

Capturing price level impacts of trade policies in a CGE model

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Computable General Equilibrium (CGE) models are designed to solve for relative prices rather than absolute price levels. These models typically anchor prices to a benchmark index, such as the consumer price index (CPI) or producer price index (PPI), which remains fixed. Consequently, price movements resulting from a policy shock are interpreted relative to this anchored benchmark.

However, certain analysis may require flexible price indexes to assess, for example, how policy impacts the overall national price level. Robinson and Thierfelder (2022^[1]) examined whether trade liberalisation could reduce CPI inflation. Luu et al, (2020^[2]) and OECD (2022^[3]) analysed the household distributional effects of trade policy change through its impact on consumer prices. Luu et al, (2020^[2]) and OECD (2022^[3]) used the OECD METRO model for the analysis and incorporated the exchange rate impact on consumer prices post analyses.

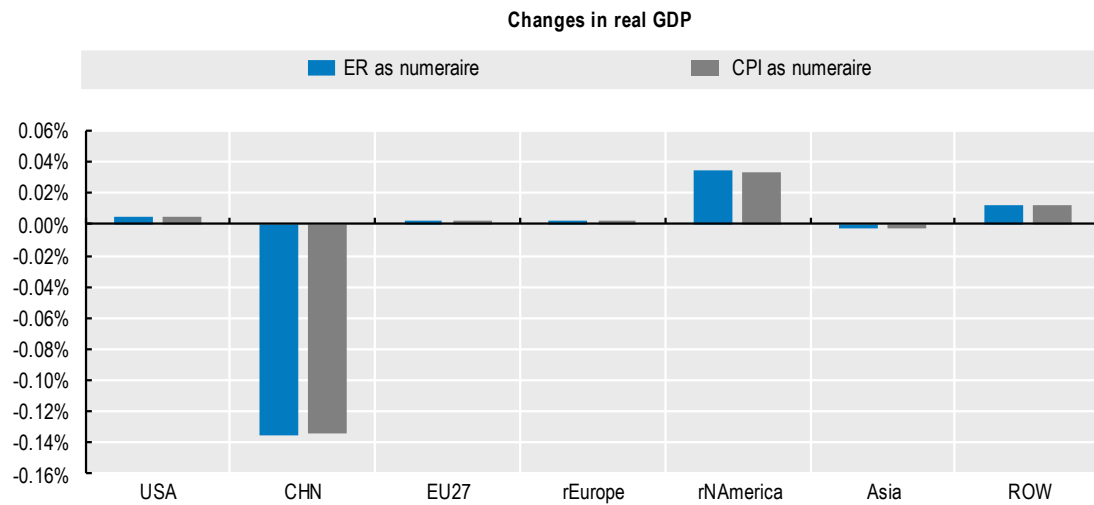
This paper proposes to modify the METRO model using the same approach as Robinson and Thierfelder (2022) such that exchange rates, which is defined as the ratio of exchange of domestic currency relative to the world numeraire, becomes the regional numeraire. This adjustment enables consumer price index to fluctuate, opening new possibilities for analysis of economic impacts.

Additionally, the paper explores how the choice of numeraire influences model outcomes. The analysis covers seven countries/regions—the United States, China, EU27, rest of Europe, rest of North America, Asia, and Rest of World—where the US and China impose a 10-percentage point increase in tariffs on goods imported from each other. The scenario is examined under two model configurations: one where the CPI is the fixed regional numeraire and another where the exchange rate serves as the numeraire, allowing the CPI to adjust freely.

Preliminary results analysis shows that real macro changes are not affected by the choice of numeraire (Figure 1). Moreover, the ratio of CPI capture similar real exchange rate changes when price level is allowed to adjust (Figure 2). Lastly, using a set up where CPI is flexible allows for a more precise description of consumer price impacts from a simulation. While the relative magnitude and direction of the price change are the same in the US between the two set ups (Figure 3 Panel A), it is not the case for China (Figure 3 Panel B). The relative magnitude across the different price changes in China are similar under the two different model set ups. However, the directions of change are different. When the CPI is fixed, and prices are interpreted relative to the CPI, then some consumer prices increase. However, when CPI is allowed to adjust, consumer prices in all sectors decline. Adjusting the OECD METRO model to allow the overall price index of a region to change offers a more nuanced understanding of trade policy impacts by capturing inflationary pressures more realistically.

Figure 1. Real GDP changes when US and China increase tariffs on each other

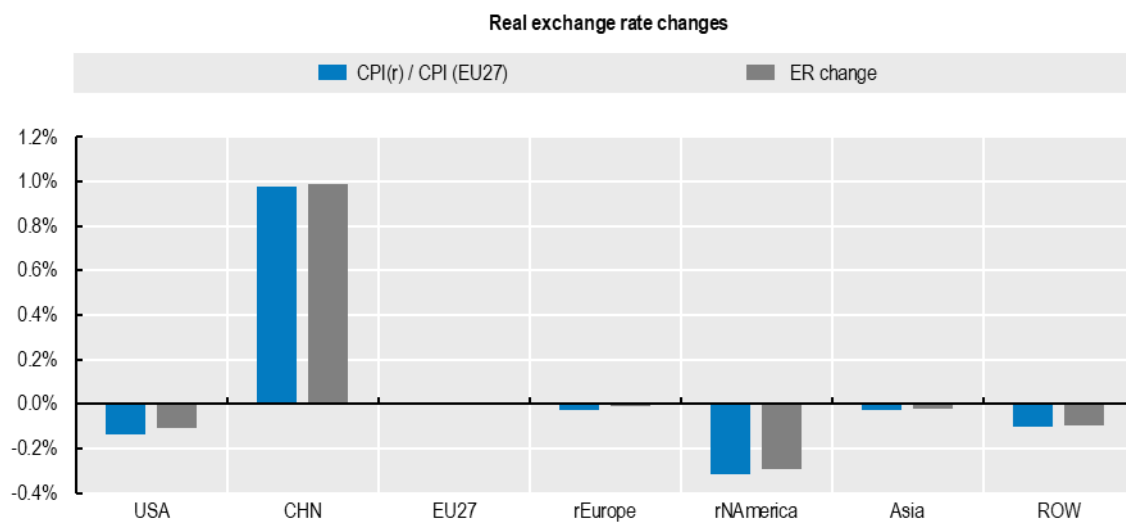
Comparing models with different regional numeraires



Note: Model closure assumes trade balance is fixed, governments spend a fixed share of final demand and internal balance adjusts, and the regional savings rate (household and government combined) is fixed. EU27 is the world numeraire.

Source: OECD METRO Model

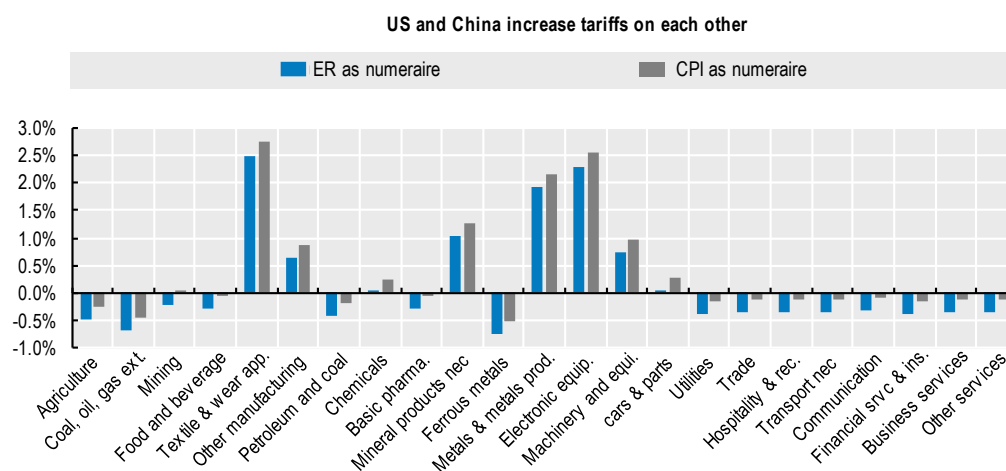
Figure 2. Real exchange representation in the two model set-ups



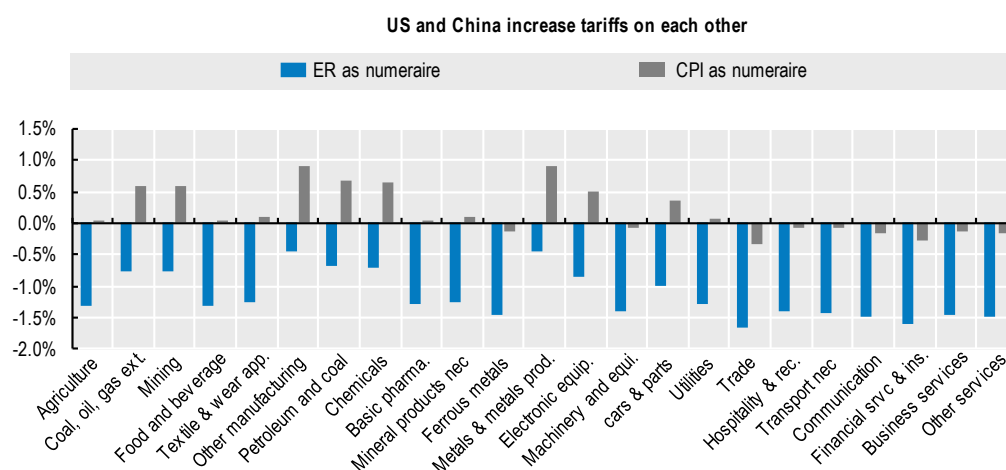
Source: OECD METRO Model

Figure 3. Changes in consumer prices, scenario US and China increase tariffs on each other

Panel A. Within the US



Panel A. Within China



Source: OECD METRO model

Références

Luu, N. et al. (2020), "Mapping trade to household budget survey: A conversion framework for assessing the distributional impact of trade policies", *OECD Trade Policy Papers*, No. 244, OECD Publishing, Paris, <https://doi.org/10.1787/5f6181b-en>.

[2]

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[3]

Robinson, S. and K. Thierfelder (2022), *Can liberalizing trade reduce US CPI inflation? Insights from an economywide analysis.*, <https://www.piie.com/blogs/realtime-economics/2022/can-liberalizing-trade-reduce-us-cpi-inflation-insights-economywide>.

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