ESTIMATING THE ECONOMIC EFFECTS OF LABOR PROVISIONS USING A DYNAMIC GE MODEL

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ECONOMICS WORKING PAPER SERIES
Working Paper 2024–04–C

U.S. INTERNATIONAL TRADE COMMISSION
500 E Street SW
Washington, DC 20436

April 2024

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Abstract

We use the dynamic general equilibrium model of international trade in Dix-Carneiro, Pessoa, Reyes-Heroles and Traiberman (2023) to simulate the impact of labor provisions that increase workers' bargaining power. We estimate the resulting changes in employment, real wages, unemployment rates, trade flows, real consumption levels in the short run and in the long run. We simulate a Race to the Top scenario and then compare it to a Race to the Bottom scenario.

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1 Introduction

Could labor provisions in trade agreements, if undertaken on a very large scale, have significant economy-wide effects? What would they look like? Could provisions that increase workers' bargaining power move the needle on sector-specific employment, real wages, and trade flows and aggregate unemployment rates and real consumption levels?

Riker (2020) uses a model of trade to simulate the effects of changes in workers' bargaining power on trade and labor market outcomes. His simulations analyze the effects of increasing labor standards in developing countries to the standards in their trading partners (a Race to the Top) on wages, international trade, employment, and prices in different regions. He demonstrates that a Race to the Top that increases bargaining power in developing countries can be welfare-improving in all countries.[1] However, the static partial equilibrium model in Riker (2020) only estimates industry-specific effects. It is not suited for analyzing economy-wide effects or economic adjustments over time. It cannot address whether increasing workers' bargaining power on a large scale could move the needle on aggregate unemployment rates and real consumption levels.

Addressing these questions about macroeconomic impact requires a dynamic general equilibrium model of trade with costly labor adjustment, unemployment, and wage bargaining. Artuç, Chaudhuri and McLaren (2010) and Caliendo, Dvorkin and Parro (2019) are excellent examples of dynamic models of trade with costly labor adjustment, though they do not include unemployment or wage bargaining. Davidson, Martin and Matusz (1999) and Helpman and Itskhoki (2010) incorporate unemployment into trade models with search frictions and efficient bargaining over the surplus created by high-productivity job matches, but they do not address costly labor adjustment. Dix-Carneiro et al. (2023), Dix-Carneiro

[1] This is a theoretical possibility in the model. It is not a general conclusion. Whether the Race to the Top is welfare-improving depends in a specific way on conditions in the industry and market, including the elasticity of substitution, the levels of outside wages and trade costs, and the size of the market in each country.

and Traiberman (2023), and Rodríguez-Clare, Ulate and Vásquez (2022) address all three of these features of labor markets, but they do not specifically analyze the effects of changes in wage bargaining.

In this paper, we address the potential economy-wide effects of a Race to the Top. We use the dynamic general equilibrium model in Dix-Carneiro et al. (2023) to simulate the impact of labor provisions that increase workers' bargaining power on employment, real wages, unemployment rates, trade flows, real consumption levels in the short run and in the long run. We first simulate a Race to the Top scenario and then compare it to a Race to the Bottom scenario.

These simulations are not attempting to quantify the economic impact of specific recent trade policy initiatives; instead, we are using the model to estimate the potential global general equilibrium effects if labor provisions that increase workers' bargaining power were hypothetically implemented on a very large scale.

The rest of the paper is organized in four parts. Section 2 describes the economic modeling framework. Section 3 estimates economic effects of a Race to the Top. Section 4 compares the effects in a Race to the Bottom. Section 5 concludes.

2 Economic Modeling Framework

Dix-Carneiro et al. (2023) build a global, forward-looking dynamic, general equilibrium model of trade.[2] The model extends the Ricardian model of trade in Eaton and Kortum (2002), which includes productivity-based comparative advantage and international trade costs. Dix-Carneiro et al. (2023) also include trade in intermediate and final goods, following the trade modeling structure in Caliendo and Parro (2015).

The model includes two types of labor market frictions: workers' costs of switching

[2]The mathematical details of the model are explained in detail in Dix-Carneiro et al. (2023), and so they are not repeated in this brief summary.

between sectors and their costs of searching for a new job within their current sector. These labor market frictions result in involuntary and sometimes persistent unemployment, sector-specific real wages, and only gradual reallocation of workers across sectors in response to labor demand shocks.

The model also includes a wage bargaining process. Workers receive a share β of rents from productive matches. This share can vary across regions, depending on the bargaining power of workers. An increase in β in a region increases labor compensation but reduces labor demand as job creation becomes less profitable. The net effects of increasing β on trade flows, labor market outcomes, and economic welfare in the global dynamic general equilibrium model are complex. They reflect the interaction of many factors, including the pattern of productivity-based comparative advantage and the labor market frictions in all regions.

There is also an international bond market that countries use to smooth their consumption over time. Inter-temporally optimizing saving decisions determine trade imbalances and can magnify job losses and gains in the short run.

The model adopts some parameter values from the international trade literature, and it calibrates others to 2000 data using simulated method of moments. The model uses data on input-output linkages between sectors, sector-level production and expenditure, and bilateral trade flows from the World Input-Output Database (WIOD). It calibrates the adjustment costs as workers move between sectors to micro-data for worker transitions in five representative countries and uses data on labor market tightness and unemployment rates in each country from the International Labour Organization and the Federal Reserve Bank of St. Louis.[3]

The economic variables in the model are aggregated into six regions (the United States, China, Europe, Asia other than China, the Americas, and Rest of World) and six sectors

[3]The five countries are the United States, Australia, Korea, Brazil, and the United Kingdom.

that span the economy in each region (agriculture and mining, low-, mid-, and high-tech manufacturing, and low- and high-tech services). There is a 198-quarter time horizon. This allows the model to distinguish between economic effects in the short run and long run effects and to estimate the speed of economic adjustment.

3 Race to the Top Simulation

For the first simulation, we permanently increase the labor bargaining share β in the first quarter of the model in China, the Americas, and the Rest of World to the higher initial labor bargaining shares in the United States, Europe, and Asia Other than China. Table 1 lists the initial and new values in the simulation. This scenario is called Race to the Top, because it involves harmonizing up labor standards, specifically by increasing the bargaining power of labor in the three developing regions.

Table 1: Shocks in the Race to the Top Simulation

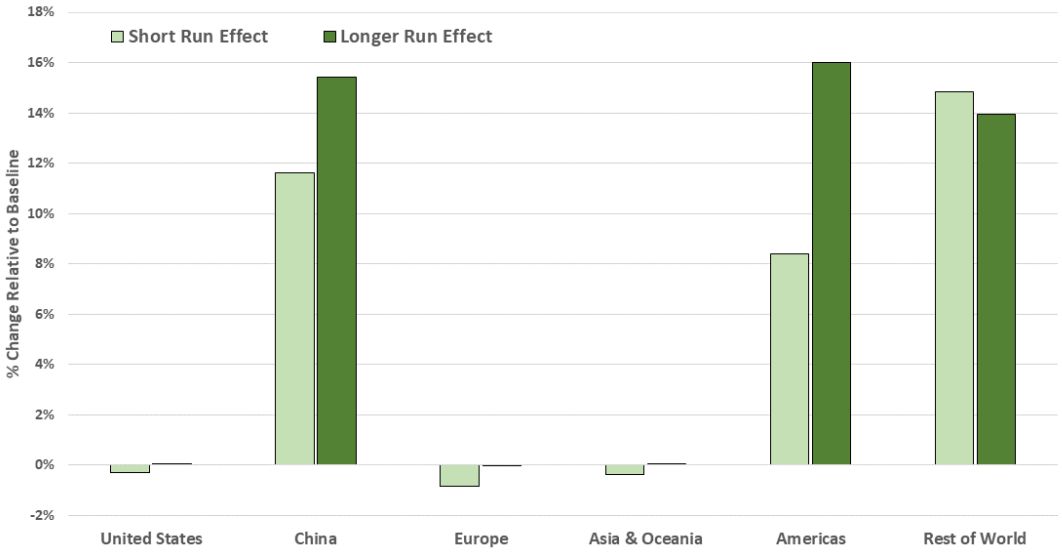
Model Regions	Initial Value of β	New Value of β
United States	0.5	0.5
China	0.4	0.5
Europe	0.5	0.5
Asia	0.5	0.5
Americas	0.4	0.5
Rest of World	0.4	0.5

We report the simulated economic effects of these shocks using graphs that emphasize how the effects vary over time, across regions, and across sectors of the regional economies.

First, we report the difference in the effects on the aggregate unemployment rate in each region in the short run and long run following the region-specific increases in β in Table 1. We define the short run as the effects in quarter 6 and the long run as the effects in quarter 198. These effects are calculated as percent changes relative to the baseline model.

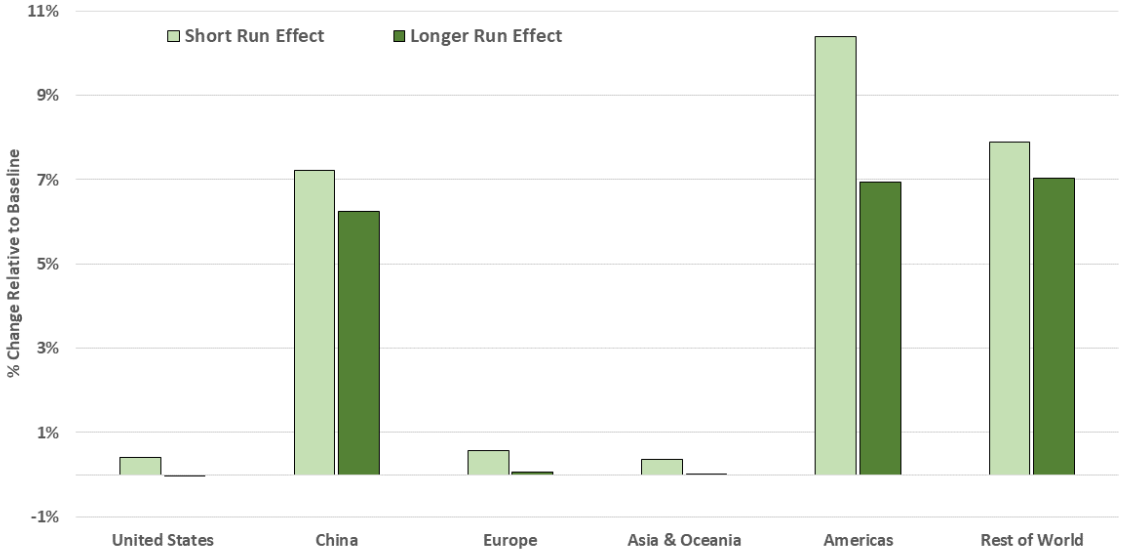
In this Race to the Top scenario, unemployment rates rise due to lower labor demand and lower job creation in China, the Americas, and the Rest of World and the rates decline slightly in their trading partners (Figure 1). The increases in unemployment rates, as a percent change from the baseline rate, are larger in the long run than in the short run in China and the Americas, but slightly lower in the long run in Rest of World.

Figure 1: Unemployment Rates in the Short and Long Run



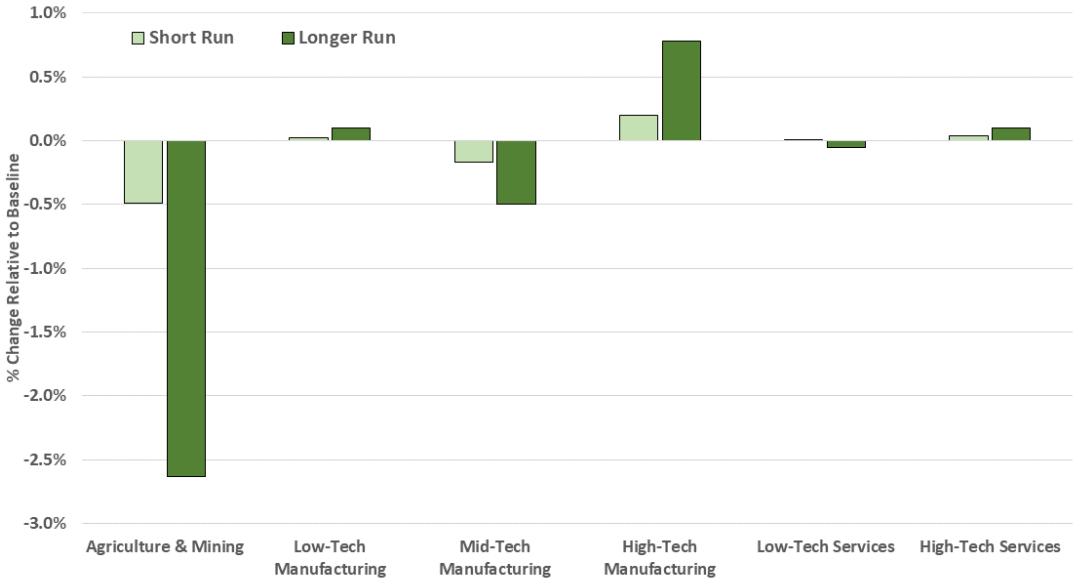
Next, we report changes in real consumption, an important indicator of aggregate economic welfare that reflects changes in income and the cost of living in each region. The Race to the Top increases real consumption in all six regions, though the increase is much larger as a percent change in the regions with increased labor bargaining power (Figure 2). These welfare effects dampen slightly in the long run in all six regions.

Figure 2: Real Consumption by Region



The next graph focuses on the impact on employment in each of the six sectors in a single country, the United States. The shift in U.S. employment between sectors reflects changes in comparative advantage as β increases in China, the Americas, and the Rest of the World. The economic effects of the increases in β are transmitted to the U.S. economy through international trade and the international bond market. The changes in U.S. employment are positive for high- and low-tech manufacturing and high-tech services and are negative for agriculture and mining, mid-tech manufacturing, and low-tech services (Figure 3). The absolute value of percent changes in employment are larger in the long run than in the short run, since labor adjustment costs slow the reallocation of workers between the sectors.

Figure 3: U.S. Employment by Sector



The next graph focuses on the impact on real wages in each sector of the U.S. economy. These percent changes, again expressed relative to baseline values, measure sector-specific changes in workers' economic welfare. In the Race to the Top scenario, the changes in real wages vary over the time horizon and across sectors (Figure 4). The percent changes are larger in absolute value in the short run and are dampened in most of the sectors in the long run. The largest negative changes in real wages are in agriculture and mining, followed by mid-tech and low-tech manufacturing. The U.S. sectors that benefit from higher real wages are the two services sectors and high-tech manufacturing.

The simulated changes in U.S. sector exports are similar to the changes in sector employment, though less concentrated in a single sector (Figure 5). All of the U.S. export changes are negative in the short run in this Race to the Top scenario. The long run effects are generally smaller than the short run effects except in agriculture and mining, where the percent changes are magnified in the long run.

Figure 4: U.S. Real Wages by Sector

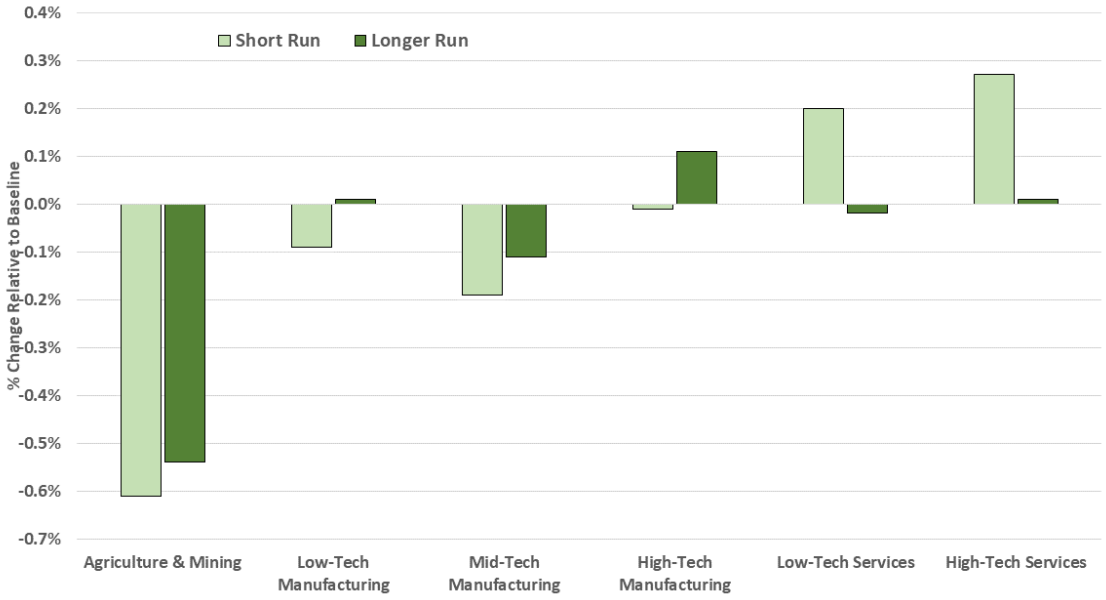
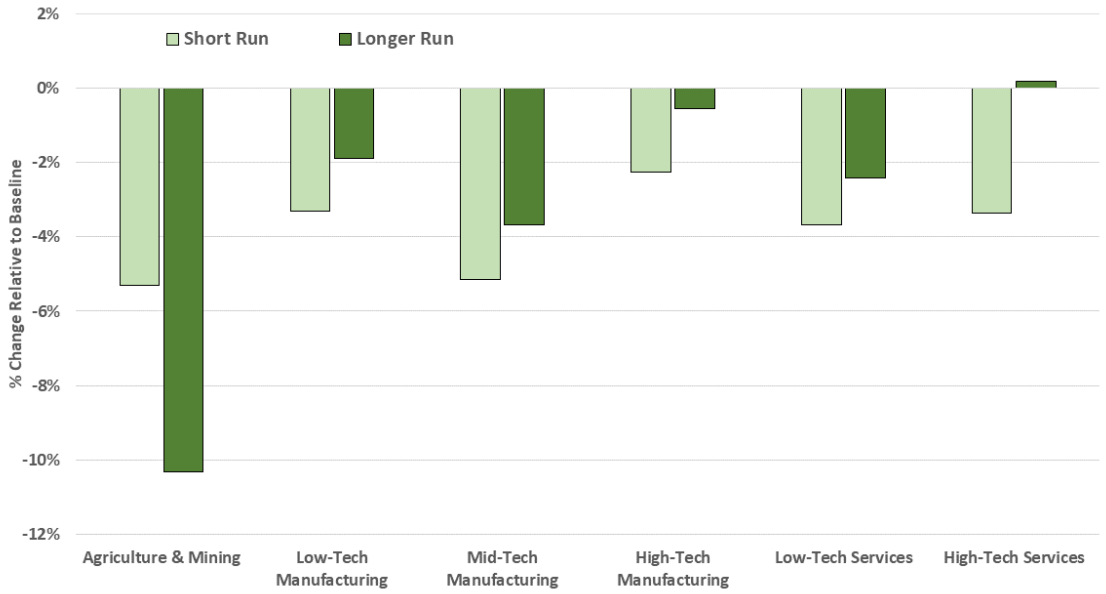
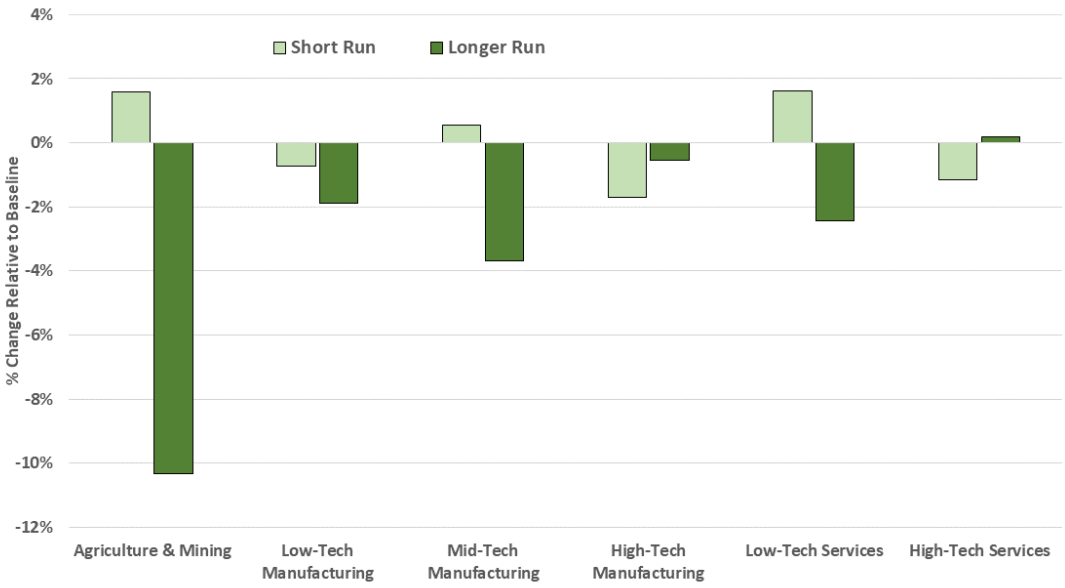


Figure 5: U.S. Exports by Sector



Finally, the simulated effects on U.S. imports are generally negative and magnified in the long run (Figure 6). These changes are especially concentrated in agriculture and mining.

Figure 6: U.S. Imports by Sector



4 Race to the Bottom Simulation

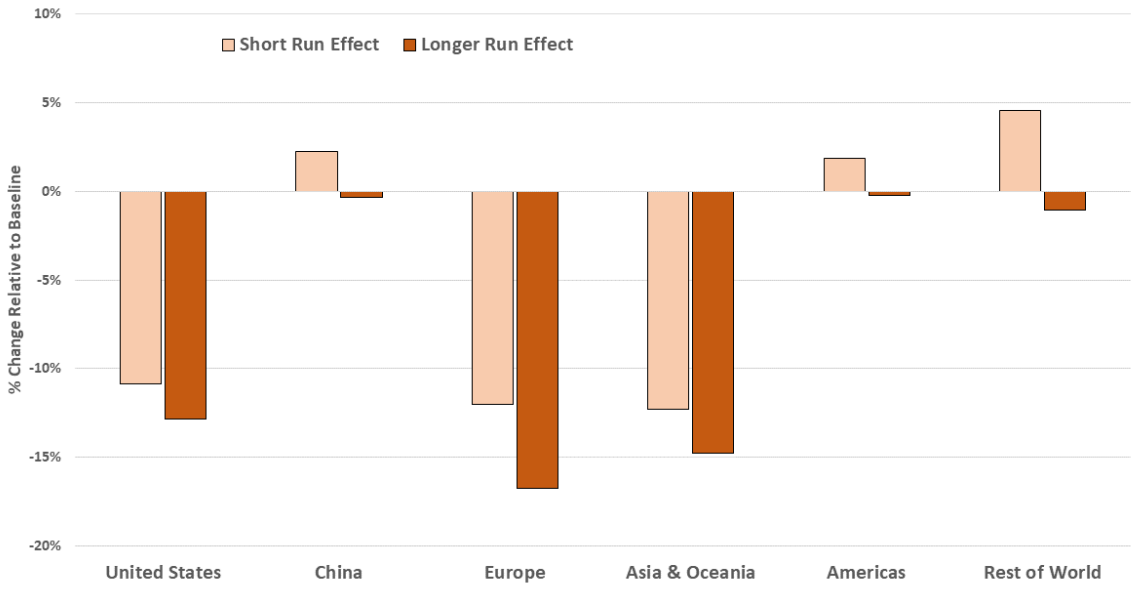
On the other hand, the second simulation permanently *reduces* the labor bargaining share β in the first quarter in the United States, Europe, and Asia Other than China to the lower initial labor bargaining shares in China, the Americas, and the Rest of the World. Table 2 lists the initial and new values in this second simulation. It is called Race to the Bottom because it involves harmonizing down the bargaining power of labor in the more economically advanced regions. This scenario seems unlikely, but it provides a useful and sometimes surprising contrast to the Race to the Top simulation.

Table 2: Shocks in the Race to the Bottom Simulation

Model Regions	Initial Value of β	New Value of β
United States	0.5	0.4
China	0.4	0.4
Europe	0.5	0.4
Asia	0.5	0.4
Americas	0.4	0.4
Rest of World	0.4	0.4

There are relatively large declines in the unemployment rates in regions that reduce β, and small increases in the unemployment rates in the other regions (Figure 7). The graph in Figure 7 is basically a mirror image of the effects in the Race to the Top simulation in Figure 1.

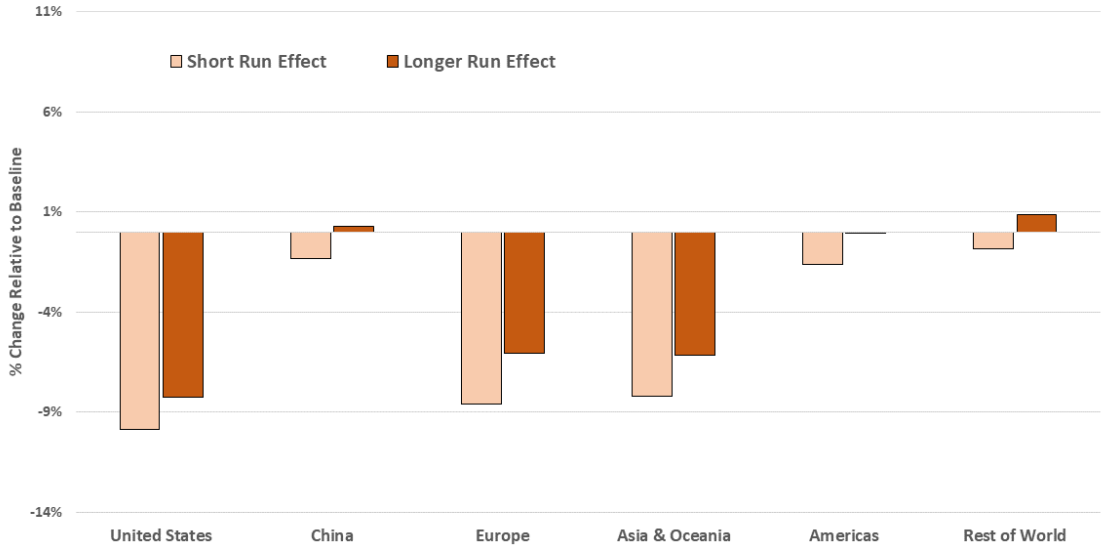
Figure 7: Unemployment Rates in the Short and Long Run



Real consumption declines in all regions in the short run in Figure 8, just as it increased in all regions in Figure 2. Again, the effects on this measure of economic welfare are much

larger in absolute magnitude in the regions where β changed (the United States, Europe, and Asia Other than China), and they are only slightly dampened in the long run.

Figure 8: Real Consumption by Region



The effects on U.S. employment in each sector in Figure 9 are similar to the effects in Figure 3 (except in high-tech manufacturing), despite the differences in the simulation shocks. There are large percent declines in U.S. employment in agriculture and mining and low-tech services, moderate increases in high-tech manufacturing and high-tech services, and smaller effects in the other two sectors.

U.S. real wages increase in agriculture and mining, especially in the long run, but decline in all of the other sectors in the short run (Figure 10). There is much less variation in the percent changes across sectors in Figure 10 than in Figure 4. In this Race to the Bottom scenario, there is a direct effect on real wages in the United States, Europe, and Asia from the reduction in the bargaining share of labor in these three regions.

Figure 9: U.S. Employment by Sector

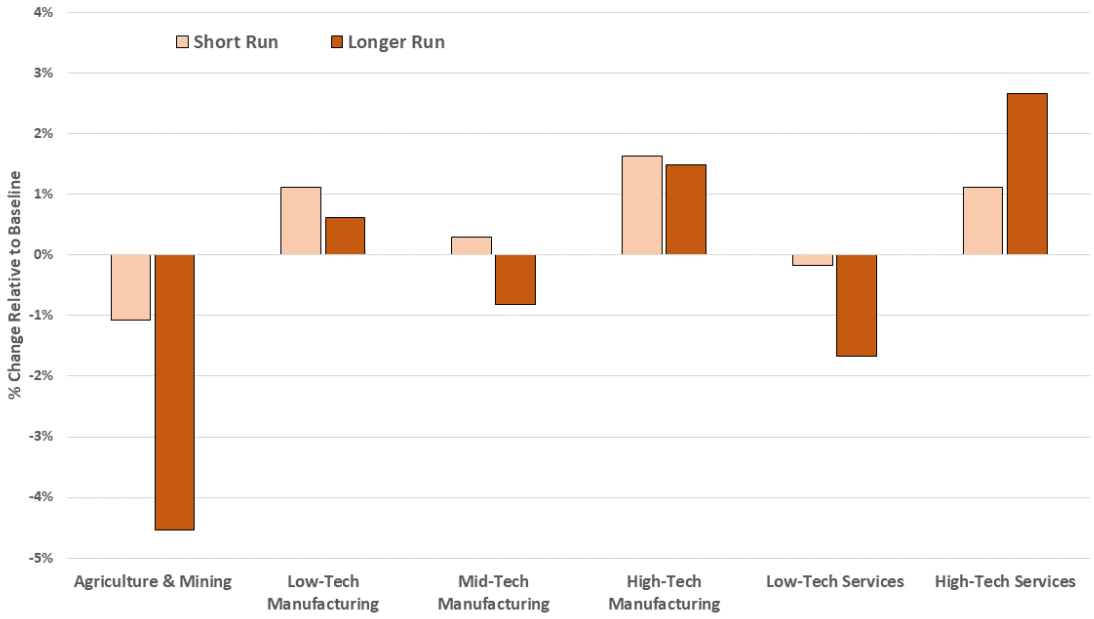
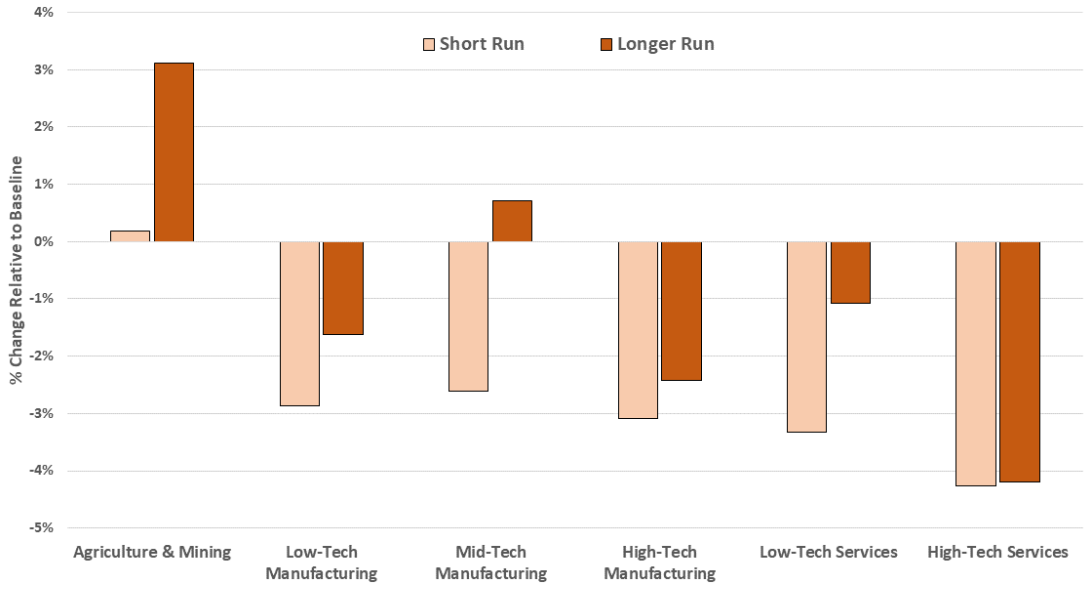
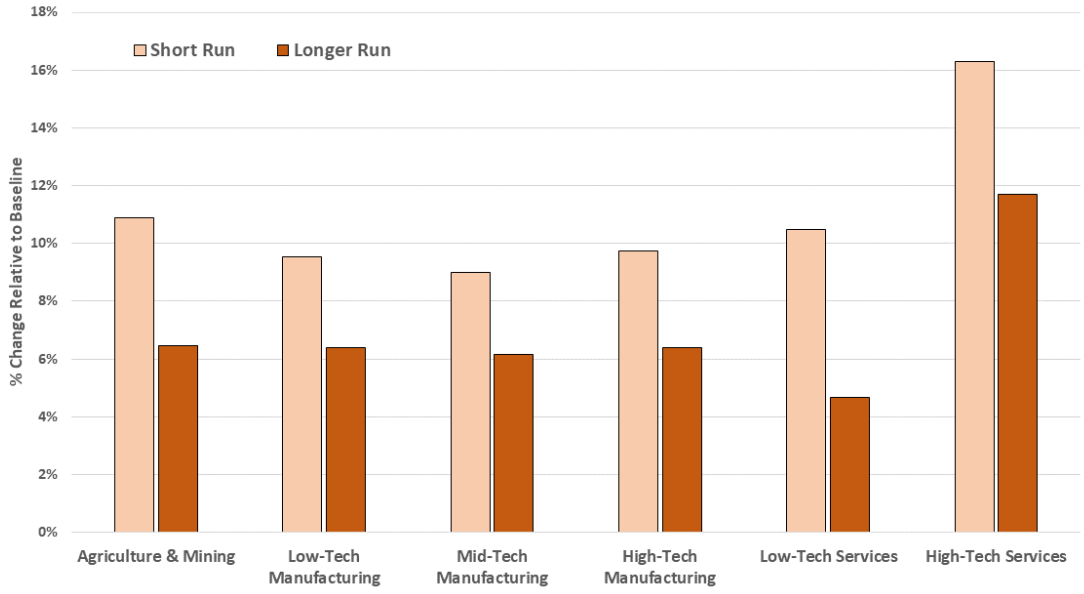


Figure 10: U.S. Real Wages by Sector



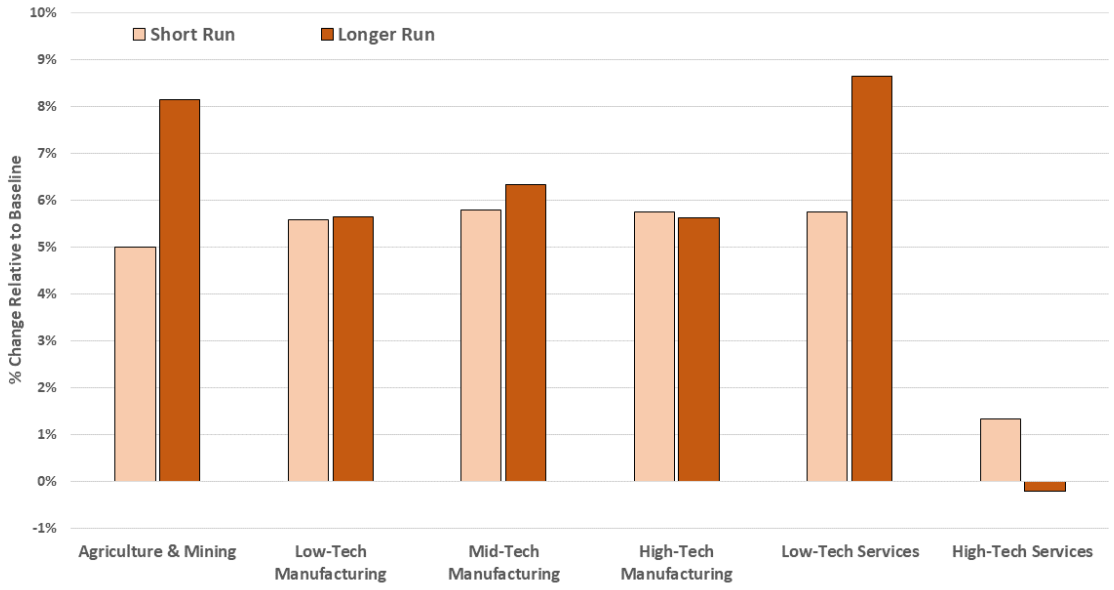
There are increases in U.S. exports in all six sectors, especially in the short run (Figure 11), in contrast to the declines in Figure 4. The absolute magnitudes of the effects in Figure 11 are more similar across the sectors than in Figure 4.

Figure 11: U.S. Exports by Sector



There is an increase in U.S. imports in all sectors, similar in magnitude in the short run and long run and also similar across sectors, except for high tech services (Figure 12). These estimated effects are very different from the mixed outcomes across sectors in the Race to the Top scenario in Figure 5.

Figure 12: U.S. Imports by Sector



5 Conclusions

The dynamic general equilibrium model in Dix-Carneiro et al. (2023) provides useful insights into the potential impact of very large scale initiatives that support labor rights and increase workers' bargaining power. A Race to the Top would increase real consumption and reduce the unemployment rate in the United States in the short run. The estimated effects on U.S. employment, real wages, and trade flows would vary significantly across sectors of the U.S. economy.

Comparing the two simulations, the effects on aggregate unemployment rates and real consumption are mirror images, moving in opposite directions. On the other hand, the sector-specific effects on employment, real wages, exports, and imports are asymmetric, reflecting the complexity of interactions in the dynamic general equilibrium model.

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