

# Playing with blocs: Quantifying decoupling\*

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## Abstract

We adopt a data-driven approach to measure trade fragmentation over the period 2015-2023. We assign countries to the US bloc, the China bloc, or to an unaligned group based on whether their trade costs with the US and China increased or decreased over this period. We find that the US bloc and the China bloc each contain roughly a quarter of the countries in the world, with about half the countries remaining unaligned. However, we also find that as cross-bloc trade costs increased, within-bloc trade costs fell. We use a quantitative model to compute the real income effects of this reconfiguration of the global trade costs. The median country in the world, and the median country within each bloc, has 0.4-0.6% *higher* real income as a result of the observed decoupling, contrary to the widespread belief that fragmentation has been welfare-reducing. Finally, we find a modest amount of bloc misalignment: the median country in the US bloc would actually be better off in the China bloc, and vice versa. These results suggest that trade decoupling does not always follow trade-driven economic interests.

*Keywords:* decoupling, fragmentation, global value chains

*JEL Codes:* F41, F44, F62, L16

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\*We thank Dennis Zhao for excellent research assistance. A user-friendly code that implements a generalized version of the global network model used in this paper is available online [here](#). The views expressed herein are those of the authors and should not be attributed to the IMF, its Executive Board, or its management.

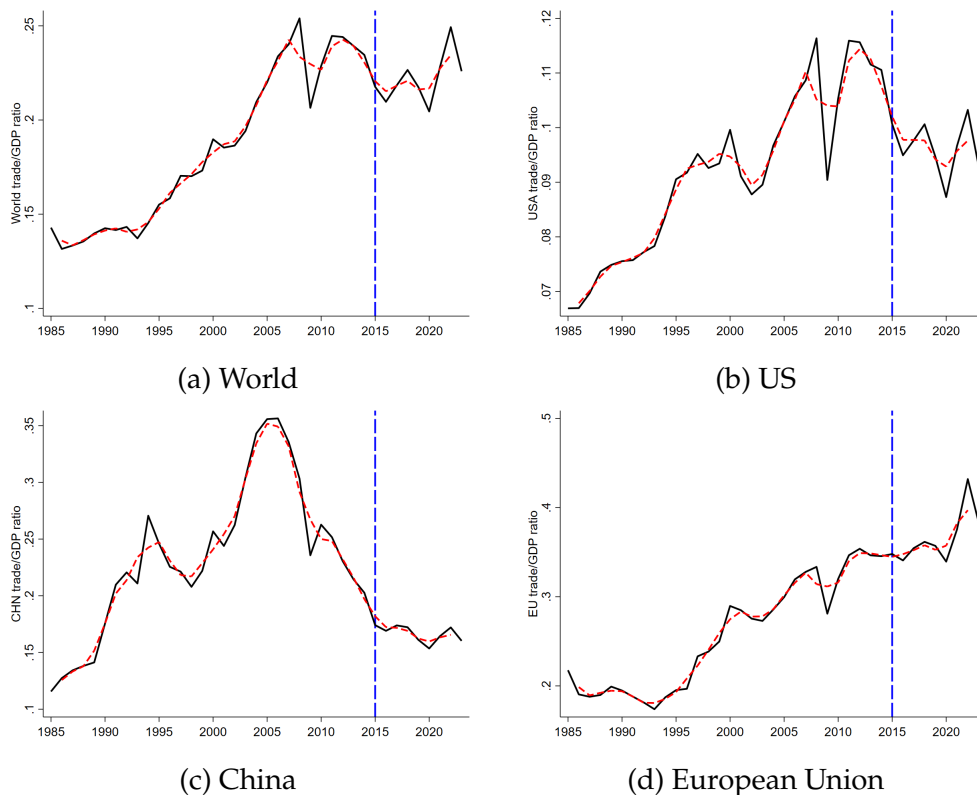
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# 1. INTRODUCTION

After a long era of ever-increasing globalization, in the past decade the world entered a period of substantial headwinds to economic integration, punctuated by Brexit, the US-China trade war, and the rupture of economic relations between the West and Russia. It is now common to wonder whether these events mark the onset of “deglobalization.”

However, world trade relative to economic activity has not in fact fallen since the onset of these shocks. Figure 1(a) plots the evolution of world goods trade to GDP from 1985 to 2023, with the vertical line at 2015, the year prior to the Brexit vote in the UK and the Trump victory in the US. Since that year, world trade has remained resilient; in fact it partly reversed the downward trend that started in 2009. Even more strikingly, the trade-GDP ratio did not fall even for the large economies at the center of the policy-induced trade disruptions: the US, China, and the EU, as displayed in panels (b)-(d) of Figure 1. Even the main parties to the trade conflicts did not experience a discernible fall in total trade.

Figure 1: Trade/GDP Ratios



**Notes:** Solid line denotes the trade-GDP ratio, defined as  $\frac{0.5 \times (\text{exports} + \text{imports})}{\text{GDP}}$ . Dashed line denotes the 3-year moving average of the trade-GDP ratio. Vertical line denotes the beginning of the US-China trade war.

**Sources:** DOTS, WEO.

The proximate explanation is that even as countries in trade conflicts disengaged from each other, they increased trade with other countries. Table 1 confirms this. It reports the changes in bilateral

Table 1: Change in trade (2015-2023)

| ↓ Exporter   Importer →        | USA    | China  | EU    | ROW    |
|--------------------------------|--------|--------|-------|--------|
| USA                            |        | -0.275 | 0.262 | 0.015  |
| China                          | -0.401 |        | 0.237 | 0.137  |
| EU                             | 0.050  | -0.066 | 0.148 | -0.014 |
| ROW                            | 0.012  | 0.047  | 0.035 | 0.105  |
| Change in total imports-to-GDP | -0.070 | 0.005  | 0.128 | 0.076  |

**Notes:** Table presents the percentage change in the imports-to-GDP ratio from the source economy to the destination economy between 2015 and 2023. Rows represent exporters and columns represent importers. “ROW” denotes rest-of-the-world.

trade in these major economies. Even as trade between the US and China fell, trade between those economies and the rest of the world increased. The world economy is experiencing decoupling or fragmentation, rather than deglobalization.

This paper measures decoupling and quantifies its impact on real GDP and income in a large sample of countries.<sup>1</sup> First, we use an entirely data-driven approach to detect fragmentation fault lines in international trade flows and classify countries into trade blocs. Relying on the gravity tradition of measuring trade costs, we project the log changes in bilateral goods trade over the period 2015-2023 on multilateral resistance (as captured by importer and exporter fixed effects). The residual from this estimation can be interpreted as the relative change in the bilateral component of trade costs between pairs of countries. Based on these, we classify countries into 3 groups: the US bloc, the China bloc, and unaligned. Countries in the US bloc are those that experienced a relative fall in trade costs with the US, and a relative rise in trade costs with China. The opposite is true for the countries in the China bloc. We classify countries whose trade costs with the US and China changed in the same direction as unaligned. In the full sample of 187 countries for which bilateral trade data are available, 43 are in the US bloc, 46 in the China bloc, and the remaining 98 are unaligned.

Next, we assess the aggregate consequences of decoupling in a quantitative multi-country, multi-sector international trade model following [Huo, Levchenko, and Pandalai-Nayar \(2023\)](#), [Bonadio et al. \(2021\)](#), and [Bonadio et al. \(2023a\)](#). Starting from the 2015 world economy, we apply the matrix of bilateral trade cost changes that occurred between 2015 and 2023, and compute the resulting changes in real GDP and real incomes. This exercise isolates the changes in trade costs occurring over this period from other shocks experienced by the world economy, and individual countries, such as productivity or structural change.

An important challenge we face is that we cannot use the usual model inversion techniques to recover the changes in trade costs that explain the trade data, because we do not have domestic absorption data for 2023. We also cannot compute the absolute changes in trade costs from the gravity

<sup>1</sup>In the paper, we use decoupling and fragmentation interchangeably to denote policy-induced changes in the sources and destinations of cross-border trade flows, which could be guided by strategic considerations, such as national and economic security, sovereignty, and autonomy.

regressions, because they only yield changes in trade costs relative to an omitted im/exporter in the regression. To overcome this challenge, we scale the gravity regression-implied bilateral trade cost changes by a common factor so that the model matches the 2015-23 change in the world trade/GDP ratio depicted in Figure 1(a). This approach allows us to preserve the full heterogeneity in trade cost changes at the country pair level, while matching the world trade trend.

We find that the median country experienced a 0.6% real GDP and real income *increase* from the trade cost changes occurring from 2015 to 2023. Thus, contrary to conventional wisdom, the decoupling process has not reduced world GDP as a whole thus far. Predictably, the income changes are larger for nonaligned countries (0.8%) than the countries in the US or the China blocs, since those countries do not systematically increase their trade costs with either bloc. But even the countries in the US and China blocs on average experience real income gains from these trade cost changes. The positive impacts of these trade cost changes are in fact quite broad-based: 51 out of 66 countries in the sample experienced real income increases from the observed trade cost changes. The ultimate source of this finding is that global trade has remained quite stable relative to global activity between 2015-23, with the decline in trade flows between some countries (e.g. the US and China) more than offset by increasing trade flows between others. *Prima facie*, this points to no major increases in average trade costs, with consequent lack of adverse impact on real GDP on average.

We then explore the consequences of bloc alignment. In particular, for each country we compute the counterfactual changes in real GDP and income that would have occurred had it belonged to a different bloc. We find that the bloc alignment uncovered in the data corresponds poorly to trade-related economic interests. On average, countries in the US bloc would gain from moving to the China bloc, while the China bloc countries would gain from moving to the US bloc. Unaligned countries would on average lose from joining either bloc. These results suggest that other motives (presumably geopolitically driven) are likely at play in the rewiring of trade flows in recent years. Behind these averages is complete heterogeneity across countries within each bloc: one can find both potential winners and losers from inter-bloc moves.

**Related Literature.** This paper contributes to several fast-growing strands of literature. A number of studies have examined the causes and consequences of recent policies that have heralded greater inward orientation by major advanced economies, such as the US increase in tariffs of Chinese imports (e.g. [Fajgelbaum et al., 2024](#)); [Amiti, Redding, and Weinstein \(2019\)](#) or Brexit (e.g. [Sampson, 2017](#); [Dhingra and Sampson, 2022](#)). These papers document the negative consequences of these policies on individual countries, but do not provide a quantitative analysis of the GDP impacts worldwide, which is one of our contributions. While the focus of this literature is primarily on large adverse shocks to trade costs, fostering the narrative of rising barriers to globalization, [Bown, Jung, and Zhang \(2019\)](#) document that trade costs did not uniformly increase in all episodes. In fact, during the US-China trade war, China lowered its most favored nation (MFN) tariffs, effectively decreasing the trade barriers it imposes on the rest of the world, while raising them against the US. Our analysis

corroborates the highly heterogeneous patterns of changes in bilateral trade costs across country pairs thus far.

The slowdown in the pace of globalization following the Global Financial Crisis in 2008 has generated debate about whether we are in an era of deglobalization. Recent studies have argued that there is no evidence supporting a deglobalization narrative based on trends in aggregate trade to GDP ratios (Antràs, 2020; Goldberg and Reed, 2023). Gopinath et al. (2024) also find no evidence of a large decrease in trade flows overall, and patterns more suggestive of fragmentation, with trade between geopolitically distant blocs significantly lower than trade within blocs since Russia's invasion of Ukraine. However, that paper documents that the barriers to trade and FDI have continued to increase in recent years. The reallocation of trade and FDI flows and the lengthening of supply chains is documented by an ever growing number of studies (e.g. Aiyar et al., 2023; Freund et al., 2023b,a; Alfaro and Chor, 2023; Blanga-Gubbay and Rubínová, 2023). The existing work on fragmentation and reallocation has focused either on the decoupling between the US and China, or fragmentation of trade between pre-defined blocs of countries. We complement these studies by examining the reallocation of trade flows across all country pairs within the gravity framework to deduce the relative changes in bilateral trade costs from the data and quantify their impact. Our methodology also allows us to identify the set of "unaligned" countries based on observed trade patterns, and examine the correlates of being a "connector" in a systematic manner.

Our paper is also related to the fast-growing literature studying geoeconomics including Clayton, Maggiori, and Schreger (2023), Aiyar, Presbitero, and Ruta (2023), Attinasi, Boeckelmann, and Meunier (2023), Bolhuis, Chen, and Kett (2023), Cerdeiro et al. (2021), Javorcik et al. (2024), and Hakobyan, Meleshchuk, and Zymek (2023). A subset of these papers use quantitative models to study the economic implications of fragmentation. We contribute to this literature by assigning countries to blocs using revealed trade cost changes, and studying whether countries have optimally selected their blocs, given the choices of the rest of the world.

Finally, our approach to bloc assignment uses revealed trade barriers in a simple gravity equation setting. Several recent papers have alternatively used UN votes to assign countries to blocs (Góes and Bekkers, 2022; Bolhuis, Chen, and Kett, 2023). We find that UN votes are correlated with our revealed blocs, albeit not perfectly. Other approaches to bloc assignment include treating the US-EU as a bloc, and China-Russia as a bloc (e.g. Fernández-Villaverde, Mineyama, and Song, 2024).<sup>2</sup>

The rest of the paper is organized as follows. Section 2 describes the data and the classification of countries into blocs. Section 3 lays out the quantitative model and results. Section 4 concludes. Further details on bloc classification, model solution, and alternative exercises are collected in the appendix.

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<sup>2</sup>Yang and Liu (2024) study the evolution of international power arising through trade relationships and find countries build up power in anticipation of future disputes. However they do not relate their measures of power to eventual formation of geopolitical blocs.

## 2. DATA, BASIC FACTS, AND BLOC CLASSIFICATION

### 2.1 Data

The analysis uses data from two main sources. Bilateral trade flows up to 2023 come from the IMF’s Direction of Trade Statistics (DOTS). This dataset has the advantage of being quite up to date, with 2023 already available. This is important as some of the most significant fragmentation events, such as the 2022 invasion of Ukraine, are quite recent. In addition, it covers 187 countries. We supplement the bilateral data with nominal GDP data from the IMF World Economic Outlook. Model quantification requires more detailed data on production and input use. The quantitative model and the counterfactual exercises use the OECD’s Inter-Country Input-Output (ICIO) tables to calibrate input shares. The sample is thus reduced to 66 countries, listed in Appendix Table A1. Our model implementation employs an aggregation to 22 sectors, listed in Appendix Table A2. We use the 2015 as the initial (pre-shock) period when applying the estimated trade cost changes to the world economy.

### 2.2 Bloc classification

To classify countries into blocs, we start from the standard gravity equation, log-differenced between 2015 and 2023:

$$\Delta \ln X_{mn} = \delta_m + \delta_n + w_{mn}, \quad (2.1)$$

where  $\Delta \ln X_{mn}$  is the log change in exports from country  $m$  to country  $n$ ,  $\delta_m$  and  $\delta_n$  are importer and exporter fixed effects, and  $w_{mn}$  is the residual. The fixed effects  $\delta_m$  and  $\delta_n$  capture the changes in exporter and importer multilateral resistance terms. These absorb all the country-specific demand and supply shocks, changes in price indices, and any changes in trade barriers that occur at the importer or exporter (rather than bilateral pair) level. The residual then reflects the change in all bilateral trade barriers – observed and unobserved – between country  $m$  and country  $n$ , up to the trade elasticity. See, among many others, [Anderson and van Wincoop \(2003\)](#), [Head and Ries \(2001\)](#), [Anderson and van Wincoop \(2004\)](#), or [Head and Mayer \(2015\)](#) for this type of structural interpretation of the gravity estimates, which is standard in the literature. We choose 2015 as the initial year, as the Brexit vote and the election of Donald Trump in 2016 were the first major events of the decoupling era. We end in 2023 as the Russian invasion of Ukraine happened in 2022. The appendix reports results for 2016-2023, since the first US-China trade war tariffs went into force in 2017.

Having recovered the estimated residual  $\hat{w}_{mn}$  from estimating (2.1), we transform it into the change in bilateral trade costs by applying the trade elasticity  $1 - \gamma$ :  $\Delta \ln \tau_{mn} = \hat{w}_{mn}/(1 - \gamma)$ . This step is also standard, see e.g. [Head and Mayer \(2015\)](#). As these data do not include domestic trade flows, the residual is interpreted as the change in bilateral trade costs relative to a reference (omitted) country pair, rather than in absolute terms.

Table 2: Log Change in Average Trade Cost between Blocs (187 countries, 2015-2023)

| ↓ Exporter   Importer → | Bloc USA | Bloc CHN | Unaligned | Overall |
|-------------------------|----------|----------|-----------|---------|
| Bloc USA                | -0.020   | 0.076    | 0.006     | 0.001   |
| Bloc CHN                | 0.105    | -0.043   | 0.085     | 0.075   |
| Unaligned               | 0.013    | 0.009    | 0.045     | 0.025   |
| Overall                 | 0.034    | 0.031    | 0.038     | 0.035   |

**Notes:** We classify countries into 3 groups, Bloc USA, Bloc CHN, and Unaligned. Then, all country pairs are classified into 9 group pairs. We report the average  $\Delta \ln \tau_{mn}$  for country pairs belonging to each group pair, weighted by bilateral trade flows in 2015. The Overall column is the average  $\Delta \ln \tau_{mn}$  of all trade flows from(to) each exporter(importer) group.

Our bloc classification scheme is simple. A country is in the US bloc if its average import and export costs with respect to the US fell, and the trade costs with respect to China rose. A country is in the China bloc if the opposite is true. Formally:

$$n \in l \text{ bloc if } \frac{1}{2}(\tau_{n,l} + \tau_{l,n}) < 0 \text{ and } \frac{1}{2}(\tau_{n,m} + \tau_{m,n}) > 0; \{l, m\} \in \{\text{USA, China}\}, l \neq m.$$

All other countries are unaligned.

Figure 2 illustrates this classification scheme. It displays the changes in trade costs with the US on the horizontal axis and with China on the vertical axis. The left panel displays all countries available in the IMF DOTS dataset, and the right panel retains only countries included in the quantitative model implemented below. The countries in the upper left quadrant are the US bloc, and the countries in the lower right quadrant are the China bloc. The countries in the other quadrants either increased their trade costs with both China and the US, or decreased their trade costs with both. Appendix Table A3 displays the full list of countries in all blocs.

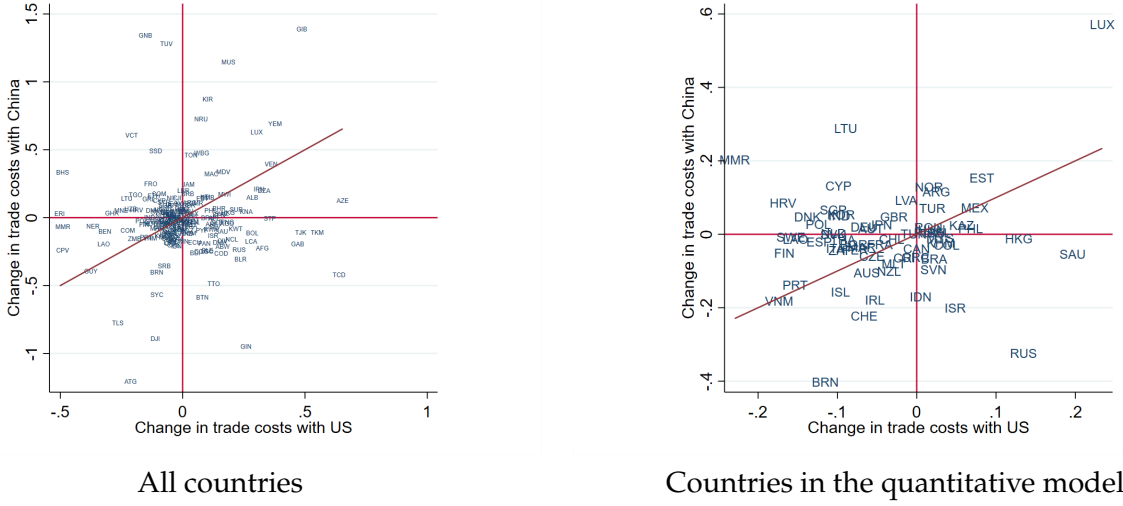
Out of 187 countries, 43 align with the US and 46 with China. The majority of countries (98) remain non-aligned by our metric. Table 2 displays the average trade cost changes across blocs. Focusing on countries included in our quantitative model, Russia, Saudi Arabia, Israel and Hong Kong are clearly aligned with China. Countries in the US bloc are predominantly European, but also include India, Korea, Japan, and Singapore.

We next turn to the quantitative assessment of the global real impact of this cross section of trade cost changes. Since the regression above can only identify relative trade cost changes, an important use of the quantitative model will be to discipline the mean level of trade cost changes.

### 3. QUANTITATIVE FRAMEWORK

We implement the multi-country multi-sector global production network model of [Huo, Levchenko, and Pandalai-Nayar \(2023\)](#), [Bonadio et al. \(2021\)](#), and [Bonadio et al. \(2023a\)](#). This framework enables us to quantify changes in GDP and real income resulting from the observed changes in trade costs for

Figure 2: Change in Trade Costs with the US and China (2015-2023)



**Notes:** The x-axis refers to the change in trade costs with the US, measured as  $d \ln \tau_n^{USA} = \frac{1}{2} \left( \frac{1}{1-\gamma} \hat{w}_{n,USA} + \frac{1}{1-\gamma} \hat{w}_{USA,n} \right)$ , which is recovered from equation (2.1). Similarly, the y-axis refers to the change in trade costs with China, measured as  $d \ln \tau_n^{CHN} = \frac{1}{2} \left( \frac{1}{1-\gamma} \hat{w}_{n,CHN} + \frac{1}{1-\gamma} \hat{w}_{CHN,n} \right)$ . The left panel displays all countries for which trade data is available until 2023. The right panel displays the countries included in our quantitative model.

all countries in general equilibrium.

### 3.1 Setup

**Preliminaries.** Let there be  $N$  countries indexed by  $n, m$ , and  $\ell$ , and  $J$  sectors indexed by  $j, i$ , and  $k$ . Each country  $n$  is populated by households that consume the final good available in country  $n$  and supply labor to firms.

**Households.** There is a continuum of households indexed by  $\omega$ , that maximize

$$\max_{\mathcal{F}_n(\omega), H_n(\omega)} \left( \mathcal{F}_n(\omega) - \chi_n \frac{H_n(\omega)^{1+1/\psi}}{1+1/\psi} \right) \quad (3.1)$$

subject to

$$P_n \mathcal{F}_n = W_n(\omega) H_n(\omega)$$

where  $\mathcal{F}_n(\omega)$  is consumption of final goods,  $P_n$  is its price index, and  $H_n(\omega)$  is the supply of hours worked, receiving a wage  $W_n(\omega)$ . Each household can supply labor to any sector  $j$  with household-specific productivity  $b_{nj}(\omega)$ . If household  $\omega$  decides to work in sector  $j$ , it supplies  $b_{nj}(\omega) H_n(\omega)$  effective units of labor and collects the labor income of  $W_n(\omega) H_n(\omega) = W_{nj} b_{nj}(\omega) H_n(\omega)$ , where  $W_{nj}$  is the equilibrium price of one efficiency unit of labor in that country-sector. The household



idiosyncratic labor productivity in sector  $j$  is distributed  $b_{nj}(\omega) \sim \text{Fréchet}(\xi_{nj}, \mu)$ , with dispersion parameter  $\mu$  and central tendency parameter  $\xi_{nj}$  that can potentially vary by country and sector. With some manipulation (see [Bonadio et al., 2023b](#)), labor supply to sector  $j$  can be written as:

$$H_{nj} = \xi_{nj} \left( \frac{1}{\chi_n} \frac{W_n}{P_n} \right)^\psi \left( \frac{W_{nj}}{W_n} \right)^{\mu-1}, \quad (3.2)$$

up to a normalization constant and under the regularity condition that  $\mu > \psi + 1$ , and where  $W_n \equiv (\sum_i \xi_{ni} W_{ni}^\mu)^{\frac{1}{\mu}}$  is an economy-wide wage index. Aggregate labor supply is:

$$H_n = \left( \frac{W_n}{P_n \chi_n} \right)^\psi \quad (3.3)$$

up to a normalization constant. Aggregate labor supply thus coincides with the GHH utility formulation ([Greenwood, Hercowitz, and Huffman, 1988](#)), and is governed by the Frisch elasticity  $\psi$ . At the same time, conditional on the aggregate labor supply, labor supply to an individual sector is isoelastic with elasticity  $\mu - 1$  in that sector's relative wage, as in the "Roy-Fréchet" formulation (e.g. [Lagakos and Waugh, 2013](#); [Hsieh et al., 2019](#); [Galle, Rodríguez-Clare, and Yi, 2023](#)).

Final consumption  $\mathcal{F}_{nt}$  is a CES aggregate of sectoral consumption bundles:

$$\mathcal{F}_n = \left[ \sum_j \zeta_{nj}^{\frac{1}{\rho}} \mathcal{F}_{nj}^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}}, \quad P_n = \left[ \sum_j \zeta_{nj} (P_{nj}^f)^{1-\rho} \right]^{\frac{1}{1-\rho}},$$

where  $\mathcal{F}_{nj}$  is the sector  $j$  quantity consumed, and  $P_{nj}^f$  is its price. Trade is subject to iceberg costs  $\tau_{mnj}^f$  to ship final good  $j$  from country  $m$  to country  $n$  (throughout, we adopt the convention that the first subscript denotes source, and the second destination). Sector  $j$  bundle is an Armington aggregate of goods coming from different countries:

$$\mathcal{F}_{nj} = \left[ \sum_m \mu_{mnj}^{\frac{1}{\gamma}} \mathcal{F}_{mnj}^{\frac{\gamma-1}{\gamma}} \right]^{\frac{\gamma}{\gamma-1}}, \quad P_{nj}^f = \left[ \sum_m \mu_{mnj} (\tau_{mnj}^f P_{mj})^{1-\gamma} \right]^{\frac{1}{1-\gamma}},$$

where  $\mathcal{F}_{mnj}$  is the final consumption by country  $n$  of sector  $j$  goods imported from country  $m$ , and  $\gamma$  controls the substitution elasticity between different origin-sector goods within a category. The  $P_{mj}$ 's are the prices of sector  $j$  country  $m$ 's product "at the factory gate" in the origin country. No arbitrage in shipping implies that the price faced by the consumer in  $n$  is  $P_{mj}$  times the iceberg cost  $\tau_{mnj}^f$ .

The share of sector  $j$  composite in total final expenditure  $\pi_{nj}^f$ , and the share of the good from

country  $m$  in total sector  $j$  final expenditure  $\pi_{mnj}^f$  are given by

$$\pi_{nj}^f = \frac{\zeta_{nj} (P_{nj}^f)^{1-\rho}}{\sum_k \zeta_{nk} (P_{nk}^f)^{1-\rho}} \quad \pi_{mnj}^f = \frac{\mu_{mnj} (\tau_{mnj}^f P_{mj})^{1-\gamma}}{\sum_\ell \mu_{\ell nj} (\tau_{\ell nj}^f P_{\ell jt})^{1-\gamma}}.$$

**Firms.** A representative firm in sector  $j$  in country  $n$  operates a CRS production function

$$Y_{nj} = Z_{nj} H_{nj}^{\eta_j} X_{nj}^{1-\eta_j}, \quad (3.4)$$

where the total factor productivity is denoted by  $Z_{nj}$ , and the intermediate input usage  $X_{nj}$  is an aggregate of sectoral inputs:

$$X_{nj} \equiv \left( \sum_i \vartheta_{i,nj}^{\frac{1}{\varepsilon}} X_{i,nj}^{\frac{\varepsilon-1}{\varepsilon}} \right)^{\frac{\varepsilon}{\varepsilon-1}}.$$

Because it is the only primary factor of production,  $H_{nj}$  should be interpreted as “equipped labor” that encompasses all primary factor services (Alvarez and Lucas, 2007). The total use of sector  $i$  inputs in sector  $j$  in country  $n$  is an Armington aggregate across different source countries:

$$X_{i,nj} \equiv \left( \sum_m \mu_{mi,nj}^{\frac{1}{\nu}} X_{mi,nj}^{\frac{\nu-1}{\nu}} \right)^{\frac{\nu}{\nu-1}} \quad P_{i,nj}^X = \left( \sum_m \mu_{mi,nj} (\tau_{mi,nj}^x P_{mi})^{1-\nu} \right)^{\frac{1}{1-\nu}},$$

where  $X_{mi,nj}$  is the usage of inputs coming from sector  $i$  in country  $m$  in production of sector  $j$  in country  $n$ ,  $\mu_{mi,nj}$  is a taste shifter, and  $P_{i,nj}^X$  is the price index of sector  $i$  inputs in production of sector  $j$  in country  $n$ . We allow the iceberg trade cost for intermediate inputs  $\tau_{mi,nj}^x$  to generically differ from the iceberg trade cost for final goods  $\tau_{mni}^f$ .

Let  $\pi_{i,nj}^x$  be the share of sector  $i$  in total intermediate expenditure by  $(n, j)$ , and  $\pi_{mi,nj}^x$  be the share of intermediates from country  $m$  in total intermediate spending on sector  $i$  by  $(n, j)$ :

$$\pi_{i,nj}^x = \frac{\vartheta_{i,nj} (P_{i,nj}^X)^{1-\varepsilon}}{\sum_k \vartheta_{k,nj} (P_{k,nj}^X)^{1-\varepsilon}} \quad \pi_{mi,nj}^x = \frac{\mu_{mi,nj} (\tau_{mi,nj}^x P_{mi})^{1-\nu}}{\sum_\ell \mu_{\ell i,nj} (\tau_{\ell i,nj}^x P_{\ell it})^{1-\nu}}.$$

To summarize, both final use and intermediate input bundles have two nests, governed by different elasticities. The upper nest combines broad sectors, such as textiles and apparel, machinery, or retail trade. The lower nest is an Armington aggregate of items coming from different source countries.

Firms are competitive and price at marginal cost. Cost minimization implies that the payments to

primary factors and intermediate inputs are:

$$W_{nj}H_{nj} = \eta_j P_{nj} Y_{nj} \quad (3.5)$$

$$P_{mi,nj} X_{mi,nj} = \pi_{i,nj}^x \pi_{mi,nj}^x (1 - \eta_j) P_{nj} Y_{nj}. \quad (3.6)$$

**Equilibrium.** An equilibrium in this economy is a set of goods and factor prices  $\{P_{nj}, W_{nj}\}$ , factor allocations  $\{H_{nj}\}$ , and goods allocations  $\{Y_{nj}\}, \{\mathcal{F}_{mnj}, X_{mi,nj}\}$  for all countries and sectors such that (i) households maximize utility; (ii) firms maximize profits; and (iii) all markets clear.

At the sectoral level, the following market clearing condition has to hold for each country  $n$  sector  $j$ :

$$P_{nj} Y_{nj} = \sum_m P_m \mathcal{F}_m \pi_{mj}^f \pi_{nmj}^f + \sum_m \sum_i (1 - \eta_i) P_{mi} Y_{mi} \pi_{j,mi}^x \pi_{nj,mi}^x. \quad (3.7)$$

Meanwhile, trade balance implies that each country's final expenditure equals the sum of value added across domestic sectors:

$$P_m \mathcal{F}_m = \sum_i \eta_i P_{mi} Y_{mi}. \quad (3.8)$$

Our simulations shock the world economy with changes in iceberg trade costs and compute changes relative to the pre-shock equilibrium. We report results for two aggregate outcomes: real GDP and real income. The real GDP change in any country  $n$  following a vector of trade cost shocks is to first order given by

$$d \ln G_n = \sum_{j=1}^J \eta_j \frac{P_{nj,0} Y_{nj,0}}{G_{n,0}} d \ln H_{nj}, \quad (3.9)$$

where the items subscripted by a "0" denote the steady state/pre-shock values. This expression for the real GDP follows from the systems of national accounts definition of real GDP as output evaluated at base prices minus inputs evaluated at base prices. (For the complete detail see, e.g. [Huo, Levchenko, and Pandalai-Nayar, 2023](#); [Bonadio et al., 2023b](#)). The advantage of real GDP is that it is a familiar object that is tracked by national accounts. The disadvantage is that because it keeps prices at their pre-shock values, it does not take into account the fact that changes in trade costs affect import prices, which are in the consumption price index. Thus, we will also report results for the real income, defined as  $W_n/P_n$  (and also referred to as real wage).

**Equilibrium in changes.** We use exact-hat algebra to solve the model in changes. We denote gross proportional changes from an initial equilibrium using "hat" variables:  $\hat{X} = \frac{X'}{X}$ , where  $X$  is the initial equilibrium value and  $X'$  is the new equilibrium value. For a given change in trade costs  $\hat{\tau}_{mi,nj}^x$  and  $\hat{\tau}_{mnj}^f$ , we can solve for the change in all endogenous variables according to the formulas derived in [Appendix B](#).

Table 3: Parameter values

| Param.                          | Value | Source                                | Related to                                   |
|---------------------------------|-------|---------------------------------------|--|
| $\rho$                          | 1     |                                       | final cross-sector substitution elasticity   |
| $\varepsilon$                   | 1     |                                       | intermediate cross-sector subst. elasticity  |
| $\gamma$                        | 4     | Broda and Weinstein (2006)            | trade elasticity in final consumption        |
| $\nu$                           | 4     | Broda and Weinstein (2006)            | trade elasticity in intermediate inputs      |
| $\psi$                          | 1     | Chetty et al. (2011)                  | Frisch elasticity of labor supply            |
| $\mu$                           | 1.5   | Galle, Rodríguez-Clare, and Yi (2023) | Sectoral labor supply elasticity             |
| $\eta_j$                        |       | ICIO                                  | value added share in gross output            |
| $\pi_{njt}^f, \pi_{i,njt}^x$    |       | ICIO                                  | sectoral consumption and intermediate shares |
| $\pi_{m njt}^f, \pi_{mi,njt}^x$ |       | ICIO                                  | final and intermediate trade shares          |

**Notes:** This table summarizes the parameters and data targets used in the quantitative model and their sources.

### 3.2 Calibration

Table 3 summarizes the parameters we use. We set the substitution elasticities between sectors in final consumption ( $\rho$ ) and intermediate use ( $\varepsilon$ ) to 1. For the Armington elasticities of substitution between goods coming from different source countries in the final ( $\gamma$ ) and intermediate ( $\nu$ ) bundles, we adopt a conventional value of 4 (e.g. Broda and Weinstein, 2006). The Frisch labor supply elasticity is set to 1 following the business cycle literature (Chetty et al., 2011), and the parameter  $\mu$  which governs the sectoral labor supply elasticity  $\mu$  is set to 1.5 following Galle, Rodríguez-Clare, and Yi (2023). Production function parameters and final/input shares are taken directly from the data.

### 3.3 Baseline trade cost change scenario

As mentioned above, the gravity estimation only identifies the relative trade cost changes. To pin down the absolute changes, we use the model to target the data on the world trade to GDP ratio. Specifically, we start from the 2015 equilibrium and shock it with the following trade cost changes for all exporting manufacturing sectors  $i$ :

$$\hat{\tau}_{mi,nj}^x = \hat{\tau}_{mni}^f = \exp\left(\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}\right) \quad \forall m \neq n, \quad (3.10)$$

where  $\Delta \ln \tau_{mn}$  are the bilateral (relative) trade costs backed out in Section 2.2, and  $\Delta \ln \tau^{base}$  is a trade cost shifter common to all country pairs. We search for a  $\Delta \ln \tau^{base}$  such that the change in the world trade to GDP ratio in the model matches the change in the data from 21.8% in 2015 to 22.6% in 2023, a 0.8 percentage point increase.

We find a  $\Delta \ln \tau^{base} = -0.003$ , implying that if anything, on average trade costs decreased by 0.3%.<sup>3</sup>

<sup>3</sup>While the model can accommodate standard shocks such as productivity or demand, we abstract from shocks that are not changes to trade costs in this exercise. Additional shocks would help match the evolution of GDP in each country. We discipline the average (“base”) trade cost change using the differential change in trade relative to GDP worldwide. World

Table 4: Log Change in Average Trade Costs between Blocs (2015-2023)

| ↓ Exporter   Importer → | Bloc USA | Bloc CHN | Unaligned | Overall |
|-------------------------|----------|----------|-----------|---------|
| Bloc USA                | -0.043   | 0.043    | 0.007     | 0.000   |
| Bloc CHN                | 0.117    | -0.069   | 0.027     | 0.053   |
| Unaligned               | -0.030   | -0.032   | -0.005    | -0.021  |
| Overall                 | 0.005    | -0.009   | 0.007     | 0.003   |

**Notes:** We classify countries into 3 groups, Bloc USA, Bloc CHN, and Unaligned. Then, all country pairs are classified into 9 group pairs. We report the average  $\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}$  for country pairs belonging to each group pair, weighted by bilateral trade flows in 2015. The Overall column/row is the average  $\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}$  of all trade flows from(to) each exporter(importer) group.

Figure 3 displays the trade-weighted import and export trade cost changes for each country. Table 4 shows the average trade cost changes across blocs, inclusive of the calibrated  $\Delta \ln \tau^{base}$ , as well as the overall trade cost changes for each bloc pair. As expected, trade costs between the US and China bloc have increased. Trade costs from the China bloc to the US bloc increased by 11.7%, and in the opposite direction they rose by 4.3%. However, these increases are counteracted by reductions in within-bloc trade costs, as well as in import trade costs from the unaligned countries. Only the China bloc experiences an overall increase in export costs, and none of the blocs see significant increases in overall import costs. Hence, the more structural approach confirms the picture emerging from the raw data in Table 1 in the Introduction: while fragmentation has happened, overall trade costs have not increased. Appendix Table B1 presents the classification of the countries in the model into blocs. This classification is done based on the calibrated absolute changes in trade costs  $\hat{\tau}_{mni}^f / \hat{\tau}_{mi,nj}^x$  in (3.10), rather than the relative ones in Section 2. According to the classification, 14 countries are in the US bloc and 10 in the China bloc (beyond the US and China themselves).

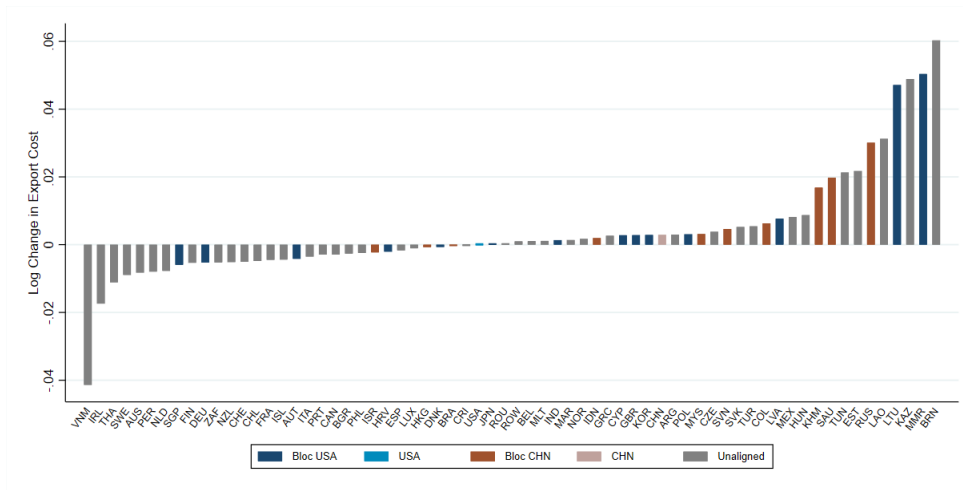
Figure 4 illustrates the changes in real GDP and real incomes for each country in the model factual. Table 5 displays summary statistics of the changes in real GDP and incomes. While there is quite a bit of heterogeneity, the median country actually sees a 0.6% gain, and three-quarters of the countries experience an increase in both real GDP and real incomes, with the median changes positive in all blocs. The US and China themselves see changes close to zero. Neither countries in the US bloc nor countries in the China bloc see uniform gains or losses. Even at the 25th percentiles, only in the China bloc the changes are negative. Recall that this scenario mutes any productivity or demand shocks. The equilibrium changes in GDP predicted here are entirely due to the observed trade cost changes in the data during the decoupling period. The factual suggests that, given the observed pattern of trade cost changes and taking into account the general equilibrium effects such as substitution towards partners facing lower trade costs, most countries' output and real incomes increased during this period.

The modest positive average effects are accompanied by large heterogeneity in GDP and income impacts across countries. At the top, Vietnam and Laos strongly benefit, gaining 6.9% and 3.5%,

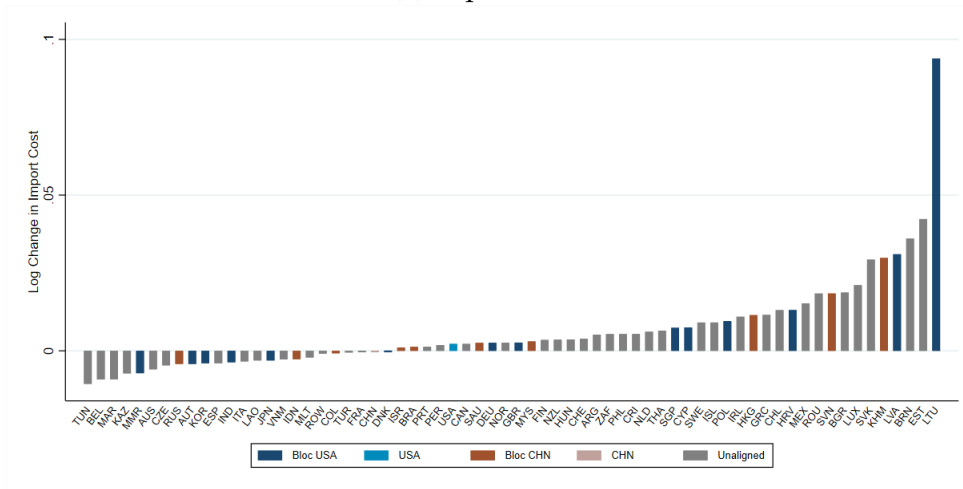
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GDP growth and its level are not pinned down by this exercise. While we refer to the base change as a change in average trade costs, these incorporate average changes in preferences for foreign goods as well.

Figure 3: Baseline Change in Trade Costs (2015-2023)



(a) Export costs



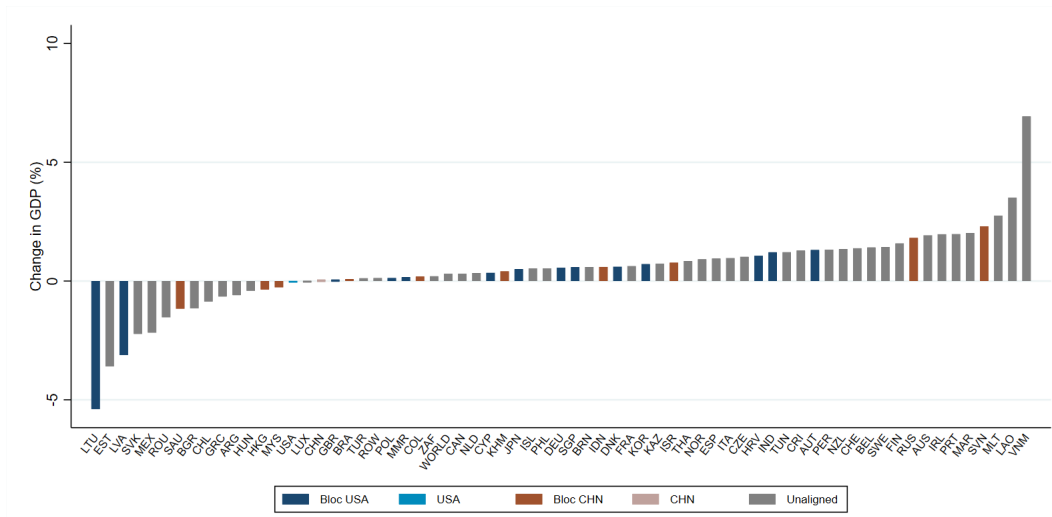
(b) Import costs

**Notes:** The top and bottom panels show the log change in export and import costs implied by the model factual, respectively. The changes in trade costs are measured as the trade-weighted mean change in trade cost across all sectors.

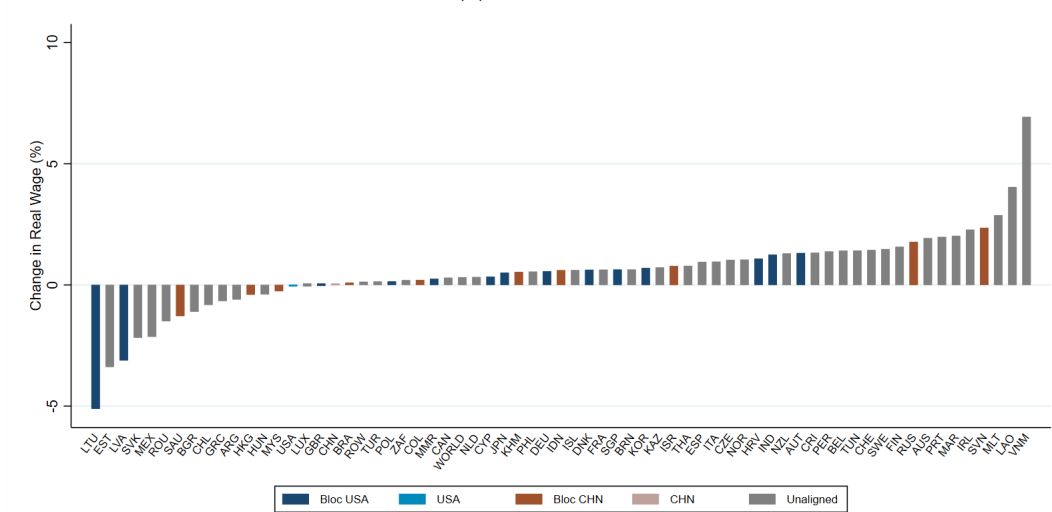
respectively. Vietnam and Laos experienced trade cost declines with both the US and China. While our classification considers Vietnam and Laos unaligned, the quantification shows large increases in bilateral trade with these countries, and increases in their GDP and real incomes. This is consistent with the anecdotal accounts of supply chains shifting away from China and towards countries like Vietnam.<sup>4</sup> At the opposite extreme are the Baltic countries, whose close trade links with Russia unraveled, without a compensating decrease in trade costs elsewhere. As a result, these countries experienced losses of 3-5%.

<sup>4</sup>See for example "Vietnam is emerging as a winner from the era of deglobalisation", The Economist, Sept. 22, 2022.

Figure 4: Baseline Change in Real GDP and Real Income (2015-2023)



(a) Real GDP



(b) Real Income

**Notes:** The top panel shows the change in GDP, in percentage points, implied by the model baseline change in trade costs. The bottom panel shows the change in real income implied by the model baseline change in trade costs.

### 3.4 Counterfactuals

According to the factual simulation above, most countries are actually better off in the fragmented world, as trade costs decreases within blocs more than offset trade cost increases across blocs. A natural question is whether countries sort into blocs according to benefits arising from international trade. To answer this question, we perform counterfactual exercises in which we move countries to different blocs and compare their real outcomes to the baseline.

Specifically, we first construct the average import and export trade cost change between each country and a given bloc. For each country  $m$  and bloc  $l$ , we compute the average export cost change

Table 5: Baseline Change in Real GDP and Real Income, Percentage Points (2015-2023)

| Bloc      | Real GDP |        |       | Real Income |        |       |
|-----------|----------|--------|-------|-------------|--------|-------|
|           | Median   | p25    | p75   | Median      | p25    | p75   |
| Overall   | 0.588    | 0.061  | 1.297 | 0.619       | 0.059  | 1.322 |
| Bloc USA  | 0.532    | 0.125  | 0.712 | 0.536       | 0.147  | 0.699 |
| Bloc CHN  | 0.299    | -0.263 | 0.773 | 0.372       | -0.261 | 0.780 |
| Unaligned | 0.787    | 0.034  | 1.397 | 0.755       | 0.066  | 1.432 |

**Notes:** Baseline change in GDP and real income are reported in percentage points.

from the bloc to country  $m$ :

$$d \ln \tau_{l,m} = \frac{1}{N_l} \sum_{n \in l} d \ln \tau_{n,m}$$

and the average import cost change from  $m$  to the bloc:

$$d \ln \tau_{m,l} = \frac{1}{N_l} \sum_{n \in l} d \ln \tau_{m,n}.$$

Thus,  $d \ln \tau_{l,m}$  and  $d \ln \tau_{m,l}$  are the average export and import trade cost changes for countries in bloc =  $l$  with respect to country  $m$ .

Then, we move each country  $n$  to a particular bloc by replacing its factual trade cost changes with the averages for that bloc for every potential partner  $m$ . However, country  $n$ 's factual average change in trade costs might differ from the bloc-level average. To avoid this type of mechanical level effect, we renormalize the country's counterfactual trade cost changes such that their trade-weighted average change is equal to the factual. Specifically, for each country  $n$  moving to bloc  $l$ , we compute an adjustment factors  $d \ln \tau_{n,imports}^{adj,l}$  and  $d \ln \tau_{n,exports}^{adj,l}$  such that:

$$\underbrace{\sum_{m,i,j,u=\{f,x\}} \frac{IM_{mi,nj}^u}{IM_n} d \ln \tau_{mi,nj}}_{\text{actual}} = \underbrace{d \ln \tau_{n,imports}^{adj,l}}_{\text{adjustment factor}} + \underbrace{\sum_{m,i,j,u=\{f,x\}} \frac{IM_{mi,nj}^u}{IM_n} d \ln \tau_{m,l}}_{\text{counterfactual: moving to bloc}}$$

and

$$\underbrace{\sum_{m,i,j,u=\{f,x\}} \frac{EX_{nj,mi}^u}{EX_n} d \ln \tau_{nj,mi}}_{\text{actual}} = \underbrace{d \ln \tau_{n,exports}^{adj,l}}_{\text{adjustment factor}} + \underbrace{\sum_{m,i,j,u=\{f,x\}} \frac{EX_{nj,mi}^u}{EX_n} d \ln \tau_{l,m}}_{\text{counterfactual: moving to bloc}}$$

where  $IM_{mi,nj}^u$  is imports of category  $u \in \{f, x\}$  from country sector  $mi$  to sector  $j$  in  $n$ ,  $IM_n$  are  $n$ 's total imports, and similarly for exports  $EX_{mi,nj}^u$  and  $EX_n$ . We then construct the counterfactual trade



cost changes when putting country  $n$  into bloc  $l$  as:

$$d \ln \tau_{m,n}^{CF:l} = d \ln \tau_{m,l} + d \ln \tau_{n,imports}^{adj,l}$$

$$d \ln \tau_{n,m}^{CF:l} = d \ln \tau_{l,m} + d \ln \tau_{n,exports}^{adj,l}$$

This counterfactual answers the question, what is the effect of rearranging the country's trade costs such that it looks like bloc  $l$ , while keeping its average trade cost change the same? While there are many permutations of groups of countries that could be subjected to this counterfactual, we perform it one country at a time, keeping the trade cost changes for all other countries at their factual values.

Since each country is in exactly one bloc in the factual, for each country there are 2 possible moves, into one of the other 2 blocs. Thus, for each unaligned country the counterfactuals put it into the US and China blocs. For countries already in the US or China bloc, the counterfactuals put it into the other bloc or into the unaligned group.

Figure 5 displays the results for real GDP, while Appendix Figure B1 displays the results for real income. Table 6 reports the summary statistics of the counterfactuals by bloc. The top panel of the figure and the table shows the change compared to the factual when moving countries to the US bloc. Countries in the China bloc are marked in brown. Six out of ten China bloc countries would actually benefit from switching to the US bloc, with the median real income benefit of 0.66%. The unaligned countries would on average lose from moving to the US bloc, through there is wide heterogeneity of effects ranging from positive to negative.

The middle panel shows the results of moving countries not aligned with China to the China bloc. Countries in the US bloc would on average benefit from moving to the China bloc, with eight out of fourteen of the US bloc countries gaining from moving to the China bloc, with the median US bloc country gaining 0.2% from the move. Once again in both the US bloc and unaligned groups, the benefits range from positive to negative. The bottom panel shows the results of moving the aligned countries to the non-aligned bloc. While on average moving countries from the US and China blocs to unaligned reduces real GDP and income, a few countries such as Saudi Arabia, Latvia, and Lithuania would see GDP increases of over 2% by becoming unaligned. Figure B1 in the Appendix displays the counterfactual changes in real incomes with similar results.

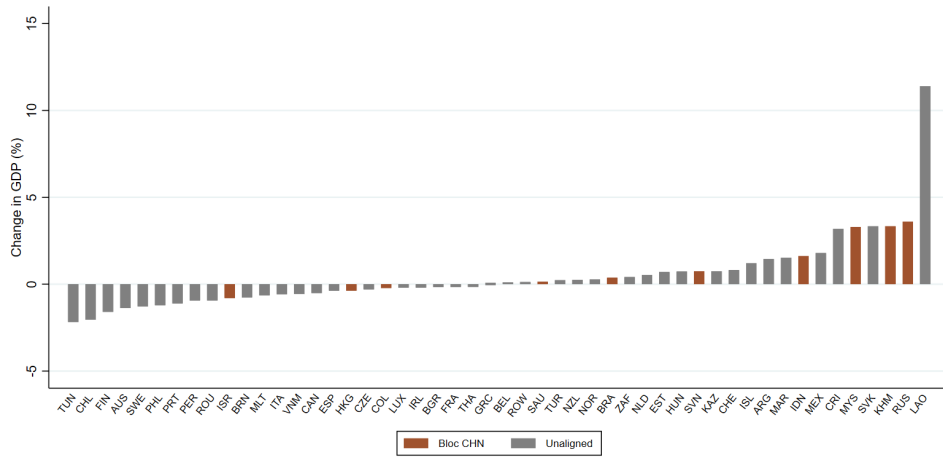
Overall, it appears that on average countries in the US and China blocs are in the "wrong" bloc. At the same time, countries in these blocs would also on average lose from becoming unaligned. The averages hide complete variation from negative to positive within each possible category of move.

### 3.5 Robustness and sensitivity

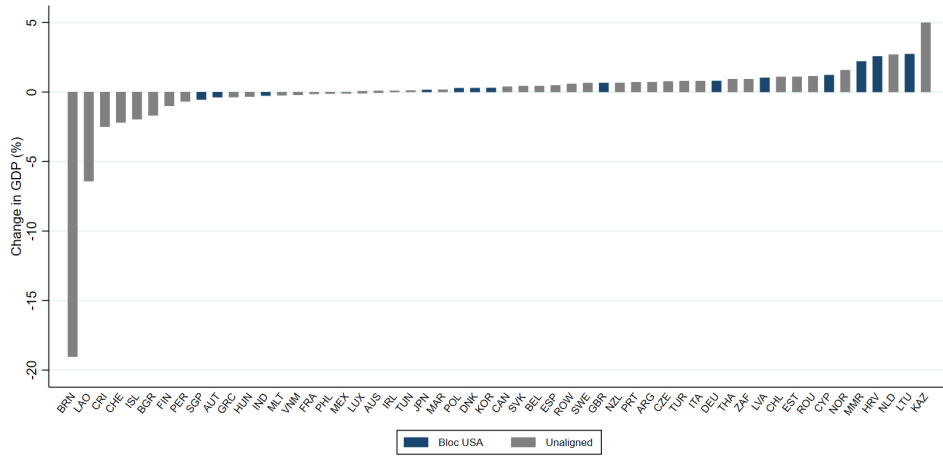
We now perform several sensitivity checks on the bloc assignment and the inferred trade cost changes.

**Observable trade costs: tariffs.** Since the absolute level of trade cost changes is pinned down by our model matching the overall trade to GDP ratio change, one might worry that the outcome is

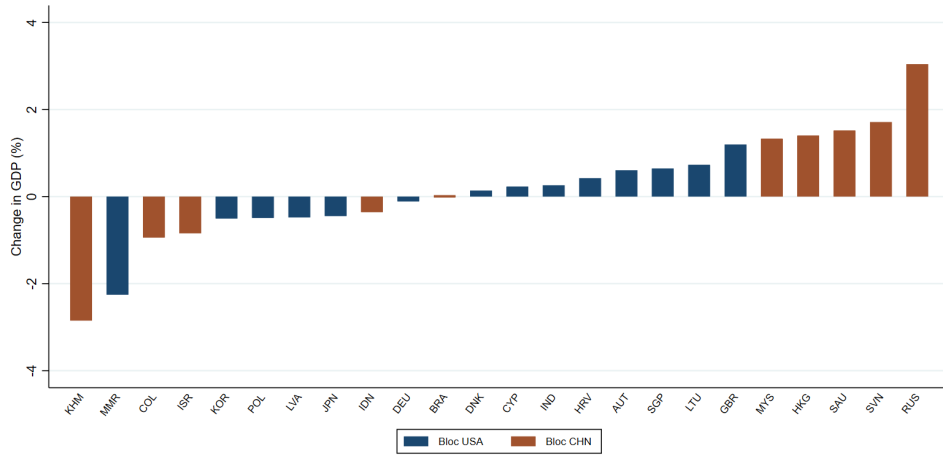
Figure 5: Counterfactual Real GDP Changes (2015-2023)



(a) Moving to USA bloc



(b) Moving to China bloc



(c) Moving to unaligned bloc

Notes: Each bar in each plot shows the percentage change in GDP for each country, relative to factual, when the country is moved to different bloc.

Table 6: Counterfactual GDP and Real Income, Percentage Points (2015-2023)

| Counterfactual      | Bloc      | Real GDP |        |       | Real Income |        |       |
|---------------------|-----------|----------|--------|-------|-------------|--------|-------|
|                     |           | Median   | p25    | p75   | Median      | p25    | p75   |
| Moving to Bloc USA  | Overall   | -0.445   | -1.534 | 0.969 | -0.448      | -1.512 | 0.945 |
|                     | Bloc USA  | -        | -      | -     | -           | -      | -     |
|                     | Bloc CHN  | 0.658    | -0.411 | 1.796 | 0.661       | -0.410 | 1.906 |
|                     | Unaligned | -0.710   | -1.638 | 0.618 | -0.762      | -1.636 | 0.589 |
| Moving to Bloc CHN  | Overall   | -0.269   | -1.465 | 0.740 | -0.289      | -1.430 | 0.717 |
|                     | Bloc USA  | 0.211    | -0.405 | 1.527 | 0.238       | -0.369 | 1.612 |
|                     | Bloc CHN  | -        | -      | -     | -           | -      | -     |
|                     | Unaligned | -0.501   | -1.856 | 0.676 | -0.476      | -1.951 | 0.606 |
| Moving to Unaligned | Overall   | -0.593   | -0.944 | 1.203 | -0.589      | -0.967 | 1.253 |
|                     | Bloc USA  | -0.622   | -0.943 | 0.065 | -0.629      | -0.940 | 0.020 |
|                     | Bloc CHN  | -0.324   | -1.131 | 1.589 | -0.328      | -1.138 | 1.581 |
|                     | Unaligned | -        | -      | -     | -           | -      | -     |

**Notes:** Counterfactual change in GDP and real income, relative to baseline, are reported in percentage points.

model-dependent. Appendix Figure C1 provides support for our finding that some trade costs rose and some fell by using the component of trade costs directly observable in the data: tariffs. The most recent tariff data are for 2021, so we document the tariff changes between 2015 and 2021. The source of the tariff data is UN-TRADES. The left panel plots the histogram of the applied tariff changes. Because MFN tariff changes are measured with less error (Teti, 2024), the right panel also reports the histogram of MFN tariff changes only. While there is large dispersion in the effectively applied tariff changes, the average change is close to 0, and 39.5% of bilateral pairs experience tariff decreases.

**Bloc assignments.** We next use an alternative methodology to assign countries to blocs, based on the Leiden algorithm (Traag, Waltman, and van Eck, 2019). The Leiden algorithm is a machine learning method designed to detect non-overlapping communities in large networks. We feed in the same residualized trade growth between 2015 and 2023 as in our baseline classification, but use the Leiden algorithm to classify the countries in blocs. The algorithm contains a random component, so we perform many draws and assign countries to blocs based on the percentage of times they are classified in the same community as the US or China. Appendix C.1 presents the details of the procedure. Table C1 summarizes the overlap between our baseline and the Leiden algorithm approach. Overall, our baseline procedure is more conservative in that it classifies more countries as unaligned. However, the two methods agree more than 70% of the time when both assign the country to either the US or China bloc.

**Alternative start year.** Our baseline uses 2015 as the pre-period, since it is the year before the Brexit referendum and the Donald Trump election. In the Appendix, we instead use 2016 as a start date, since the tariffs in US-China trade war first increased in 2017. Tables C2 and C3 show that the bloc assignment in that case is similar to our baseline. While some countries move to being unaligned,

no country in our quantitative model sample is classified in the opposite bloc to the baseline results. Tables C4 and C5 display summary statistics of the changes in trade costs and GDP respectively. The results are qualitatively the same as our baseline scenario: while trade costs across blocs are increasing, they are compensated by decreases within bloc and to/from the unaligned bloc.

**Placebo period.** We conduct a placebo exercise, where we repeat our procedure with data from before the US-China trade tensions, between 2002 and 2007. In that case, we find no evidence of fragmentation. Table C6 displays the bloc assignment compared to our baseline 2015-23 classification. Only 3 countries are assigned to the China bloc, including China. More countries are unaligned than in our baseline (70% instead of 60% in our baseline). Table C7 displays the change in trade costs across bloc pairs between 2002 and 2007. Most bloc pairs, including China bloc to US bloc, experience trade cost declines.

We also compute the changes in trade costs between 2002 and 2007, for the blocs identified in our baseline using 2015-23 trade data. Table C8 reports the average 2002-2007 trade cost changes across the 2015-23 bloc pairs. Contrary to the 2015-23 trade cost changes, we find no evidence of fragmentation: all cross-bloc pairs experience trade cost decreases, in the same order of magnitude as the within bloc pairs.

**Fit of trade costs.** Our procedure matches the global trade to GDP ratio to pin down the level of trade cost changes. The reason is that domestic absorption data are not available for 2023, which prevents us from identifying trade costs levels following the [Head and Ries \(2001\)](#), henceforth HR method. To provide evidence that our trade/GDP-targeting procedure is reliable, we implement our procedure on years where domestic absorption data are available, which allows us to compare our method to HR. We use 8-year windows starting from 2000 until 2010. On average, our procedure and the HR method produce similar trade cost changes: the difference between our approach and the HR method is -0.9% at the mean (-0.03% at the median), and the correlation is 0.79. Appendix C.4 details the exercise.

### 3.6 Determinants of trade changes

The counterfactual results from Section 3.4 imply that some countries do not necessarily sort into their economically optimal bloc. In this section, we investigate potential drivers of changes in trade patterns after 2015.

We start by regressing the change in bilateral trade flows between 2015 and 2023 on the United Nations general assembly vote agreement in 2015 ([Bailey, Strezhnev, and Voeten, 2017](#)). We control for trade flows in 2015, historical trade flows from 2000, and distance. The first column of Table 7 displays the results. Country pairs who voted together at the UN assembly in 2015 witnessed a relative increase in bilateral trade flows after 2015. Large flows in 2015 tend to decrease subsequent trade growth, while trade flows from 2000 are positively correlated with the growth of trade post-2015.

Table 7: Explanatory Variables for Trade Flow Changes

|                   | 2015 to 2023          | Placebo<br>2010 to 2015 |
|-------------------|-----------------------|-------------------------|
| UN vote agreement | 0.672***<br>(0.197)   | 0.184<br>(0.186)        |
| Log initial flows | -0.423***<br>(0.0294) | -0.354***<br>(0.0435)   |
| Log 2000 flows    | 0.148***<br>(0.0212)  | 0.0957***<br>(0.0313)   |
| Log distance      | -0.288***<br>(0.0563) | -0.291***<br>(0.0428)   |
| Observations      | 3674                  | 3674                    |
| Importer FE       | ✓                     | ✓                       |
| Exporter FE       | ✓                     | ✓                       |

**Notes:** Vote agreement measures the likelihood of agreement between country pairs in the UN voting at the initial year (2015 in the first column, 2010 in the second column). Log initial trade flows is the log of bilateral trade flow between country pairs at the initial year. Distance comes from CEPII gravity database. The sample includes all country pairs in our quantitative model sample. Standard errors are clustered twoway at the exporter and importer level.

This indicates that trade grew more for geopolitically close pairs, and patterns moved away from 2015 partners back towards historical 2000 partners. The second column of Table 7 reports results of a placebo regression that uses instead the change in trade flows between 2010 and 2015. There, there is no correlation with UN agreement.

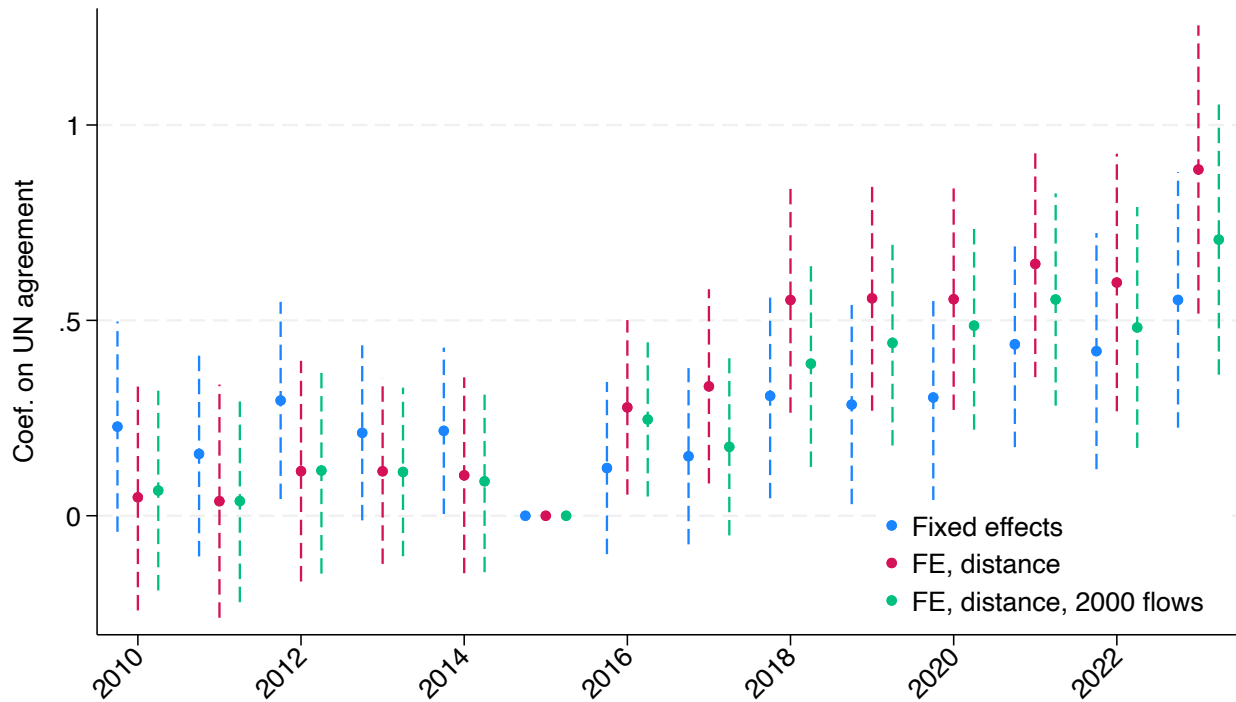
To probe this further, we perform an event-study type regression:

$$\ln X_{mn,t} = \eta_{mt} + \gamma_{nt} + \delta_{mn} + \sum_t \beta_t^{UN} UNagree_{mn} + \sum_t X'_{mn} \beta_t^x + \varepsilon_{mnt}. \quad (3.11)$$

We include importer-year and exporter-year fixed effects, as well as bilateral pair fixed effects that capture any time-invariant trade costs. We then add a year-specific coefficient  $\beta_t^{UN}$  on UN vote agreement, as well as year-specific coefficients on a vector of other controls potentially correlated with vote agreement  $X_{mn}$ , such as 2000 trade flows and bilateral distance. The UN vote agreement is measured as the average voting similarity over the UN voting sessions between 2000 and 2022, as computed by [Bailey, Strezhnev, and Voeten \(2017\)](#).

Figure 6 displays the results of estimating specification (3.11), with the coefficient for 2015 normalized to 0. All specifications indicate that prior to 2015, there is no impact of the UN agreement on trade, relative to the reference year. After 2015, the correlation between UN vote and trade flow starts

Figure 6: Bilateral trade flows and political alignment: coefficient on UN agreement ( $\beta_t^{UN}$ )



**Notes:** The figure displays the estimates of  $\beta_t^{UN}$  from regression 3.11. Each dot color corresponds to different controls. The blue coefficients only include the fixed effects. The red coefficients include time-varying coefficients on distance, and the green coefficients include time-varying coefficients on 2000 bilateral trade flows. The sample covers countries in our quantitative model. Appendix Figure ?? replicates the findings with all available country pairs.

to increase, getting progressively stronger over time.

Overall, the results suggest that 2015-2017 marked the start of an increase in the role of geopolitical forces in international trade. After 2015, countries increased trade with their pre-2015 allies, at the expense of trade with non-allies.

#### 4. CONCLUSION

The year 2016 ushered an era of significant changes in policies that are weighing on international trade: the Brexit vote, the US-China trade war, the Russian invasion of Ukraine and the resulting severing of trade links between Russia and the West, and the Biden administration's semiconductor export bans, to name a few of the most important ones. A reasonable expectation is that world trade would have decreased over this period. However, at least as of 2023, this has not been the case. Instead, these policies have triggered a reallocation of trade flows across sources and destinations as also argued by a number of recent studies.

To understand how this rewiring of international trade is occurring, this paper adopts a data-

driven approach to measure trade cost changes in a large sample of countries and detect which countries are in which blocs. We do find evidence of decoupling: about half the countries in the world appear to have aligned themselves with either the US or China, at the expense of higher trade costs with the other bloc. However, we find that as cross-bloc trade costs went up, within-bloc trade costs fell. On net, the median country in the world, and the median country within each bloc, has slightly *higher* real income as a result of this reconfiguration of the global trade costs. At the same time, we find a modest level of bloc misalignment: the median country in the US bloc would actually be better off in the China bloc, and vice versa. This suggests that considerations other than international trade are dominating bloc alignment, at least so far.

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**ONLINE APPENDIX  
(NOT FOR PUBLICATION)**

## A. DATA AND BLOC ASSIGNMENT

**Country coverage.** Table A1 lists the countries.

**Sectoral classification and aggregation.** Table A2.

Table A1: Country list

| Country code | Country name      | Country code | Country name                     |
|--------------|-------------------|--------------|----------------------------------|
| AUS          | Australia         | KAZ          | Kazakhstan                       |
| ARG          | Argentina         | KHM          | Cambodia                         |
| AUT          | Austria           | KOR          | Korea                            |
| BEL          | Belgium           | LAO          | Lao People's Democratic Republic |
| BGR          | Bulgaria          | LTU          | Lithuania                        |
| BRA          | Brazil            | LUX          | Luxembourg                       |
| BRN          | Brunei Darussalam | LVA          | Latvia                           |
| CAN          | Canada            | MAR          | Morocco                          |
| CHE          | Switzerland       | MEX          | Mexico                           |
| CHL          | Chile             | MLT          | Malta                            |
| CHN          | China             | MMR          | Myanmar                          |
| COL          | Colombia          | MYS          | Malaysia                         |
| CRI          | Costa Rica        | NLD          | Netherlands                      |
| CYP          | Cyprus            | NOR          | Norway                           |
| CZE          | Czech Republic    | NZL          | New Zealand                      |
| DEU          | Germany           | PER          | Peru                             |
| DNK          | Denmark           | PHL          | Philippines                      |
| ESP          | Spain             | POL          | Poland                           |
| EST          | Estonia           | PRT          | Portugal                         |
| FIN          | Finland           | ROU          | Romania                          |
| FRA          | France            | ROW          | Rest of the World                |
| GBR          | United Kingdom    | RUS          | Russian Federation               |
| GRC          | Greece            | SAU          | Saudi Arabia                     |
| HKG          | Hong Kong         | SGP          | Singapore                        |
| HRV          | Croatia           | SVK          | Slovak Republic                  |
| HUN          | Hungary           | SVN          | Slovenia                         |
| IDN          | Indonesia         | SWE          | Sweden                           |
| IND          | India             | THA          | Thailand                         |
| IRL          | Ireland           | TUN          | Tunisia                          |
| ISL          | Iceland           | TUR          | Turkey                           |
| ISR          | Israel            | USA          | United States                    |
| ITA          | Italy             | VNM          | Viet Nam                         |
| JPN          | Japan             | ZAF          | South Africa                     |

**Notes:** This table displays the list of countries included in our quantitative model.

Table A2: Sector key

| ICIO code | ICIO description                                      | Sector code | Sector description   |
|-----------|---|-------------|--|
| 01T02     | Agriculture, hunting, forestry                        | 1           | Agriculture, hunting, forestry and fishing                       |
| 03        | Fishing and aquaculture                               | 1           | Agriculture, hunting, forestry and fishing                       |
| 05T06     | Mining and quarrying, energy producing products       | 2           | Mining and quarrying, energy producing products                  |
| 07T08     | Mining and quarrying, non-energy producing products   | 3           | Other mining and quarrying                                       |
| 09        | Mining support service activities                     | 3           | Other mining and quarrying                                       |
| 10T12     | Food products, beverages and tobacco                  | 4           | Food products, beverages and tobacco                             |
| 13T15     | Textiles, textile products, leather and footwear      | 5           | Textiles, textile products, leather and footwear                 |
| 16        | Wood and products of wood and cork                    | 6           | Wood products, paper products and printing                       |
| 17T18     | Paper products and printing                           | 6           | Wood products, paper products and printing                       |
| 19        | Coke and refined petroleum products                   | 7           | Coke and refined petroleum products                              |
| 20        | Chemical and chemical products                        | 8           | Chemical products  |
| 21        | Pharmaceuticals                                       | 8           | Chemical products  |
| 22        | Rubber and plastics products                          | 8           | Chemical products  |
| 23        | Other non-metallic mineral products                   | 9           | Other non-metallic mineral products                              |
| 24        | Basic metals  | 10          | Metal products   |
| 25        | Fabricates metal products                             | 10          | Metal products   |
| 26        | Computer, electronic and optical equipment            | 11          | Computer, electronic and optical equipment                       |
| 27        | Electrical equipment                                  | 12          | Electrical equipment   |
| 28        | Machinery and equipment nec                           | 13          | Machinery and equipment nec                                      |
| 29        | Motor vehicles, trailers and semi-trailers            | 13          | Machinery and equipment nec                                      |
| 30        | Other transport equipment                             | 13          | Machinery and equipment nec                                      |
| 31T33     | Manufacturing nec                                     | 14          | Manufacturing nec  |
| 35        | Electricity, gas, steam and air conditioning supply   | 15          | Electricity, gas, steam and water supply                         |
| 36T39     | Water supply; sewage, waste management                | 15          | Electricity, gas, steam and water supply                         |
| 41T43     | Construction  | 16          | Construction   |
| 45T47     | Wholesale and retail trade; repair of motor vehicles  | 17          | Wholesale and retail trade; repair of motor vehicles             |
| 49        | Land transport and transport via pipelines            | 18          | Transportation and postal services                               |
| 50        | Water transport                                       | 18          | Transportation and postal services                               |
| 51        | Air transport   | 18          | Transportation and postal services                               |
| 52        | Warehousing and support activities for transportation | 18          | Transportation and postal services                               |
| 53        | Postal and courier activities                         | 18          | Transportation and postal services                               |
| 55T56     | Accommodation and food service activities             | 19          | Accommodation and food service activities                        |
| 58T60     | Publishing, audiovisual and broadcasting activities   | 20          | Broadcasting, telecommunications and IT services                 |
| 61        | Telecommunications                                    | 20          | Broadcasting, telecommunications and IT services                 |
| 62T63     | IT and other information services                     | 20          | Broadcasting, telecommunications and IT services                 |
| 64T66     | Financial and insurance activities                    | 21          | Financial, real estate, professional and administrative services |
| 68        | Real estate activities                                | 21          | Financial, real estate, professional and administrative services |
| 69T75     | Professional, scientific and technical activities     | 21          | Financial, real estate, professional and administrative services |
| 77T82     | Administrative and support services                   | 21          | Financial, real estate, professional and administrative services |
| 84        | Public administration and defense                     | 22          | Public administration, education and other services              |
| 85        | Education   | 22          | Public administration, education and other services              |
| 86T88     | Human health and social work activities               | 22          | Public administration, education and other services              |
| 90T93     | Arts, entertainment and recreation                    | 22          | Public administration, education and other services              |
| 94T96     | Other service activities                              | 22          | Public administration, education and other services              |
| 97T98     | Activities of households as employers                 | 22          | Public administration, education and other services              |

Table A3: Bloc Assignment, 187 Countries (2015-2023)

| Country | Bloc | Country | Bloc      | Country | Bloc      |
|---------|------|---------|-----------|---------|-----------|
| AUT     | USA  | GTM     | CHN       | HTI     | Unaligned |
| BGD     | USA  | HND     | CHN       | HUN     | Unaligned |
| BHS     | USA  | ISR     | CHN       | IDN     | Unaligned |
| CYP     | USA  | KGZ     | CHN       | IRL     | Unaligned |
| DEU     | USA  | KWT     | CHN       | IRN     | Unaligned |
| DNK     | USA  | LCA     | CHN       | IRQ     | Unaligned |
| EGY     | USA  | LSO     | CHN       | ISL     | Unaligned |
| ERI     | USA  | MLT     | CHN       | ITA     | Unaligned |
| ETH     | USA  | MYS     | CHN       | JAM     | Unaligned |
| FJI     | USA  | NCL     | CHN       | JOR     | Unaligned |
| FRO     | USA  | NPL     | CHN       | KAZ     | Unaligned |
| GHA     | USA  | NZL     | CHN       | KEN     | Unaligned |
| GNB     | USA  | PAN     | CHN       | KHM     | Unaligned |
| GNQ     | USA  | PNG     | CHN       | KIR     | Unaligned |
| GRL     | USA  | PYF     | CHN       | KNA     | Unaligned |
| HRV     | USA  | RUS     | CHN       | LAO     | Unaligned |
| IND     | USA  | RWA     | CHN       | LBN     | Unaligned |
| JPN     | USA  | SAU     | CHN       | LBR     | Unaligned |
| KOR     | USA  | SLB     | CHN       | LUX     | Unaligned |
| LTU     | USA  | SLE     | CHN       | MAC     | Unaligned |
| LVA     | USA  | SLV     | CHN       | MAR     | Unaligned |
| MLI     | USA  | STP     | CHN       | MDA     | Unaligned |
| MNE     | USA  | TCD     | CHN       | MDG     | Unaligned |
| MRT     | USA  | TJK     | CHN       | MDV     | Unaligned |
| NIC     | USA  | TKM     | CHN       | MEX     | Unaligned |
| NLD     | USA  | TTO     | CHN       | MKD     | Unaligned |
| NOR     | USA  | ALB     | Unaligned | MMR     | Unaligned |
| SGP     | USA  | ARG     | Unaligned | MNG     | Unaligned |
| SOM     | USA  | ARM     | Unaligned | MOZ     | Unaligned |
| SSD     | USA  | ATG     | Unaligned | MUS     | Unaligned |
| SWE     | USA  | AUS     | Unaligned | MWI     | Unaligned |
| SYR     | USA  | AZE     | Unaligned | NAM     | Unaligned |
| TGO     | USA  | BEL     | Unaligned | NER     | Unaligned |
| THA     | USA  | BEN     | Unaligned | NGA     | Unaligned |
| TUR     | USA  | BGR     | Unaligned | NRU     | Unaligned |
| TUV     | USA  | BHR     | Unaligned | OMN     | Unaligned |
| UGA     | USA  | BIH     | Unaligned | PAK     | Unaligned |
| UKR     | USA  | BLZ     | Unaligned | PER     | Unaligned |
| URY     | USA  | BMU     | Unaligned | PHL     | Unaligned |
| UZB     | USA  | BRB     | Unaligned | POL     | Unaligned |
| VCT     | USA  | BRN     | Unaligned | PRT     | Unaligned |
| VUT     | USA  | BWA     | Unaligned | PRY     | Unaligned |
| WSM     | USA  | CAF     | Unaligned | QAT     | Unaligned |
| ABW     | CHN  | CHE     | Unaligned | ROU     | Unaligned |
| AFG     | CHN  | CHL     | Unaligned | SEN     | Unaligned |
| AGO     | CHN  | CMR     | Unaligned | SRB     | Unaligned |
| ARE     | CHN  | COM     | Unaligned | SUR     | Unaligned |
| BDI     | CHN  | CPV     | Unaligned | SVK     | Unaligned |
| BFA     | CHN  | CRI     | Unaligned | SVN     | Unaligned |
| BLR     | CHN  | CZE     | Unaligned | SWZ     | Unaligned |
| BOL     | CHN  | DJI     | Unaligned | SYC     | Unaligned |
| BRA     | CHN  | DZA     | Unaligned | TLS     | Unaligned |
| BTN     | CHN  | ESP     | Unaligned | TON     | Unaligned |
| CAN     | CHN  | EST     | Unaligned | TUN     | Unaligned |
| CIV     | CHN  | FIN     | Unaligned | TZA     | Unaligned |
| COD     | CHN  | FRA     | Unaligned | VEN     | Unaligned |
| COG     | CHN  | GBR     | Unaligned | VNM     | Unaligned |
| COL     | CHN  | GEO     | Unaligned | WBG     | Unaligned |
| DMA     | CHN  | GIB     | Unaligned | YEM     | Unaligned |
| DOM     | CHN  | GMB     | Unaligned | ZAF     | Unaligned |
| ECU     | CHN  | GRC     | Unaligned | ZMB     | Unaligned |
| GAB     | CHN  | GUY     | Unaligned | ZWE     | Unaligned |
| GIN     | CHN  | HKG     | Unaligned |         |           |

**Notes:** A country is assigned to the USA bloc if  $d \ln \tau_i^{USA} < 0$  and  $d \ln \tau_i^{CHN} > 0$ . Similarly, a country is assigned to the CHN bloc if  $d \ln \tau_i^{CHN} < 0$  and  $d \ln \tau_i^{USA} > 0$ . All other countries are assigned to the Unaligned bloc.

## B. QUANTIFICATION

This section presents how to solve for the equilibrium change following a change in exogenous trade costs  $\hat{\tau}_{mnj}^f$  and  $\hat{\tau}_{mi,nj}^x$  and potential exogenous change in trade deficit  $\hat{D}_n$ . The following system of equations determines output  $\hat{Y}_{nj}$ , prices  $\hat{P}_{nj}$ , consumption sectoral shares  $\hat{\pi}_{mj}^f$ , final trade shares  $\hat{\pi}_{nmj}^f$ , intermediate sectoral shares  $\hat{\pi}_{j,mi}^x$ , intermediate trade shares  $\hat{\pi}_{nj,mi}^x$  and sectoral wages  $\hat{W}_{nj}$ :

$$\begin{aligned} (\hat{P}_{nj}\hat{Y}_{nj})(P_{nj}Y_{nj}) &= \sum_m \left( \sum_i \eta_i (\hat{P}_{mi}\hat{Y}_{mi})(P_{mi}Y_{mi}) + \hat{D}_m D_m \right) \pi_{mj}^f \hat{\pi}_{mj}^f \pi_{nmj}^f \hat{\pi}_{nmj}^f \\ &+ \sum_m \sum_i (1 - \eta_i) (\hat{P}_{mi}\hat{Y}_{mi})(P_{mi}Y_{mi}) \pi_{j,mi}^x \hat{\pi}_{j,mi}^x \hat{\pi}_{nj,mi}^x \pi_{nj,mi}^x \end{aligned}$$

$$\hat{\pi}_{nj}^f = \frac{(\hat{P}_{nj}^F)^{1-\rho}}{\sum_k \pi_{nk,t}^f (\hat{P}_{nk}^F)^{1-\rho}}$$

where  $\hat{P}_{nj}^F = \left[ \sum_m \pi_{mnj,t}^f (\widehat{\tau}_{mnj}^f \hat{P}_{mj})^{1-\gamma} \right]$

$$\hat{\pi}_{mnj,t+1}^f = \frac{(\widehat{\tau}_{mnj}^f \hat{P}_{mj})^{1-\gamma}}{\sum_k \pi_{knj,t}^f (\widehat{\tau}_{knj}^f \hat{P}_{kj})^{1-\gamma}}$$

$$\hat{\pi}_{i,nj,t+1}^x = \frac{(\hat{P}_{i,nj}^X)^{1-\varepsilon}}{\sum_k \pi_{k,nj,t}^x (\hat{P}_{k,nj}^X)^{1-\varepsilon}}$$

where  $\hat{P}_{i,nj}^X = \left[ \sum_i \pi_{mi,nj,t}^x (\widehat{\tau}_{mi,nj}^x \hat{P}_{mi})^{1-\nu} \right]^{\frac{1}{1-\nu}}$

$$\hat{\pi}_{mi,nj,t+1}^x = \frac{(\widehat{\tau}_{mi,nj}^x \hat{P}_{mj})^{1-\nu}}{\sum_k \pi_{ki,nj,t}^x (\widehat{\tau}_{ki,nj}^x \hat{P}_{kj})^{1-\nu}}$$

$$\hat{P}_{nj} = (\hat{Z}_{nj})^{-1} \hat{W}_{nj}^{(1-\alpha_j)\eta_j} (\hat{P}_{nj}\hat{Y}_{nj})^{\alpha_j\eta_j} (\hat{K}_{nj})^{-\alpha_j\eta_j} (\hat{P}_{nj}^X)^{1-\eta_j}$$

where  $\hat{P}_{nj}^X = \left[ \sum_i \pi_{i,nj,t}^x (\hat{P}_{i,nj}^X)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$

$$\hat{W}_{nj} \left( \frac{\hat{W}_n}{\hat{P}_n} \right)^\psi \left( \frac{\hat{W}_{nj}}{\hat{W}_n} \right)^{\mu-1} = \hat{P}_{nj}\hat{Y}_{nj}$$

where  $\hat{W}_n = \left( \sum \pi_{nj}^H (\hat{W}_{nj})^\mu \right)^{\frac{1}{\mu}}$ ,  $\hat{P}_n = \left[ \sum_j \pi_{nj,t}^f (\hat{P}_{nj}^F)^{1-\rho} \right]$

The following algorithm provides a numerical solution to the above system of equations:

1. Guess  $\hat{P}_{nj}$
2. Solve for  $\hat{\pi}_{nj}^f, \hat{\pi}_{mnj}^f, \hat{\pi}_{i,nj}^x, \hat{\pi}_{mi,nj}^x$  using:

$$\hat{\pi}_{nj}^f = \frac{\left(\hat{P}_{nj}^F\right)^{1-\rho}}{\sum_k \pi_{nk,t}^f \left(\hat{P}_{nk}^F\right)^{1-\rho}}$$

$$\text{where } \hat{P}_{nj}^F = \left[ \sum_m \pi_{mnj,t}^f \left(\widehat{\tau_{mnj}^f} \hat{P}_{mj}\right)^{1-\gamma} \right]$$

$$\hat{\pi}_{mnj}^f = \frac{\left(\widehat{\tau_{mnj}^f} \hat{P}_{mj}\right)^{1-\gamma}}{\sum_k \pi_{knj,t}^f \left(\widehat{\tau_{knj}^f} \hat{P}_{kj}\right)^{1-\gamma}}$$

$$\hat{\pi}_{i,nj}^x = \frac{\left(\hat{P}_{i,nj}^X\right)^{1-\varepsilon}}{\sum_k \pi_{k,nj,t}^x \left(\hat{P}_{k,nj}^X\right)^{1-\varepsilon}}$$

$$\text{where } \hat{P}_{i,nj}^X = \left[ \sum_i \pi_{mi,nj,t}^x \left(\widehat{\tilde{\tau}_{mi,nj}^x} \hat{P}_{mi}\right)^{1-\nu} \right]^{\frac{1}{1-\nu}}$$

$$\hat{\pi}_{mi,nj}^x = \frac{\left(\widehat{\tilde{\tau}_{mi,nj}^x} \hat{P}_{mj}\right)^{1-\nu}}{\sum_k \pi_{ki,nj,t}^x \left(\widehat{\tilde{\tau}_{ki,nj}^x} \hat{P}_{kj}\right)^{1-\nu}}$$

3. Solve for  $\hat{P}_{nj} \hat{Y}_{nj}$  using the new trade shares

$$\begin{aligned} \left(\hat{P}_{nj} \hat{Y}_{nj}\right) (P_{nj} Y_{nj}) &= \sum_m \left( \sum_i \eta_i \left(\hat{P}_{mi} \hat{Y}_{mi}\right) (P_{mi} Y_{mi}) + \hat{D}_m D_m \right) \pi_{mj}^f \hat{\pi}_{mj}^f \pi_{nmj}^f \hat{\pi}_{nmj}^f \\ &+ \sum_m \sum_i (1 - \eta_i) \left(\hat{P}_{mi} \hat{Y}_{mi}\right) (P_{mi} Y_{mi}) \pi_{j,mi}^x \hat{\pi}_{j,mi}^x \hat{\pi}_{nj,mi}^x \pi_{nj,mi}^x \end{aligned}$$

4. Solve for wages  $\hat{W}_{nj}$  using

$$\hat{W}_{nj} \left(\frac{\hat{W}_{nj}}{\hat{P}_{nj}}\right)^\psi \left(\frac{\hat{W}_{nj}}{\hat{W}_{nj}}\right)^{\mu-1} = \hat{P}_{nj} \hat{Y}_{nj}$$

5. Solve for prices  $\hat{P}_{nj}$

$$\hat{P}_{nj} = \left(\hat{Z}_{nj}\right)^{-1} \hat{W}_{nj}^{(1-\alpha_j)\eta_j} \left(\hat{P}_{nj} \hat{Y}_{nj}\right)^{\alpha_j \eta_j} \left(\hat{K}_{nj}\right)^{-\alpha_j \eta_j} \left(\hat{P}_{nj}^X\right)^{1-\eta_j}$$

$$\text{where } \hat{P}_{nj}^X = \left[ \sum_i \pi_{i,nj,t}^x \left(\hat{P}_{i,nj}^X\right)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$

6. Go back to 1

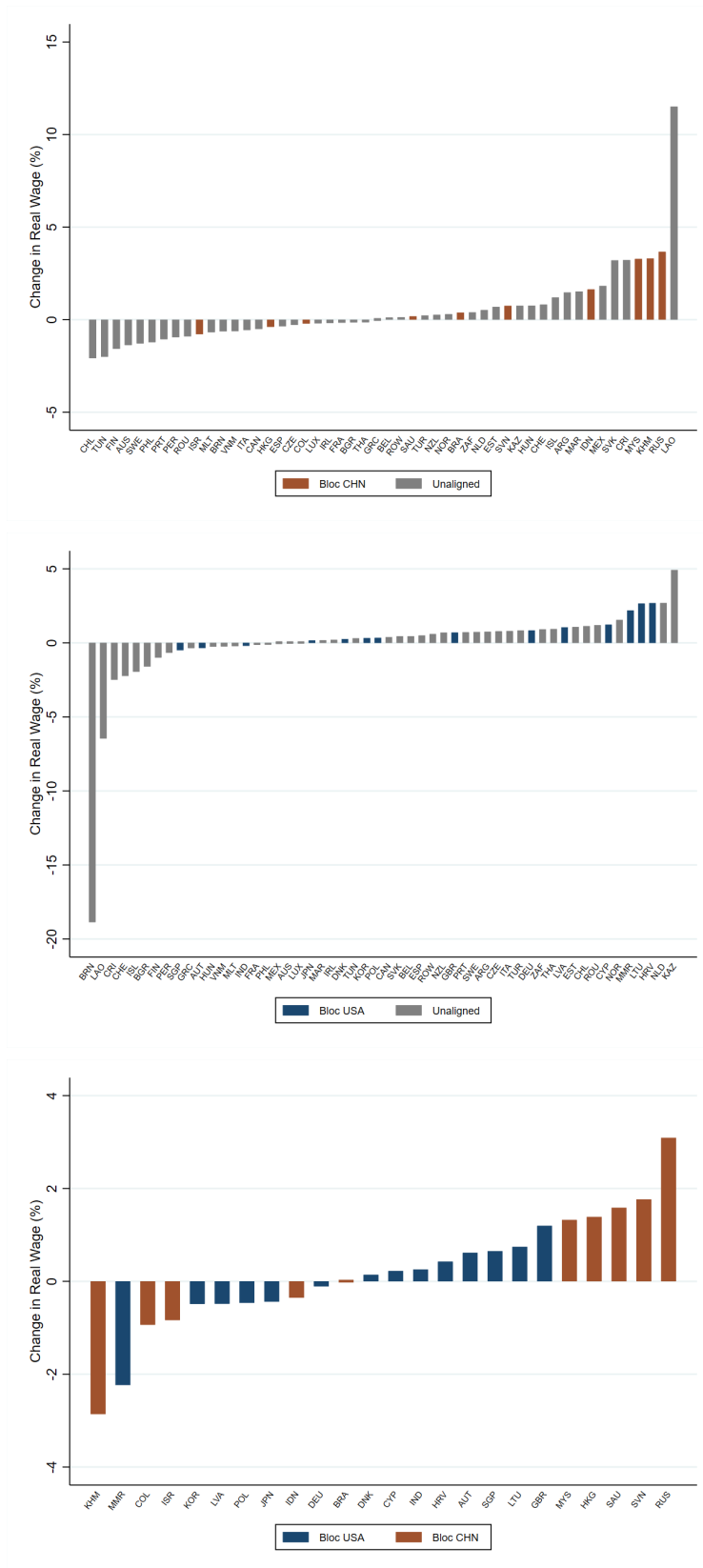


Table B1: Bloc Assignment, 66 Model Countries (2015-2023)

| Country | Bloc | Country | Bloc      | Country | Bloc      |
|---------|------|---------|-----------|---------|-----------|
| AUT     | USA  | ARG     | Unaligned | NZL     | Unaligned |
| CYP     | USA  | AUS     | Unaligned | PER     | Unaligned |
| DEU     | USA  | BEL     | Unaligned | PHL     | Unaligned |
| DNK     | USA  | BGR     | Unaligned | PRT     | Unaligned |
| GBR     | USA  | BRN     | Unaligned | ROU     | Unaligned |
| HRV     | USA  | CAN     | Unaligned | ROW     | Unaligned |
| IND     | USA  | CHE     | Unaligned | SVK     | Unaligned |
| JPN     | USA  | CHL     | Unaligned | SWE     | Unaligned |
| KOR     | USA  | CRI     | Unaligned | THA     | Unaligned |
| LTU     | USA  | CZE     | Unaligned | TUN     | Unaligned |
| LVA     | USA  | ESP     | Unaligned | TUR     | Unaligned |
| MMR     | USA  | EST     | Unaligned | VNM     | Unaligned |
| POL     | USA  | FIN     | Unaligned | ZAF     | Unaligned |
| SGP     | USA  | FRA     | Unaligned |         |           |
| USA     | USA  | GRC     | Unaligned |         |           |
|         |      | HUN     | Unaligned |         |           |
| BRA     | CHN  | IRL     | Unaligned |         |           |
| CHN     | CHN  | ISL     | Unaligned |         |           |
| COL     | CHN  | ITA     | Unaligned |         |           |
| HKG     | CHN  | KAZ     | Unaligned |         |           |
| IDN     | CHN  | LAO     | Unaligned |         |           |
| ISR     | CHN  | LUX     | Unaligned |         |           |
| KHM     | CHN  | MAR     | Unaligned |         |           |
| MYS     | CHN  | MEX     | Unaligned |         |           |
| RUS     | CHN  | MLT     | Unaligned |         |           |
| SAU     | CHN  | NLD     | Unaligned |         |           |
| SVN     | CHN  | NOR     | Unaligned |         |           |

**Notes:** The  $x$ -axis refers to the change in trade costs with the US, measured as  $d \ln \tau_i^{USA} = \frac{1}{2} \left[ \left( \frac{1}{1-\gamma} \hat{w}_{i,USA} + d \ln \tau^{base} \right) + \left( \frac{1}{1-\gamma} \hat{w}_{USA,i} + d \ln \tau^{base} \right) \right]$ , where  $\hat{w}_{ij}$  is recovered from equation (2.1) and  $d \ln \tau^{base}$  is calibrated to match the change in trade/GDP ratio. Similarly, the  $y$ -axis refers to the change in trade costs with China, measured as  $d \ln \tau_i^{CHN} = \frac{1}{2} \left[ \left( \frac{1}{1-\gamma} \hat{w}_{i,CHN} + d \ln \tau^{base} \right) + \left( \frac{1}{1-\gamma} \hat{w}_{CHN,i} + d \ln \tau^{base} \right) \right]$

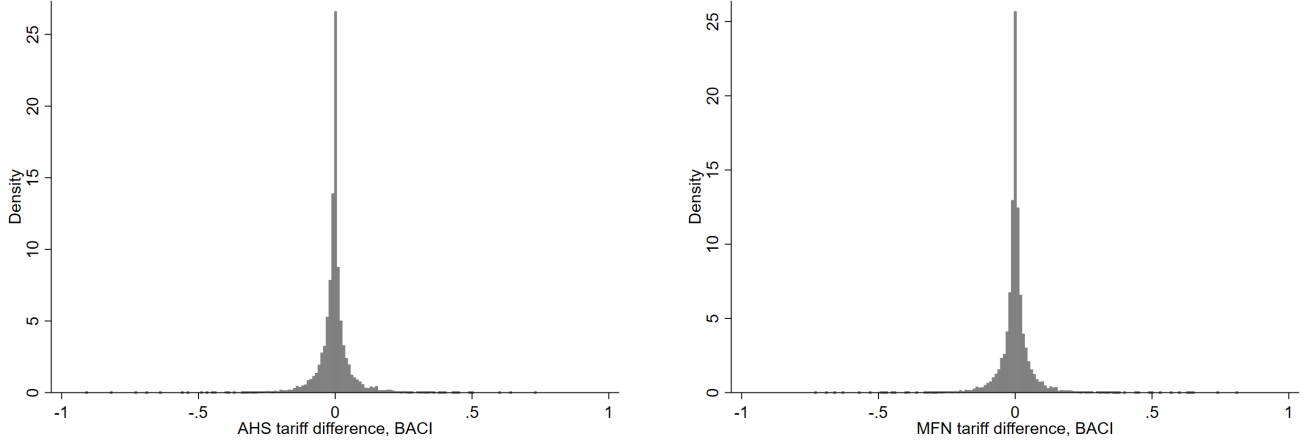
Figure B1: Counterfactual Real Income Changes (2015-2023)



**Notes:** Each bar in each plot shows the percentage change in real income for each country, relative to factual, when the country is moved to a different bloc.

## C. ADDITIONAL EXERCISES AND ROBUSTNESS

Figure C1: Bilateral tariff changes, 2021-2015



(a) Effectively applied tariff (AHS)

(b) Most favored nation tariff (MFN)

**Notes:** Figure shows histogram of the non-zero changes in bilateral average tariffs between 2021-2015.

**Sources:** BACI, TRAINS.

### C.1 Community detection algorithm

In this section we perform an alternative exercise where we classify countries into blocs using a community detection algorithm. More specifically, we use the Leiden algorithm (Traag, Waltman, and van Eck 2019), which is designed to find non-overlapping communities in large networks.

In the first step, we run the regression

$$\Delta \ln x_{mn}^{2023-2015} = \alpha_m + \alpha_n + \varepsilon_{mn},$$

where  $\Delta \ln x_{mn}^{2023-2015}$  is the log-change in aggregate trade flows from source  $m$  to destination  $n$  between 2015 and 2023, while  $\alpha_m$  and  $\alpha_n$  are source and destination fixed effects, respectively. As in the main text, the trade data we use comes from the Direction of Trade Statistics (DOTS) dataset and has an annual frequency.

Then, we recover the predicted residual  $\widehat{\varepsilon}_{mn}$  and calculate the undirected trade weight  $w_{mn}$  as

$$w_{mn} = \frac{\widehat{\varepsilon}_{mn} + \widehat{\varepsilon}_{nm}}{2}.$$

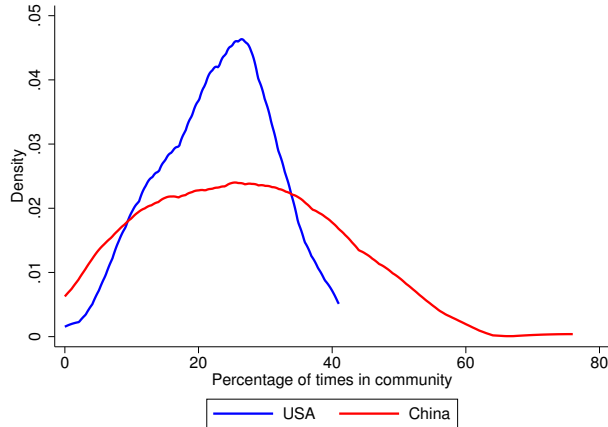
The undirected trade weight  $w_{mn}$  captures the average effect of the trade occurring between countries  $m$  and  $n$  that is not due to source-specific or destination-specific characteristics. With this measure, we rule out the effect of countries that increased or decreased trade with all their partners between 2015 and 2023, focusing only on the bilateral effects. Because  $w_{mn} = w_{nm}$ , we drop any repeated pair from our dataset.

In the next step, we run the Leiden algorithm using the undirected trade weights  $w_{mn}$  as inputs. In terms of the country trade-based network, the larger the weight between two countries, the stronger their link and vice versa. We perform 100 draws of the Leiden algorithm, where each draw returns a list of communities to which each country belongs.<sup>5</sup> Intuitively, a community is a group of countries with particularly strong links between them with respect to the other countries. Moreover, because communities are non-overlapping, a country may not belong to more than one community.

<sup>5</sup>We perform 100 draws because the Leiden algorithm contains a random component. We only count draws where (i) USA and China belong in different communities and (ii) there are 5 communities or less.

As we run the algorithm 100 times, we can calculate the percentage of times each country belongs to the same community as the US or China out of the total draws. Let  $p_{USA}$  be the percentage of times a country belongs to the same community as the US and  $p_{CHN}$  be the percentage of times a country belongs to the same community as China. We present the density of these percentages in Figure C2.

Figure C2: Density of percentages, Leiden algorithm



**Notes:** Figure shows the density of the percentage of times a country belongs to the same community as the US and the same community as China. Each observation is a country.

We now introduce a frequency-based classification of countries into blocs. First, we classify a country as belonging to the US bloc if  $p_{USA} > 0.2$  and  $p_{USA} > p_{CHN}$ . Second, we classify a country as belonging to the China bloc if  $p_{CHN} > 0.2$  and  $p_{CHN} > p_{USA}$ . Finally, we classify a country as unaligned if  $p_{USA} < 0.2$  and  $p_{CHN} < 0.2$ .

Table C1: Bloc comparison, community detection algorithm and baseline classification

|                                  |            | Baseline |            |           |
|----------------------------------|------------|----------|------------|-----------|
|                                  |            | USA bloc | China bloc | Unaligned |
| Community detection, Leiden alg. | USA bloc   | 24       | 10         | 32        |
|                                  | China bloc | 11       | 28         | 57        |
|                                  | Unaligned  | 7        | 7          | 10        |

**Notes:** Table shows number of countries in each bloc according to each classification.

Table C1 presents the comparison between the blocs resulting from the community detection algorithm and the baseline classification. We see that after using a different method to classify countries into blocs, we get similar results to the baseline ones. The baseline procedure is more conservative in classifying more countries as unaligned. However, for the 73 countries assigned by both procedures to either the USA or China bloc, 52 (or 71%) are assigned to the same bloc.

## C.2 Start year: 2016

Table C2: Bloc comparison, Baseline 2015 vs Baseline 2016 (All Countries)

|                  |            | Baseline 2015 |            |           |
|------------------|------------|---------------|------------|-----------|
|                  |            | USA bloc      | China bloc | Unaligned |
| Baseline<br>2016 | USA bloc   | 31            | 2          | 18        |
|                  | China bloc | 2             | 38         | 10        |
|                  | Unaligned  | 11            | 7          | 71        |

**Notes:** Table shows number of countries in each bloc according to each classification. USA(CHN) bloc includes USA(CHN) itself.

Table C3: Bloc comparison, Baseline 2015 vs Baseline 2016 (Model Countries)

|                  |            | Baseline 2015 |            |           |
|------------------|------------|---------------|------------|-----------|
|                  |            | USA bloc      | China bloc | Unaligned |
| Baseline<br>2016 | USA bloc   | 12            | 0          | 5         |
|                  | China bloc | 0             | 6          | 2         |
|                  | Unaligned  | 3             | 5          | 33        |

**Notes:** Table shows the number of countries in each bloc according to each classification. USA(CHN) bloc includes USA(CHN) itself.

Table C4: Log Change in Average Trade Cost between Blocs (Model countries, 2016-2023)

| ↓ Exporter   Importer → | Bloc USA | Bloc CHN | Unaligned | Overall |
|-------------------------|----------|----------|-----------|---------|
| Bloc USA                | -0.051   | 0.040    | -0.034    | -0.027  |
| Bloc CHN                | 0.081    | -0.150   | -0.020    | 0.019   |
| Unaligned               | -0.053   | -0.059   | -0.050    | -0.053  |
| Overall                 | -0.020   | -0.027   | -0.037    | -0.010  |

**Notes:** We classify countries into 3 groups, Bloc USA, Bloc CHN, and Unaligned. Then, all country pairs are classified into 9 group pairs. We report the average  $\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}$  for country pairs belonging to each group pair, weighted by bilateral trade flows in 2016. The Overall column is the average  $\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}$  of all trade flows from(to) each exporter(importer) group.

Table C5: Baseline Change in GDP and Real Income (2016-2023)

| Bloc      | GDP    |       |       | Real Income |       |       |
|-----------|--------|-------|-------|-------------|-------|-------|
|           | Median | p25   | p75   | Median      | p25   | p75   |
| Overall   | 1.262  | 0.720 | 1.868 | 1.257       | 0.748 | 1.919 |
| Bloc USA  | 0.774  | 0.210 | 1.135 | 0.815       | 0.203 | 1.137 |
| Bloc CHN  | 1.672  | 0.903 | 2.554 | 1.855       | 0.895 | 2.562 |
| Unaligned | 1.581  | 0.839 | 2.521 | 1.607       | 0.846 | 2.519 |

**Notes:** Baseline change in GDP and real income are reported in percentage changes.

### C.3 Placebo: 2002-2007

Table C6: Bloc comparison, Baseline 2015 vs Baseline 2002 (Model Countries)

|                  |            | Baseline 2015 |            |           |
|------------------|------------|---------------|------------|-----------|
|                  |            | USA bloc      | China bloc | Unaligned |
| Baseline<br>2002 | USA bloc   | 5             | 3          | 9         |
|                  | China bloc | 1             | 2          | 0         |
|                  | Unaligned  | 9             | 6          | 31        |

**Notes:** Table shows the number of countries in each bloc according to each classification. USA(CHN) bloc includes USA(CHN) itself.

Table C7: Log Change in Average Trade Cost between Blocs (Model countries, 2002-2007)

| ↓ Exporter   Importer → | Bloc USA | Bloc CHN | Unaligned | Overall |
|-------------------------|----------|----------|-----------|---------|
| Bloc USA                | -0.081   | 0.081    | -0.140    | -0.102  |
| Bloc CHN                | -0.032   | -0.063   | -0.135    | -0.075  |
| Unaligned               | -0.159   | -0.085   | -0.196    | -0.176  |
| Overall                 | -0.122   | -0.009   | -0.174    | -0.145  |

**Notes:** We classify countries into 3 groups, Bloc USA, Bloc CHN, and Unaligned. Then, all country pairs are classified into 9 group pairs. We report the average  $\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}$  for country pairs belonging to each group pair, weighted by bilateral trade flows in 2002. The Overall column is the average  $\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}$  of all trade flows from(to) each exporter(importer) group.

Table C8: Log Change in Average Trade Costs between 2015 Blocs (Model countries, 2002-2007)

| ↓ Exporter   Importer → | Bloc USA | Bloc CHN | Unaligned | Overall |
|-------------------------|----------|----------|-----------|---------|
| Bloc USA                | -0.145   | -0.004   | -0.139    | -0.124  |
| Bloc CHN                | -0.118   | -0.015   | -0.172    | -0.127  |
| Unaligned               | -0.165   | -0.124   | -0.180    | -0.167  |
| Overall                 | -0.152   | -0.055   | -0.160    | -0.145  |

**Notes:** Using 2015 blocs, we classify countries into 3 groups, Bloc USA, Bloc CHN, and Unaligned. Then, all country pairs are classified into 9 group pairs. We report the average  $\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}$  for country pairs belonging to each group pair, weighted by bilateral trade flows in 2002. The Overall column is the average  $\Delta \ln \tau_{mn} + \Delta \ln \tau^{base}$  of all trade flows from(to) each exporter(importer) group.

#### C.4 Validation of the trade cost estimates

For each 8-year period since 2000 for which the ICIO dataset is available, we compute the Head and Ries ratio to back out estimates of trade cost changes implied by trade data including own-trade data. Starting from the gravity equation in changes:

$$d \ln X_{mn} = \eta_m + \gamma_n + (1 - \gamma) d \ln \tau_{mn}, \quad (C.1)$$

we can recover the change in bilateral trade cost from:

$$\tilde{\tau}_{mn}^{HR} = \Delta_{t,t-8} (\ln \tau_{mn} + \ln \tau_{nm}) = \frac{1}{(1 - \gamma)} \Delta_{t,t-8} \ln \left( \frac{X_{mn}}{X_{nn}} * \frac{X_{nm}}{X_{mm}} \right). \quad (C.2)$$

For every 8-year period from 2000-2008 to 2010-2018, we compute  $\tilde{\tau}_{mn}^{HR}$  from trade data, and we also compute an estimate of  $\Delta_{t,t-8} (\ln \tau_{mn} + \ln \tau_{nm})$  from our procedure using residuals of the gravity regression, and then targeting the change in world trade to GDP ratio to pin down the level.

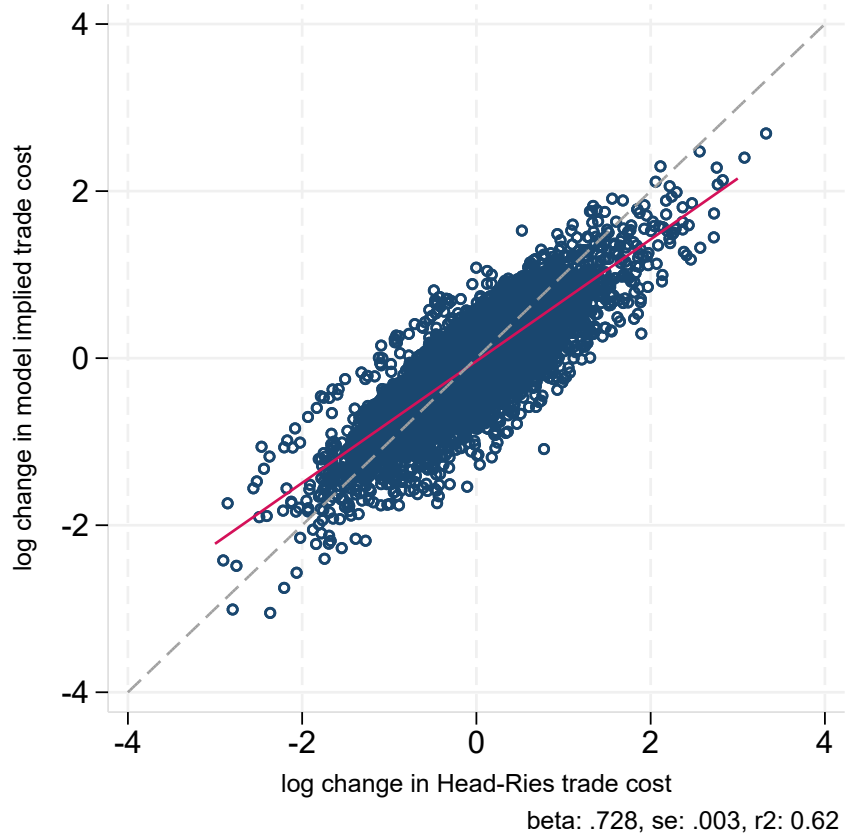
Table C9 shows summary statistics of the difference between  $\tilde{\tau}_{mn}^{HR}$  and our estimates. Figure C3 shows a scatter plot.

Table C9: Model implied Trade Cost and Head-Ries Trade Cost

|  | Average | Median | p25    | p75   |
|--|---------|--------|--------|-------|
| Log Change in Model implied Trade Cost | -0.105  | -0.097 | -0.308 | 0.106 |
| Log Change in Head-Ries Trade Cost     | -0.096  | -0.084 | -0.303 | 0.104 |
| Difference                             | -0.009  | -0.004 | -0.161 | .157  |

**Notes:** We report the summary statistics for our model implied  $\Delta \ln \tau_{mn} + \Delta \ln \tau_{nm}$  and the counterpart from the observed Head-Ries trade cost using ICIO dataset between 2002 and 2007. The last row displays the summary statistics of the difference

Figure C3: Model implied Trade Cost and Head-Ries Trade Cost



**Notes:** The scatterplot compares our model implied  $\Delta \ln \tau_{mn} + \Delta \ln \tau_{nm}$  to the counterpart from the observed Head-Ries trade cost using ICIO dataset.