies, reflected as a flattened short-term aggregate supply (AS) curve.
 - ◆ A flattened short-term AS curve can help to explain the persistent low inflation observed in many advanced economies prior to the Covid-19 pandemic.
- Policy implications, including in the context of today's high inflation challenge
 - ◆ Aggregate demand policies may be less effective than in the past in addressing inflation challenges.
 - ◆ Supply-side policies and structural reforms are also key.
 - ◆ Broader implications on issues such as monopoly, inequality, and taxation

Flattening of the AS Curve – A Visual Illustration (1)



Inflation gap = current inflation – long-term Consensus inflation forecast. Output gap data is retrieved from OECD.
Structural break test: ***, p-value < 0.01; **, p-value < 0.05; *, p-value < 0.1.

Flattening of the AS Curve – A Visual Illustration (2)

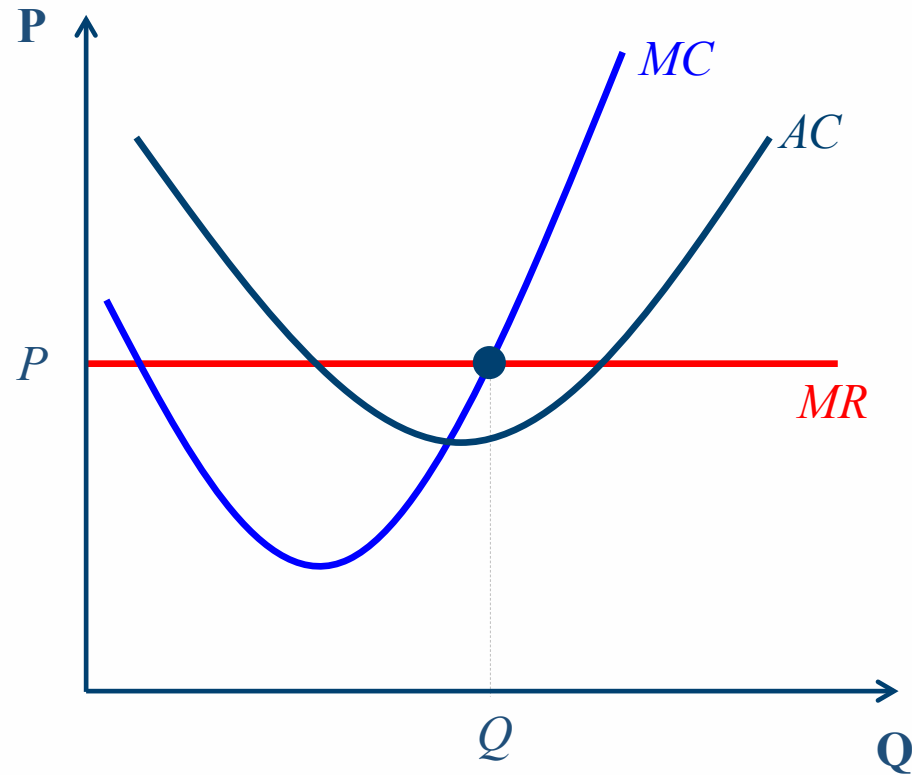


Inflation gap = current inflation – long-term Consensus inflation forecast or WEO 5-year inflation forecast. Output gap data is retrieved from OECD. Structural break test: ***, p-value < 0.01; **, p-value < 0.05; *, p-value < 0.1.

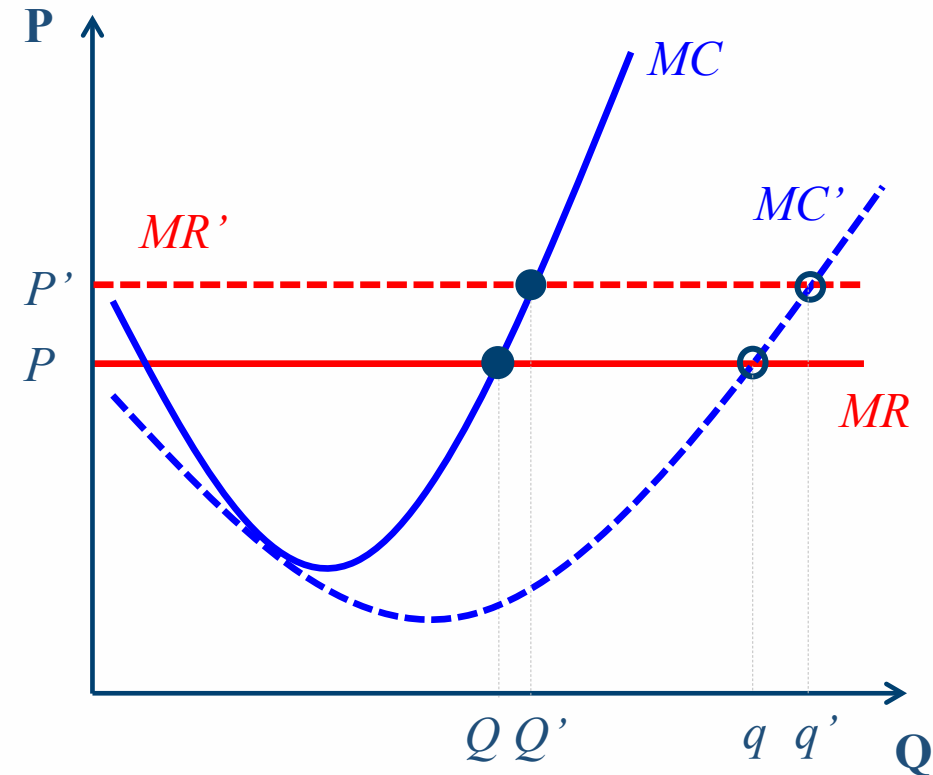
Why has the AS curve become flatter? (1)

Because marginal production cost (MPC) curve has flattened over time

Condition for profit maximization



Lower MPC, higher sensitivity of production to price



Why has the AS curve become flatter? (2)

Globalization and rising importance of intangible capital has helped to flatten the MPC curve over time

Globalization

Global sourcing of intermediate inputs -> lower MPC

Intangible capital

Scalability -> lower MPC

Distribution of streaming contents

Development of auto drive chip and software

Tele physicians and online training programs

Empirical evidence: Intangible capital, globalization, and the AS curve (1)

Regressions analysis: $AS\ slope_t = \alpha + \beta \cdot X_t + \varepsilon_t$

Dependent variable

Time series of the AS curve slope

Estimated for each country based on a 40-quarter rolling window

Regressors

Degree of global integration (proxied by trade openness)

Intangible capital (stock ratio to tangible capital, percent share of GDP)

Regressions

For Individual economy

Panel regression

Empirical evidence: Intangible capital, globalization, and the AS curve (2)

From the cross-country perspective, higher degree of global integration and higher shares of intangible capital are associated with flatter AS curves

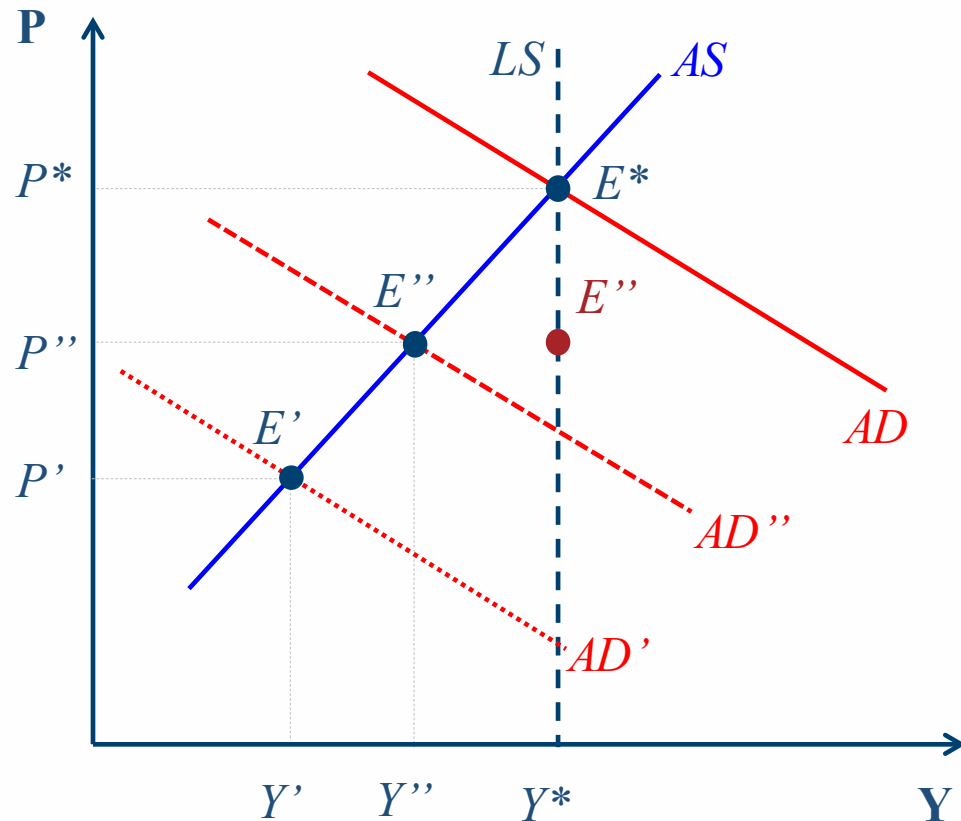
	Without time dummies					With time dummies				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Trade openness	-0.60***			-0.43***	-0.43***	-0.19***			-0.11**	-0.09*
Intangible capital, ratio to tangible capital		-1.08***		-0.63***			-0.27***		-0.25**	
Intangible capital, percent share of GDP 2			-0.51***		-0.31***			-0.37***		-0.36***
N	968	812	812	812	812	968	812	812	812	812
r2	0.32	0.30	0.31	0.39	0.40	0.49	0.51	0.53	0.51	0.53

legend: * p<.1; ** p<.05; *** p<.01

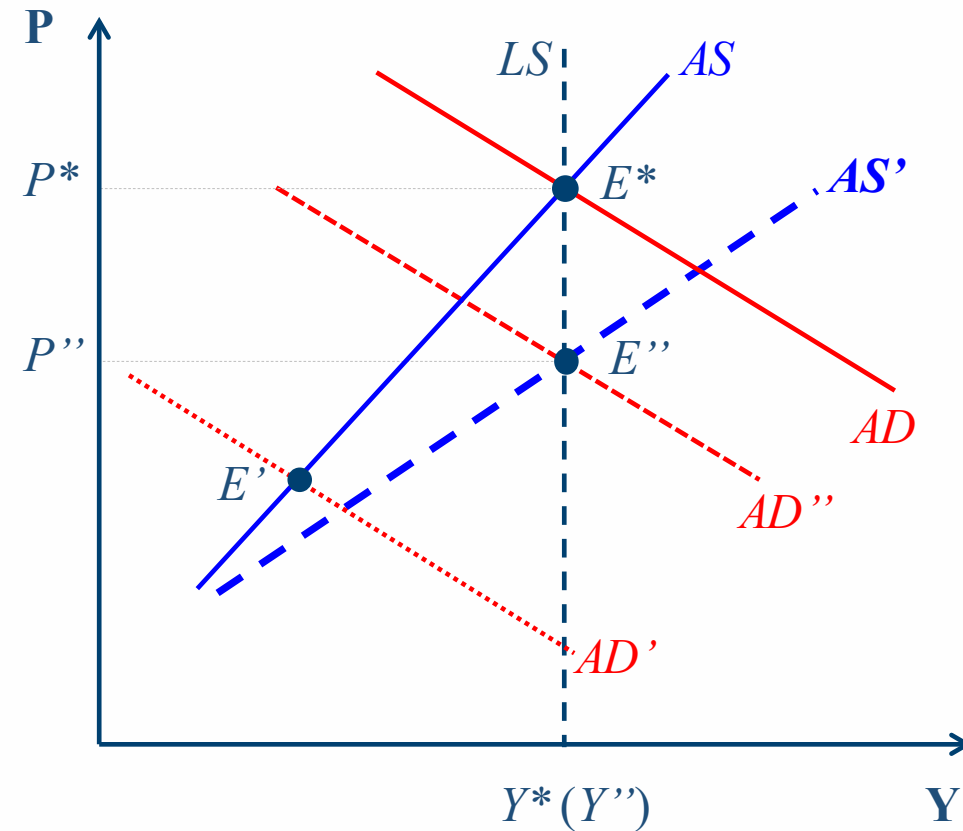
All the regressions include country fixed effects, and those in columns (6) to (10) also include time dummies.

Flattened AS curve and pre-Covid low inflation

Puzzle: Small/closed output gap, along with persistent low inflation



Flattened AS curve “solves” the puzzle, with profound implications

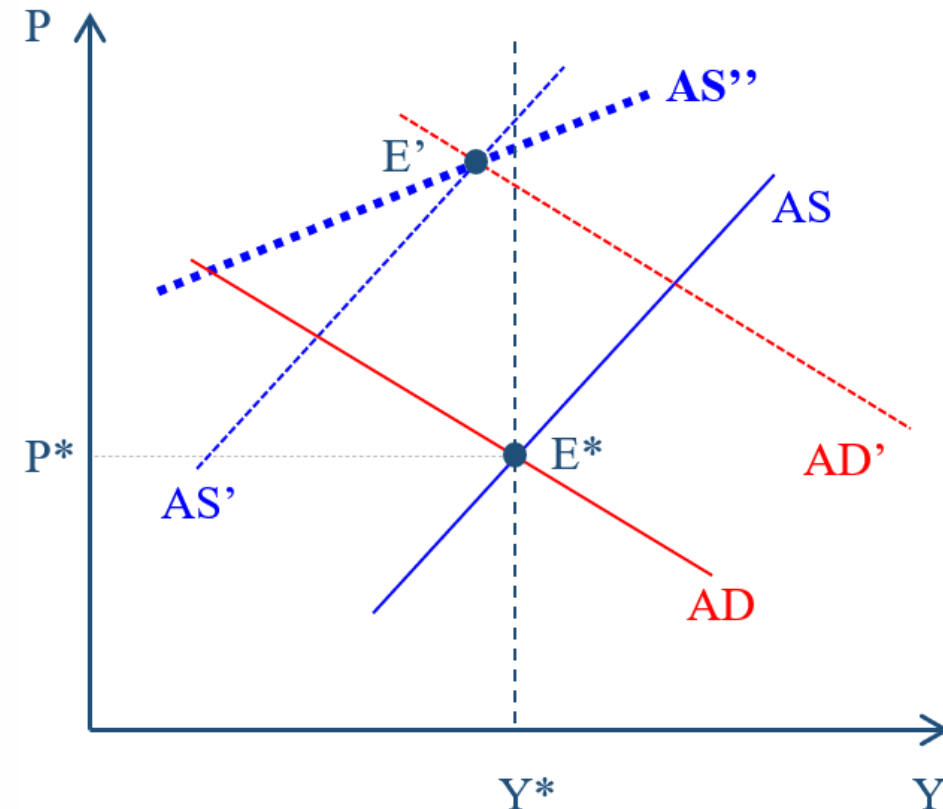
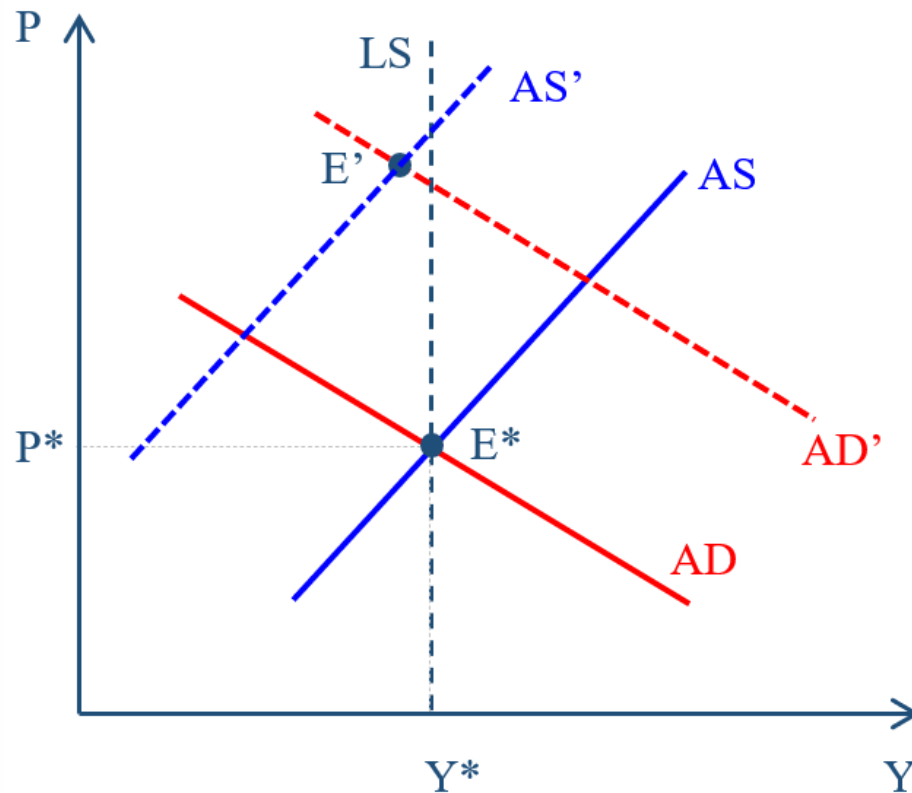


Policy implications: Current high inflation challenge

Supply shocks have played an important role behind the current high inflation

Flattened AS curve: Quantities can adjust more easily without large price changes

- Demand-side policies may be less effective in addressing inflation challenges
- Structural reforms to boost supply are also key

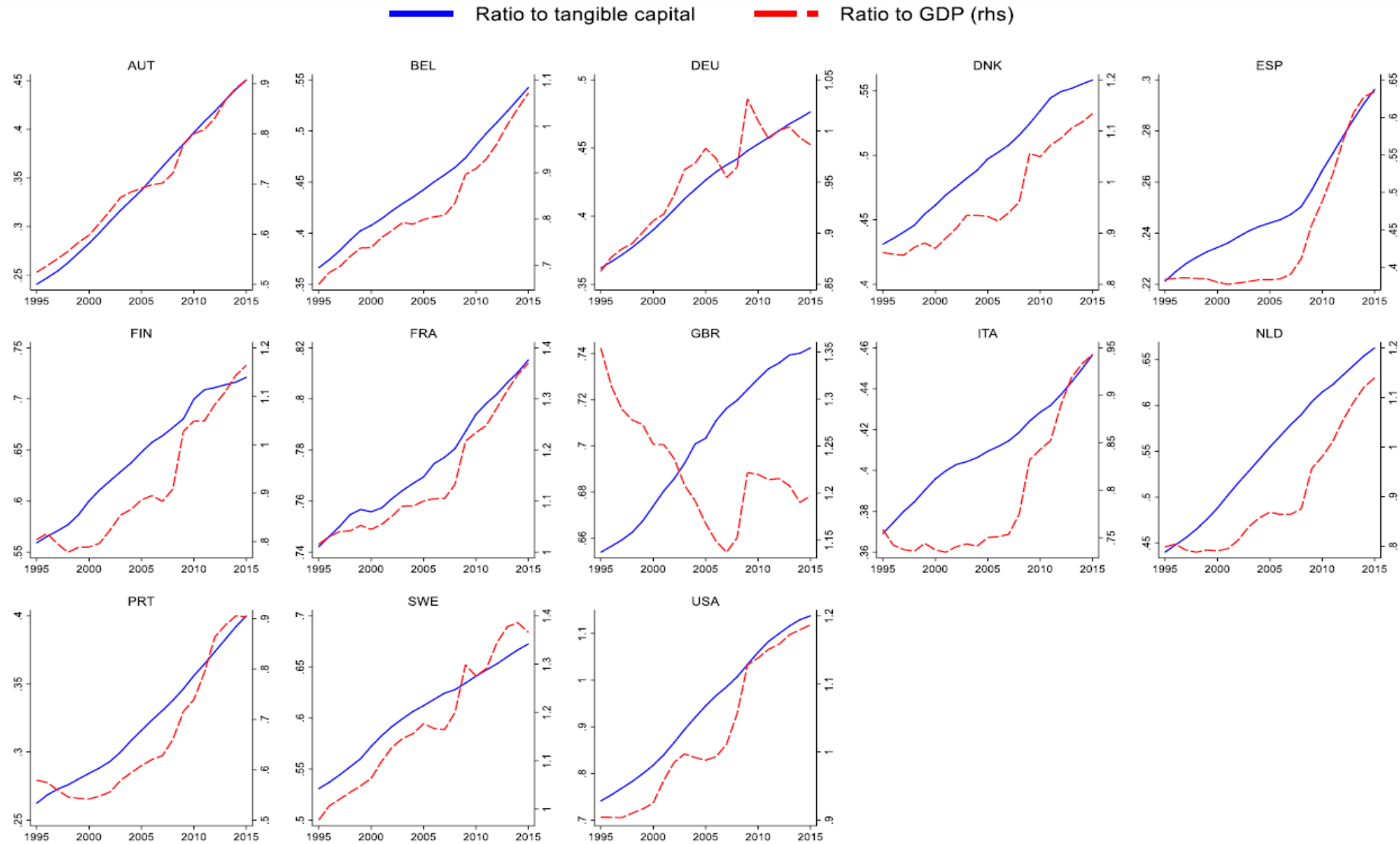


The rise of intangible capital – broader implications

- “Best performing” firms in the past two decades
 - ◆ Big technology firms...
 - ◆ All heavy on intangible, light on physical capital
- Intangible capital is still a rising trend
 - ◆ Monopoly. Could be a feature and not a bug of the system
 - ◆ Financing. With little tangible collateral, bank-funding or VC-type funding?
 - ◆ Labor market and inequality. When labor competes with AI...
 - ◆ Optimal taxation. When monopoly profits are becoming more common...

Thank you!

Intangible capital over time



Sources: [INTAN-invest](#) database and IMF WEO database.