

Global Trade Slowdown: Cyclical or Structural?

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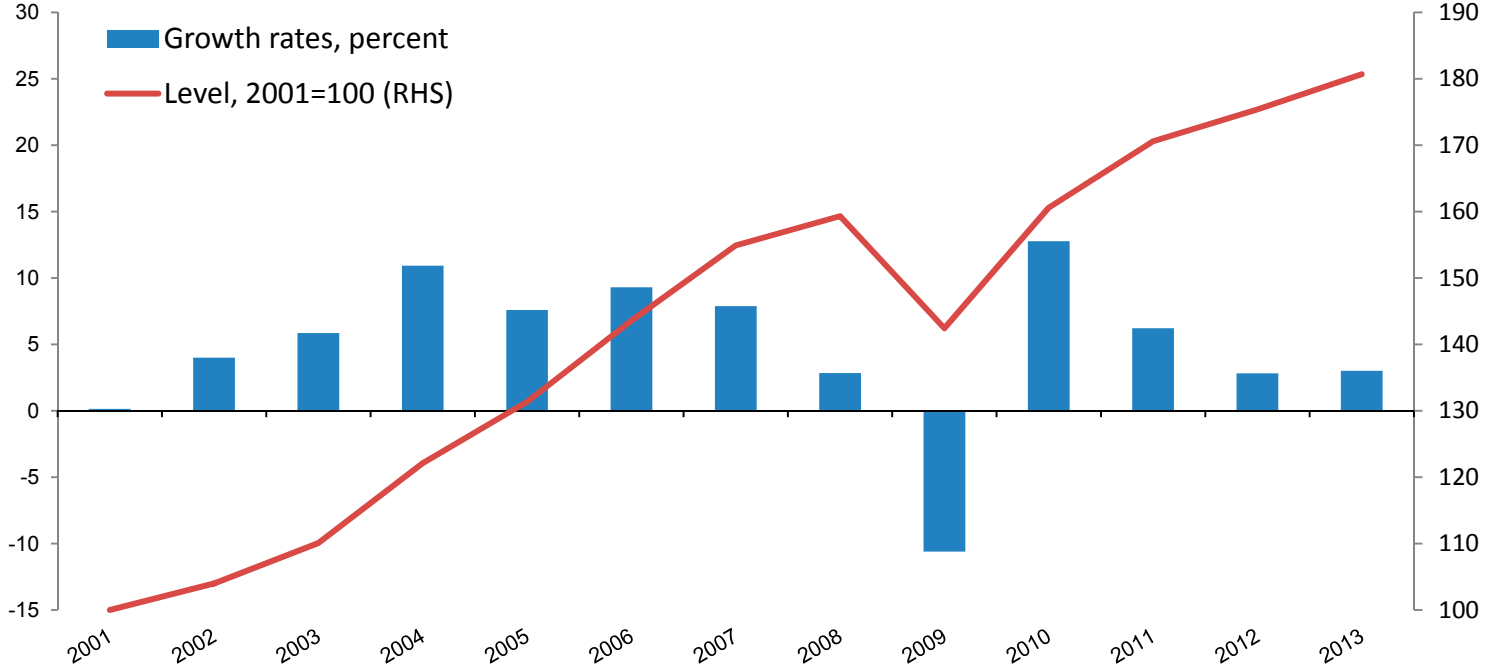
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Main Messages

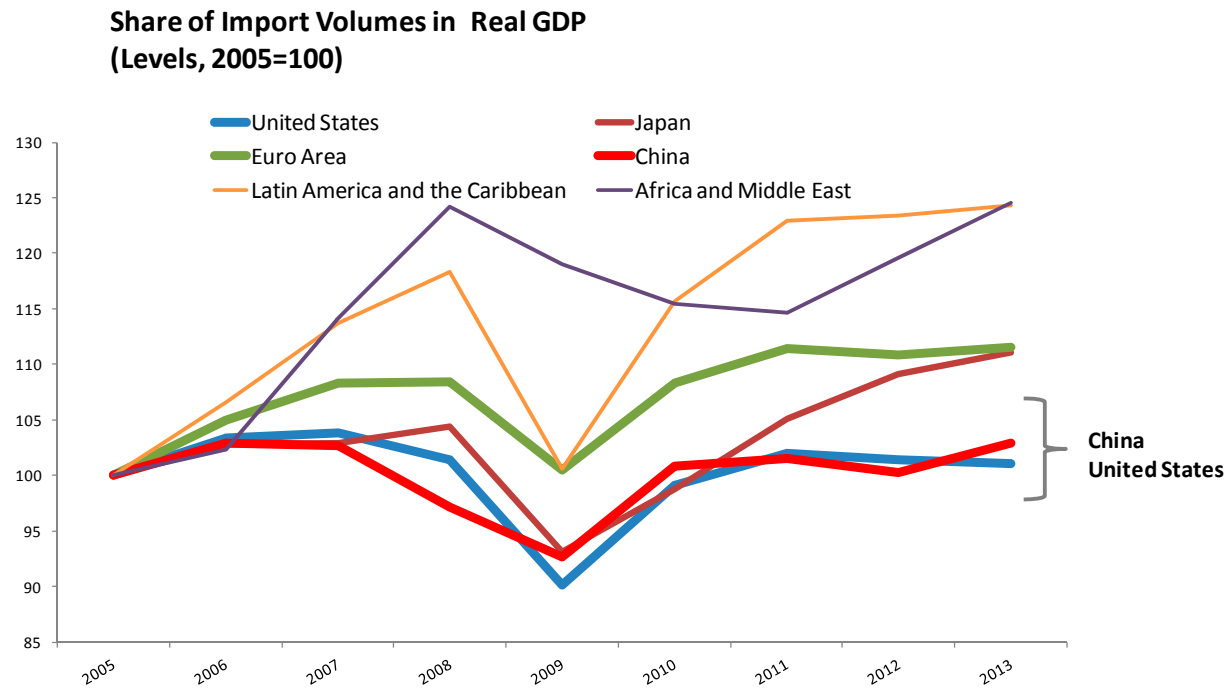
- World trade grew less than 3 percent in 2012-13, compared to the pre-crisis average of 7 percent for 1987-2007
- Proximate explanations of the trade slowdown link it to changes in GDP and, hence, to the Euro crisis and other cyclical factors
- A deeper reason may be the changing long-run relationship between trade and GDP
 - Possibly related to shifts in vertical specialization more than protectionism or the changing composition of trade and GDP
- Trade is growing slowly not only because GDP growth is sluggish, but also because trade itself has become less responsive to GDP

Trade rebounded after the Great Recession, but trade growth has been sluggish since then



Source: IMF World Economic Outlook

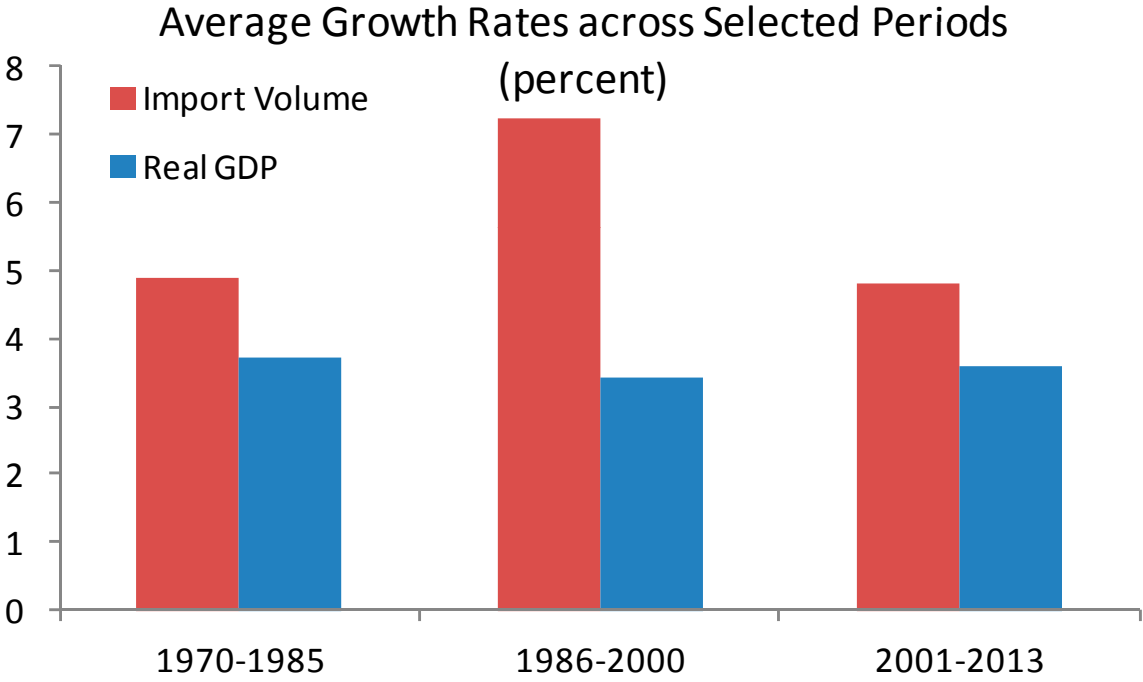
Structural change?



Source: IMF World Economic Outlook

Total imports (goods and services) as a share of GDP have been flat in China and the US, both pre- and post-crisis:

The relationship between world trade and income changed in the past four decades



Source: IMF World Economic Outlook

How did the trade-income relationship evolve? Empirical strategy

- We use an Error Correction Model to study the behavior of trade and income

$$\Delta \ln m_t = \alpha + \beta \Delta \ln y_t + \gamma \ln m_{t-1} + \delta \ln y_{t-1} + \varepsilon_t$$

- Short-run trade elasticity = β
 - Speed of adjustment = $-\gamma$
 - Long-run trade elasticity = $-\delta / \gamma$
- Sample: annual (1970-2013) and quarterly (1990-2013) data for world economy and selected country/regions

The long 1990s were different: Long-run elasticity declined in the 2000s back to its pre-90s level

	Pooled w/o dummy variables ¹	Pooled w/ dummy variables for separate periods ²		
	1970-2013 (1)	1970-1985 (2)	1986-2000 (3)	2001-2013 (4)
α	-0.43** (0.17)	-0.35 (0.53)	-3.17*** (0.64)	-0.52** (0.19)
Short-run elasticity (β)	2.82*** (0.36)	2.13*** (0.60)	2.77*** (0.35)	3.43*** (0.21)
Speed of adjustment ($-\gamma$)	0.12** (0.05)	0.18 (0.31)	0.58*** (0.13)	0.31** (0.13)
δ	0.20** (0.09)	0.23 (0.39)	1.26*** (0.26)	0.40** (0.17)
Long-run elasticity ³ ($-\delta/\gamma$)	1.70***	1.31***	2.18***	1.31***
Breusch-Godfrey LM test for serial correlation ⁴	9.67**	10.52**	9.19*	7.43
Stationarity of the residual	yes	yes	yes	yes
Test that long-run elasticity differs across periods ³		(2) vs (3) 8.68***	(2) vs (4) 0.00	(3) vs (4) 291.21***
Rsquared	0.740	0.957	0.957	0.957
N	43	43	43	43

Note: Standard errors in paranthesis; *** indicates a significance level of 1%, ** of 5%, and * of 10%.

The trade elasticity decline is significant in the early 2000s and larger in the post-Great Recession world

	Pooled w/ dummy variables for separate periods ¹			
	1991q2-2000q4 (1)	2001q1-2007q4 (2)	2008q1-2013q4 (3)	2001q1-2013q4 (4)
α	-3.09*** (0.80)	-0.54 (0.46)	1.01** (0.43)	-0.07 (0.11)
Short-run elasticity (β)	1.50** (0.67)	4.05*** (1.01)	2.25*** (0.42)	2.62*** (0.23)
Speed of adjustment ($-\gamma$)	0.49*** (0.13)	0.23* (0.11)	0.64** (0.26)	0.06 (0.04)
δ	1.18*** (0.30)	0.34 (0.21)	0.43** (0.20)	0.07 (0.06)
Long-run elasticity ² ($-\delta/\gamma$)	2.40***	1.49***	0.68***	1.21***
Breusch-Godfrey LM test for serial correlation ³	1.40	1.50	0.52	0.59
Stationarity of the residual	yes (1) vs (2)	yes (1) vs (3)	yes (2) vs (3)	yes (1) vs (4)
Test that long-run elasticity differs across periods ²	15.24***	365.76***	11.19***	16.25***
Rsquared	0.838	0.838	0.838	0.812
N	90	90	90	90

Note: Standard errors in paranthesis; *** indicates a significance level of 1%, ** of 5%, and * of 10%.

Cyclical versus structural factors

- We use our estimates from the ECM framework to decompose import growth

- Predicted import growth

$$\text{Predicted } \dot{m}_t = \hat{\alpha} + \hat{\beta} \Delta \ln y_t + \hat{\gamma} \ln m_{t-1} + \hat{\delta} \ln y_{t-1}$$

- Long-term component

$$\text{LR_Predicted } \dot{m}_t = (\hat{\delta}/\hat{\gamma}) (\ln y_t - \ln y_{t-1})$$

- Short-term component

$$\text{SR_Predicted } \dot{m}_t = \text{Predicted } \dot{m}_t - \text{LR_Predicted } \dot{m}_t$$

Cyclical versus structural factors



Source: IMF World Economic Outlook and authors' calculations

Both long-term and short-term components contribute to explain the global trade slowdown

But, except during the 2009 trade collapse, structural factors seem to dominate

Elasticity decomposition

- The world trade elasticity is defined as $\sigma_W = \frac{\Delta m_W / m_W}{\Delta y_W / y_W}$
- We can decompose it to account for the changing composition of trade (e.g. services, goods)

$$\sigma_W = \sigma_W^1 \frac{m_1}{m_W} + \sigma_W^2 \frac{m_2}{m_W} + \dots + \sigma_W^k \frac{m_k}{m_W}$$

- We can also decompose it in terms of regions'/countries' trade elasticity to their own income

$$\sigma_W = \sigma_1 \frac{m_1}{m_W} \frac{\frac{\Delta y_1}{y_1}}{\frac{\Delta y_W}{y_W}} + \sigma_2 \frac{m_2}{m_W} \frac{\frac{\Delta y_2}{y_2}}{\frac{\Delta y_W}{y_W}} + \dots + \sigma_n \frac{m_n}{m_W} \frac{\frac{\Delta y_n}{y_n}}{\frac{\Delta y_W}{y_W}}$$

Regional decomposition of long-run trade elasticity

Country/group	Long run elasticities			
	from yearly estimations		from quarterly estimations	
	1986-2000	2001-2013	1991q2-2000q4	2001q1-2013q4
World	2.18***	1.31***	2.40***	1.21***
<u>Advanced Economies</u>	2.39***	2.31***	2.63***	2.11***
United States	3.68	1.77***	2.85***	1.40***
Euro Area	2.94***	3.01***	3.11***	1.83***
<u>Emerging Markets and Developing Economies</u>	2.23***	1.34***	1.69***	1.27***
Emerging and Developing Asia	1.48***	1.14***	2.35**	1.16***
China	1.54***	1.10***		
Emerging and Developing Europe	2.22	1.72***		
Latin America and the Caribbean	3.38***	1.65***		
Sub-saharan Africa, MENA	1.05***	1.60***		

Notes: *** indicates a significance level of 1%, ** of 5%, and * of 10%.

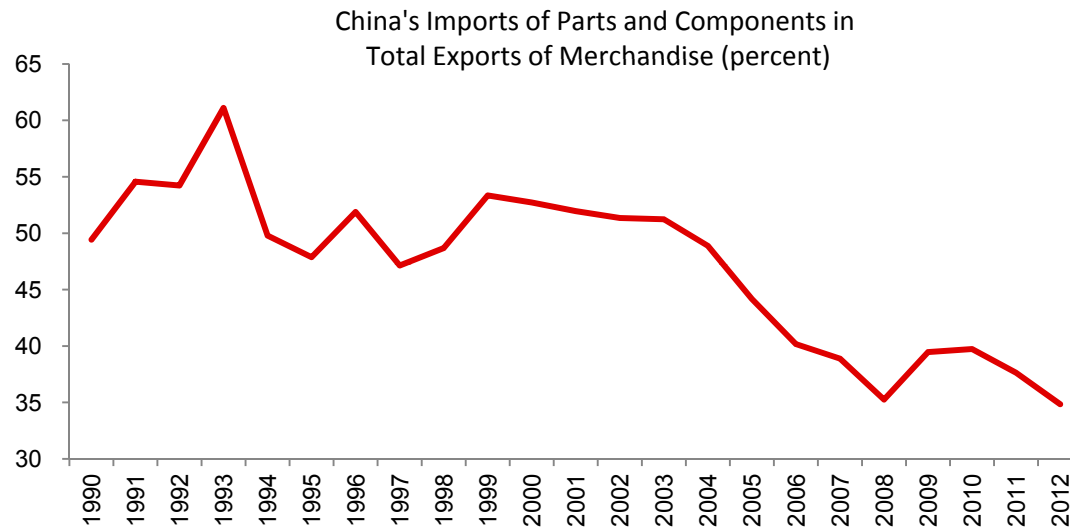
Source: IMF WEO, IMF IFS, and authors' calculations

Lower world elasticity may reflect changes in long-run trade-income relationship in US and China

Structural determinants of the global trade slowdown

- What explains the lower long-run trade elasticity since 2000?
- Several (non-exclusive and non-exhaustive) candidates:
 1. Changes in the structure of trade: supply chains
 2. Changes in the composition of trade: e.g. goods versus services
 3. Changes in the composition of demand: e.g. investment versus consumption
 4. Changes in the trade system: protectionism

Changes in vertical specialization: China's imports of parts and components

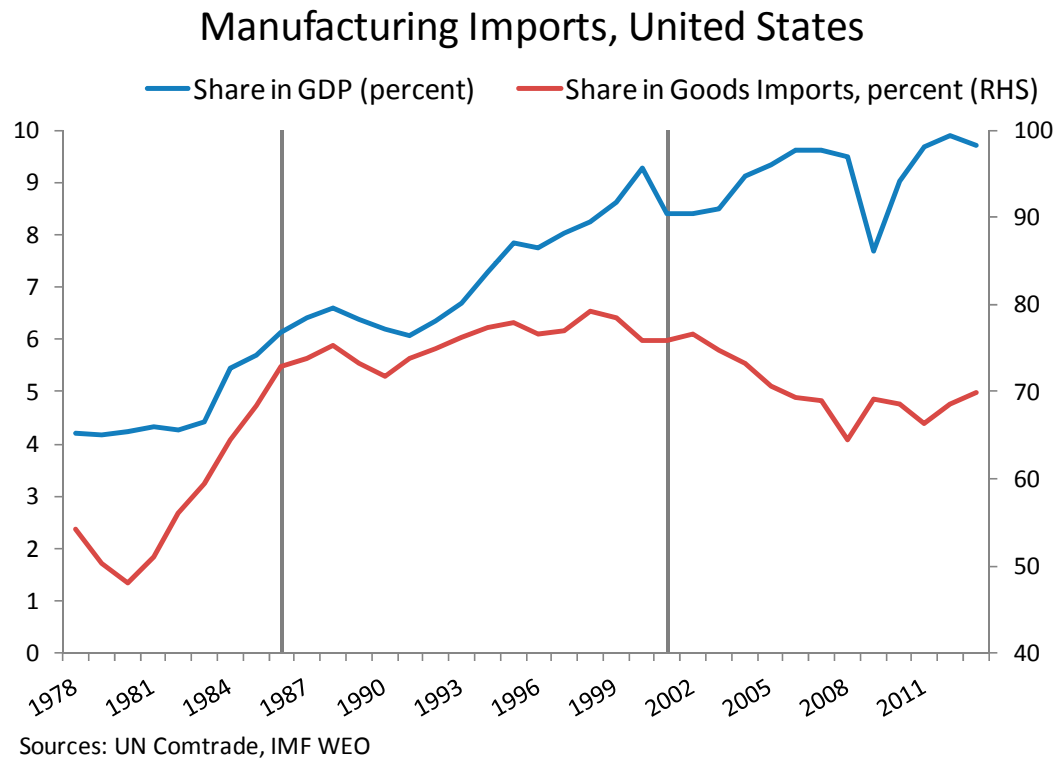


Classification of parts and components based on UN Comtrade's BEC¹

China's increasing domestic value added?

Corroborated by evidence of increasing domestic value-added in Chinese firms, due to substitution of domestic inputs for foreign inputs (Kee and Tang, 2014)

Changes in vertical specialization: Manufacturing imports in the US



The share of manufacturing imports in merchandise imports and in GDP declined / leveled off since the early 2000s

Changes in vertical specialization: Manufacturing trade

Country/Region	Period	Total trade	Manufacturing
World	1986-2000	2.18***	2.61***
	2001-2013	1.31***	0.79***
United States	1986-2000	3.68	2.75***
	2001-2013	1.77***	1.14***
China	1986-2000	1.54***	1.20***
	2001-2013	1.10***	0.73***

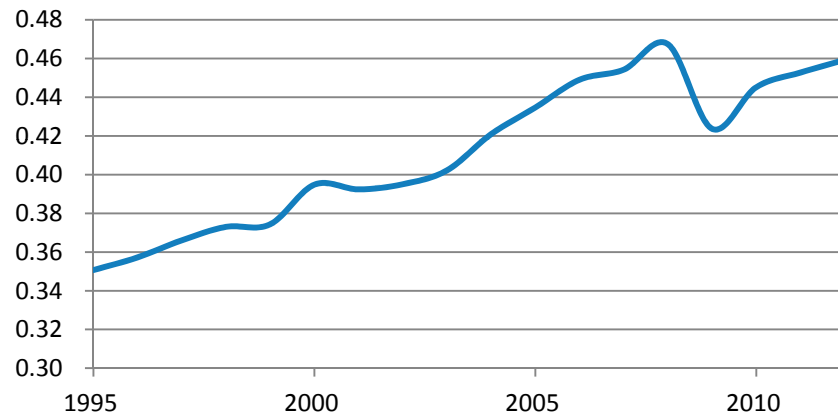
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Source: IMF WEO, UN Comtrade and authors' calculations

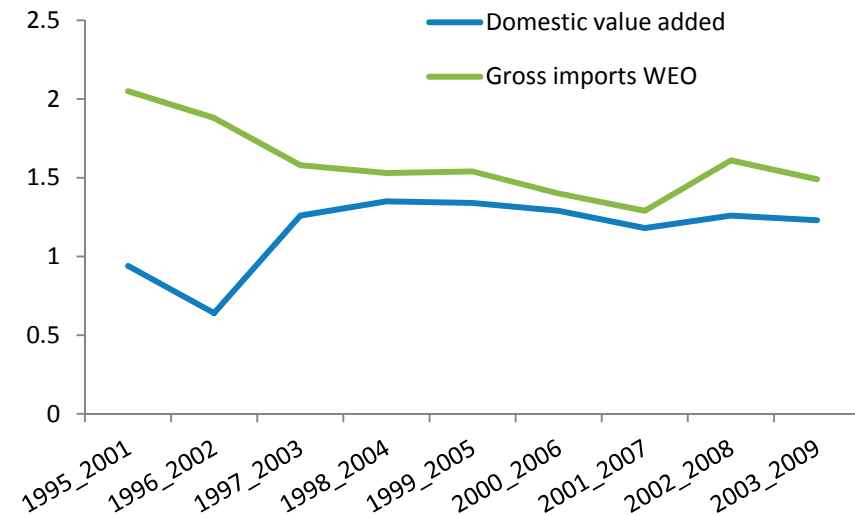
The changing long-term relationship between manufacturing trade and income that underpins the trade slowdown may be a symptom of changing vertical specialization

Changes in vertical specialization: Trade in Value Added

Ratio of foreign value added to domestic value added in world gross exports



Long run elasticities, 7-year periods



The long-run gross trade elasticity may have:

- increased during the 90s as production fragmented internationally into global supply chains
- decreased in the 2000s as this process decelerated

This contrasts with the lower and more stable estimates of value-added trade elasticities

Composition of trade: Goods versus services

Country/Region	Period	Total trade	Services	Goods		
				Total	Manufacturing	Commodities
World	1986-2000	2.18***	1.80***	2.31***	2.61***	1.66***
	2001-2013	1.31***	2.18	1.31***	0.79***	2.35***
United States	1986-2000	3.68	1.68***	3.49***	2.75***	2.41**
	2001-2013	1.77***	1.95***	1.73***	1.14***	3.77**
China	1986-2000	1.54***	2.24***	1.44***	1.20***	1.26***
	2001-2013	1.10***	1.22***	1.10***	0.73***	1.84***

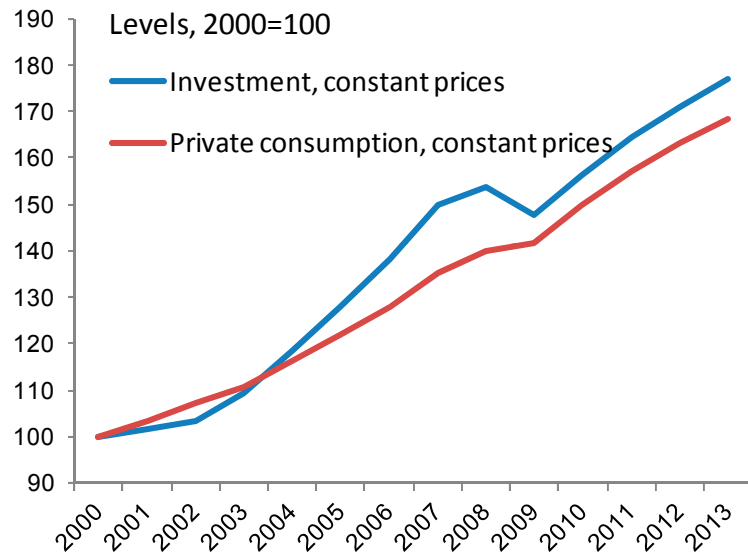
Note: *** indicates a significance level of 1%, ** of 5%, and * of 10%.

Source: IMF WEO and authors' calculations

World services and commodities trade elasticity increased in recent years (e.g. digitization of the economy, industrialization of emerging economies)

Decline in world trade elasticity is driven by manufacturing trade

Composition of demand: Investment versus consumption



Source: IMF World Economic Outlook

Long-run world trade elasticity

Period	GDP	Investment	Private consumption
1986-2000	2.18***	1.78***	2.07***
2001-2013	1.31***	1.04***	1.08***

Note: *** indicates a significance level of 1%, ** of 5%, and * of 10%.

Source: IMF WEO and authors' calculations

The share of investment in aggregate demand increased before the Great Recession and then declined

Weak investment may explain low trade elasticity post-Great Recession

But changing composition of demand cannot explain the decline in long-run trade elasticity throughout the 2000s

Protection on the rise?

Country/Region	Period	Trade elasticity standard regression	Trade elasticity accounting for protectionism
World	1986-2000	2.18***	2.04***
	2001-2013	1.31***	1.3***
United States	1986-2000	3.68	2.62***
	2001-2013	1.77***	1.86***
China	1986-2000	1.54***	-
	2001-2013	1.10***	1.07***

Note: *** indicates a significance level of 1%, ** of 5%, and * of 10%.

Source: IMF WEO and authors' calculations

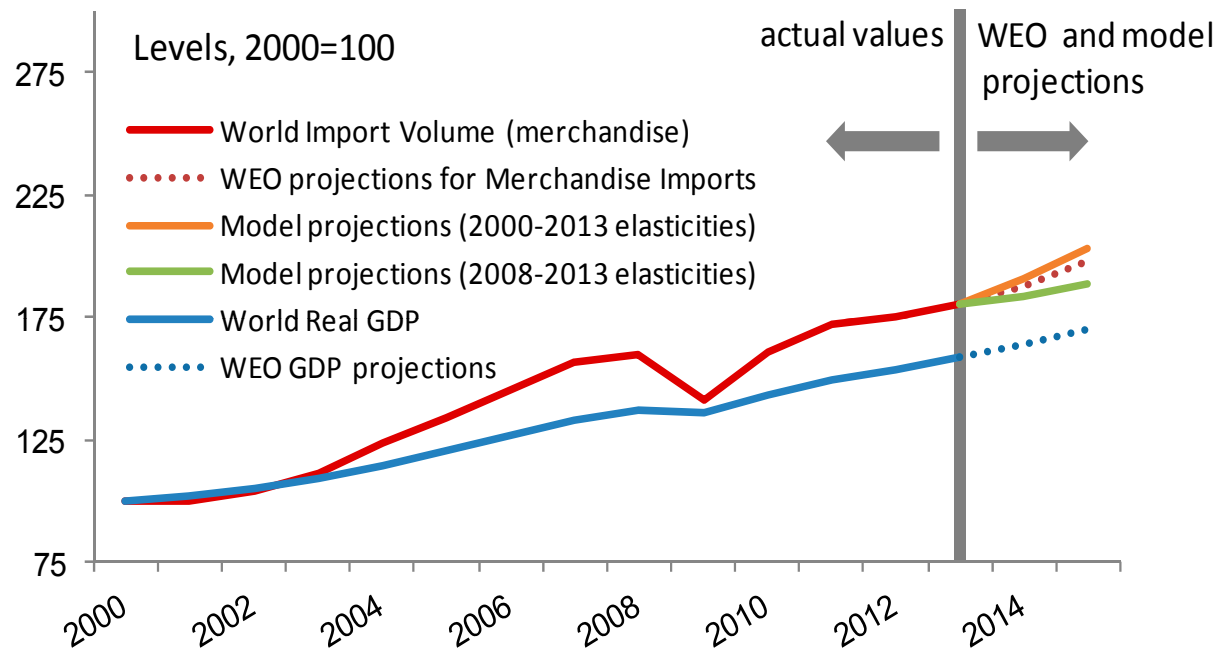
Long-run world trade elasticity is unaltered when accounting for protection, suggesting that rise in trade barriers is not a key driver

But slower pace of trade liberalization in the 2000s could contribute to explain lower world trade elasticity

Conclusion

- Is the trade slowdown structural or cyclical?
- An analysis of the relationship between trade and income in the last four decades shows:
 - The rise of the long-term trade elasticity in the long 1990s
 - Its decline in the 2000s, which set in before the Great Recession
- These findings suggest that the current trade slowdown is in part driven by structural factors
 - i.e. Changing vertical specialization, notably in China and US
- What does a lower world trade elasticity mean for global growth?

Trade projections



Source: IMF WEO, IMF IFS and authors' calculations

The figure shows model predictions of trade growth using estimates for 2000-2013 and 2008-2013 and compares them with (April 2014) WEO projections

Current projections overly-optimistic if second scenario captures a structural change