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# FOREIGN DIRECT INVESTMENT, GLOBAL VALUE CHAINS, AND LABOR RIGHTS: NO RACE-TO-THE-BOTTOM?

Hyejoon Im
John McLaren

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Hyejoon Im
School of Economics and Finance
Yeungnam University
Daehak-Ro 280
Kyungsan, 38541
S. Korea
hi6w@yu.ac.kr

John McLaren
Department of Economics
University of Virginia
P.O. Box 400182
Charlottesville, VA 22904-4182
and NBER
jmclaren@virginia.edu

# Foreign Direct Investment, Global Value Chains, and Labor Rights: No Race-to-the-Bottom?*

Hyejoon Im† and John McLaren‡

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**Abstract**

In a stylized model of multinational firms choosing host locations for their global value chains, host-country governments choose the strength of collective-bargaining rights that allow their workers to receive a share of the resulting quasi-rents. Each government must trade off the direct benefit of stronger bargaining rights against both the effect of chasing multinationals away to

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†School of Economics and Finance, Yeungnam University, Daehak-Ro 280, Kyungsan, 38541, S. Korea; hi6w@yu.ac.kr

‡Department of Economics, University of Virginia, P.O. Box 400182, Charlottesville, VA 22904-4182, USA; jem6x@virginia.edu

rival countries and general-equilibrium effects of discouraging investment in the industry altogether. We find that an increase in globalization in the sense of lower transaction costs has no effect on equilibrium workers' rights, but adding more countries to the global trading system tends, in the limit, to *weaken* them. Thus, as a matter of theory, the effect of globalization on labor rights is ambiguous.

Empirically, we find little evidence that globalization drives movements in labor rights in either direction.

# 1 Introduction.

Every country regulates labor standards for its workers, such as workplace safety conditions or collective-bargaining rights. We ask how globalization affects a government's incentives to do so. In a world in which countries compete for work in a system of globalized supply chains, it is sometimes argued that governments will choose weaker labor standards than optimal in order to make themselves more attractive to multinationals than competing countries – the 'race to the bottom.' This idea, that globalization puts downward pressure on labor rights (as well as environmental regulations and other policies), is widespread in critiques of globalization by non-economists. As phrased by Robert Kuttner (2011):

> The core problem is the increased economic leakiness resulting from globalisation. This leakiness has created a competitive dynamic that fosters a 'race to the bottom.' With jobs and investment highly mobile internationally, countries have an incentive to adopt policies

that suppress wages, demand growth, and labour, social, and environmental protection. The reasoning is that this will make them more attractive to corporations and as a site for foreign direct investment (FDI).

These ideas draw support among activists from a body of case studies and anecdotes. For example, documents publicized by Wikileaks several years back revealed a concerted effort by contractors for US multinationals (including Hanes and Levi's) to prevent a rise in Haiti's minimum wage,[1] and government documents from the military dictatorship era in Brazil show coordination between multinationals (including Volkswagen and Ford) and the government to identify, harass, and ostracize workers who were inclined to organize a labor union.[2] In both cases, the claim was that the host government faced pressure from multinationals to weaken labor rights.

As a matter of theory, race-to-the-bottom claims take many forms. The argument is sometimes framed as competition between countries for export markets (for example, Rodrik (1996), Chau and Kanbur (2006)), and sometimes as competition for footloose capital (for example, Davies and Vadlamannati (2013), Olney (2013), and Chan and Ross (2003)). Many commentators, such as Rodrik (1996), focus on the question of high-income countries lowering labor standards due to trade with low-income countries, but others focus on South-South competition for markets and footloose capital, such as Chau

[1] Dan Coughlin and Kim Ives, "WikiLeaks Haiti: Let Them Live on $3 a Day: The US Embassy aided Levi's, Hanes contractors in their fight against an increase in Haiti's minimum wage." *The Nation*, June 1, 2011.

[2] Brian Winter, "The 'Black List:' Documents suggest foreign automakers aided Brazil's dictators." *Reuters*, Aug. 5, 2014.

and Kanbur (2006) and Chan and Ross (2003), who describe competition between Mexico and China, and between cities in China, for apparel capital. Drezner (2000) provides many examples of the race-to-the-bottom argument and discusses anecdotal evidence against the claim, suggesting that the race-to-the-bottom hypothesis is a myth that persists because it is useful for activists and also for corporations that wish to evade responsibility for misconduct. Race-to-the-bottom concerns are very much alive in current policy making: For example, the Biden administration has expressed concern that globalization in the past has tended to weaken labor rights, and has publicly made 'worker-centered trade' a priority,[3] while recent revisions to NAFTA have been credited with encouraging independent trade unionization in Mexico.[4]

The term 'labor standards' is very broad and can encompass, for example, regulations on working conditions, rules for firing workers, rules on discrimination and the use of child labor, and collective-bargaining rights. This paper focusses on collective-bargaining rights for workers, which henceforth we will refer to as 'labor rights.' A companion paper, Im and McLaren (2023), focusses on standards for working conditions. We study how international competition affects labor rights in a stylized equilibrium model with endogenous global value chains (GVC's); each producer must choose in which country each productive task will be performed by local workers; and each government must choose the policies that determine the strength of collective-bargaining rights for its workers, taking into account how this may affect location decisions of firms.

[3]Farah Stockman, "Biden's Pro-Labor Vision Goes Beyond America," *New York Times*, March 6, 2022.

[4]Ana Swanson, "G.M. workers in Mexico pick an independent union, a trade deal test case. The vote came after the United States, Mexico and Canada revised a trade agreement that sought to strengthen the hand of workers." *New York Times*, Feb. 3, 2022

The question is how an increase in globalization affects Nash equilibrium labor rights in host countries. We find two contrasting results.

First, consider the case in which international transport/transaction costs fall so that multinational firms move more of their global value chains to host countries. We call this the effect of 'globalization at the intensive margin.' In our model, this kind of globalization has *no* effect on equilibrium collective-bargaining rights. A government considers three effects that result from strengthening the labor rights. First, the direct benefit; for any given amount of available quasi-rent, stronger worker bargaining power allows its workers to capture a higher income. Second, there is a cost that results from driving a certain fraction of multinationals away from that country and toward other host countries. We can call this the 'competition effect.' This is the term that is emphasized by critiques of globalization. Third, there are general-equilibrium effects: The country's aggressive pro-labor policy can discourage some firms from entering the industry, resulting in reduced product variety that harms everyone. Essentially, the 'race to the bottom' argument is based on an assumption that increased quasi-rents from reduced transaction costs result in governments being more fearful of losing any multinationals, so that the competition effect becomes larger, causing the government to weaken the labor rights. However, in our model the real value of *all three terms* is increased equally by globalization at the margin, resulting in no change in incentives. The increased size of the pie in real terms increases both the reward and the costs to collective-bargaining rights in equal proportion.

Second, consider the case in which the number of potential host countries rises, holding the size of the world economy fixed. We call this 'globalization at

the extensive margin.' In this case, in the limit, globalization drives collective bargaining rights to zero. In the long run, each country's share of potential quasi-rents becomes small, but the competition effect does not. When there are many similar host countries, a small increase in worker rights can drive almost all multinationals away to competitors, so competition between host countries eliminates collective-bargaining rights in the limit.

Therefore, the effect of globalization on labor standards is ambiguous. There is no theoretical presumption in favor of a race-to-the-bottom effect or a race-to-the-top effect.[5]

This is all in the context of a model that can be argued to be biassed in favor of finding a race-to-the-bottom effect, because in this model a country strengthening its labor rights can only discourage multinationals from using it as a host. Numerous authors have pointed out that there are reasons multinationals can under some conditions be *attracted* by strong labor rights, including the likelihood that they help promote a skilled workforce and can help improve the firm's image with consumers (Rodrik (1996), Drezner (2000), Blanton and Blanton (2012), Alfaro-Ureña et al. (2021)).

We use panel data on labor rights across countries created by Kucera and Sari (2019) to examine whether increased globalization is correlated with changes in labor rights. To examine the possibility of an intensive-margin effect, we look at increases in FDI as a fraction of GDP, instrumented with a shift-share strategy. No significant correlation is found with changes in labor rights. To examine the possibility of an extensive-margin effect, we look at changes in

[5]It should be underlined that in our model, in a closed economy there would be no rationale for labor standards to begin with, because their function is to transfer income from the foreign multinational to domestic workers.

the average numbers of countries with which each host country competes for FDI. A significant negative correlation with labor rights is found, consistent with the theory model, but the magnitude is very small. We conclude that there is no meaningful race-to-the-bottom effect in the data.

The following section reviews relevant previous work on the topic. Section 3 presents our theoretical model, 4 lays out an empirical strategy, and 5 presents empirical results.

# 2 Previous work.

We will take a moment to review earlier related work, on labor standards and on global value chains.

## 2.1 Theoretical work on labor standards.

Chau and Kanbur (2006) study equilibrium labor standards in a general-equilibrium model of LDC's that compete in an industrial-country export market. Larger countries have more of an incentive to tighten standards than small ones, owing to the terms-of-trade effect by which increases in the standard create increased local marginal costs. See also the related analysis in Dehejia and Samy (2004). Felbermayr, Larch, and Lechthaler (2012) study Nash equilibrium in unemployment insurance in the presence of trade, and Chen and Dar-Brodeur (2020) study Nash equilibrium in national labor standards in an oligopoly trade model. Each of these analysis shows that some portion of the cost of a labor standard can be borne by trade partners, resulting in inefficient

outcomes.[6]

However, the focus of this paper is specifically collective-bargaining rights, which have no role in those models.[7] Davies and Vadlamannati (2013) study a partial-equilibrium model in which each FDI host country must set collective-bargaining rights, which determines the bargaining power of local labor unions vis-a-vis a multinational. Increasing the bargaining power of local workers directly raises social welfare by ensuring higher wages in any bargaining match, but indirectly lowers social welfare by driving away some multinationals, convincing them to locate in a rival country instead. In this framework, labor standards exhibit strategic complementarity: Stronger worker bargaining power in one country drives more multinationals to rival countries, allowing them to choose stronger bargaining power for their own workers. We use this model as the core of our approach.

*Difference from the present paper.* These approaches all take the degree of globalization as given, and therefore they look at related questions separate from our main interest: The effect of increased 'globalization,' or increased integration between countries, in a many-country world, on equilibrium choices of labor standards in host countries.[8] We set up a stylized model of trade in

[6]Some forms of labor standards fit within the framework of domestic policies considered by Bagwell and Staiger (2001). The question there is quite different: When domestic policies have an effect on trade outcomes, how can multilateral trade rules be designed to improve governments' incentives regarding those policies? By contrast, here we explore the effect of increased globalization on those incentives.

[7]In related work slightly farther from our interest here, Chau and Kanbur (2013) study how bargaining with asymmetric information between a firm and its unionized workers is affected by the opportunities of the firm to move its capital to other countries.

[8]The exception is Felbermayr, Larch, and Lechthaler (2012), who show how the equilibrium changes due to changes in iceberg transpot cost. Their policy focus on unemployment insurance, however, is different from ours.

tasks with many countries that allows us to increase globalization in different ways and see how labor standards adjust.

## 2.2 Empirical work on Labor Standards.

It has been more common for empirical studies to look at the direction from human rights or labor rights to FDI than the other way around, which is our interest. Harms and Ursprung (2002) use Freedom House indexes for measures of civil rights and find that improvement of civil rights positively affects FDI flows. Li and Reuveny (2003) examine how FDI affects democracy and find the effects are positive. Blanton and Blanton (2007, 2012) examine how human rights affect FDI flows and look at the other direction as well. They find that the effects are positive in the both directions in the earlier study, and negative overall but positive for manufacturing FDI in the later one. Asiedu and Lien (2010) find that the effect of democracy on FDI depends on the importance of natural resources in the host country's exports. Democracy leads to an increase in FDI in countries where the share of natural resources in total exports is low, but it reduces FDI in countries where exports are dominated by natural resources.

A number of papers look at the effects of standards on FDI flows. Rodrik (1996) examines how labor standards affect U.S. outward FDI and finds that the effect of the total number of ILO convention ratifications is statistically insignificant but the effect of democracy is positive. On the other hand, Cooke and Noble (1998) find that the number of ILO convention ratifications positively affects U.S. outward FDI.

Kucera (2002) looks at core labor standards as FDI determinants, constructing a pioneering index based statutes in each country; he finds that collective bargaining rights are insignificant. Mosley and Uno (2007) expand Kucera's index to have annual data for the period of 1986-2002 and do a panel analysis (but with no fixed effects). They find that FDI is positively related to the rights of workers, suggesting "climb to the top," but that trade openness is negatively related to it, implying "race to the bottom." However, they do not address endogeneity of FDI in estimation.

Neumayer and De Soysa (2006) find that trade openness positively affects collective-bargaining rights, while the effects of FDI are insignificant.

A major problem with this line of research is the endogeneity of FDI. Any shock to an economy is likely to have an effect on FDI, and if the shock also has an effect on labor rights, then treating FDI as an exogenous variable will lead to biased estimates of its effects. For example, if a political party takes power that is committed to a 'pro-business' agenda that includes restrictions on union formation and collective bargaining, as well as lower corporate income taxes, the result could be both a surge in inward FDI and deterioration in labor rights. This would result in a spurious negative correlation between FDI and labor rights. This endogeneity issue has been ignored in most of the studies to date.

The two most closely related papers to ours are Davies and Vadlamannati (2013) and Olney (2013). The main focus for both is estimating the effect of a change in one country's labor standard on its competitor countries' labor standards, both finding evidence of strong complementarity. In a two-country model, this would imply upward-sloping reaction functions. The present paper

has a different focus, in effect asking how the reaction functions shift when globalization increases, rather than the sign of the slope.

*Difference from the present paper.* In summary, although several papers look at the effect of FDI on labor rights along with trade effects, those that face the endogeneity issue ask a different question from our focus. They zero in on the sign of the *slope* of each country's reaction function. By contrast, we try to find an effect of an exogenous rise in access to global capital on the labor-standard Nash equilibrium, which is essentially about the direction in the *shift* in the reaction functions.

## 2.3 Work on global value chains.

We follow a well-developed literature that studies the allocation of productive tasks across countries along the lines of comparative advantage. In Grossman and Rossi-Hansberg (2008), a low-wage country has a comparative advantage in low-skill tasks, but tasks differ in how easy they are to offshore. The division of tasks between high-wage and low-wage countries is endogenously determined. In Rodríguez-Clare (2010), low-wage countries have a comparative advantage in upstream tasks. In Costinot, Vogel and Wang (2013), more upstream tasks tend to be allocated to lower-skill countries where the workers make more mistakes. Our model in similar in spirit to each of these, but productivities for each task vary by country in a manner analogous to Eaton and Kortum (2002).

A central part of the story we examine is that multinational firms shift their labor demand across countries in response to policy shocks, a mechanism which has been studied empirically by numerous authors. Ahn, Choi, and

Chung (2022) provide a striking case study: A sudden change in labor-market regulation in South Korea, including a substantial increase in minimum wage, induced Korean firms with foreign affiliates to move some of their production activities to other countries. Harrison and Scorse (2010) provide evidence that Philippine firms that are part of GVC's of a multinational raised wages but did not lower hiring when the multinationals were hit with anti-sweatshop activism from Western activists; Makioka (2021) finds employment declines in the same data using different methods. Alfaro-Ureña et al. (2021) show that suppliers to a multinational tend to shed workers when the multinational adopts a Responsible Sourcing standard, which amounts to a voluntary labor standard.

GVC's have been shown to react to a cost shock in one part of the production network more broadly. Kovak, Oldenski and Sly (2021) show that US tax treaties that lower the cost of using a given host country cause multinationals to increase activity in that country (with a complimentary boost to hiring in the US). Antras, Fort, and Tintelnot (2017) show how endogenous cross-country production networks respond to a change in any country that is part of the network.

# 3 Theory.

Here we present a simple, stylized model of international integration of labor markets with endogenous provision of collective-bargaining rights.

To talk about collective-bargaining rights, we need a model with some surplus over which employers and workers can bargain. The most natural way to

incorporate these elements is to allow for monopolistic competition, in which a firm must make a fixed sunk cost in a county before it can produce, and then the workers bargain over the quasi-rent.[9]

Suppose there are $N+1$ countries $j = 0, 1, 2, \ldots N$. Country $j$ has $L^j$ units of labor. Think of country 0 as the home country to multinational producers. We might call country 0 'North' and countries 1 through $N$ together 'South.'

There is a numeraire good, good $Y$, produced in each country with constant unit marginal product of labor. This will tie down the wage to unity in each economy, for any worker who does not benefit from collective bargaining, as discussed below. In addition, there is a sector of differentiated goods. The composite good is denoted $X = \left(\int_0^n x(i)^\eta di\right)^{\frac{1}{\eta}}$, where $x(i)$ denotes the quantity of good $i$ consumed and $\eta \in [0, 1]$ is a constant. All consumers have Cobb-Douglas preferences, with a weight of $\alpha$ on the composite differentiated good.

A producer of a differentiated good must perform one unit each of tasks $z \in [0, 1]$ in order to produce one unit of output. The labor required to do one unit of task $z$ in country $j$ is $\delta^j a_z^j$, where $\delta^j \geq 1$ is a country-specific cost term that captures the difficulty of offshoring a task across borders, and $a_z^j$ is a country- and task-specific cost shock. For each $z$, $a_z^j$ is distributed Weibull, with shape parameter $\nu > 0$ and scale parameter 1. These values are independently distributed across tasks. The distribution of costs in countries 0 and any other country $j$ with $j \geq 1$ is independent, but all countries $j \geq 1$ have the same realized costs.

[9]We use the simplest possible monopolistically-competitive model, with homogeneous single-product firms that produce only final goods and a demand structure that ensures fixed price-marginal-cost markups. None of these restrictions is realistic, but relaxing these assumptions would add enormously to the complexity of the exercise without adding any essential insight to the questions on which we focus.

There is a fixed and sunk cost of entering the differentiated-products sector, amounting to $F^e$ units of the numeraire good. In addition, in order to perform any tasks in a given country $j$, a firm $i$ must first incur a fixed and sunk cost $F + \epsilon^{ij}$ units of the numeraire good, where $\epsilon^{ij}$ is an idiosyncratic cost for that firm of doing business in that one location.[10] The $\epsilon^{ij}$ term is iid across firms and countries, and is distributed uniformly on $[-\frac{\Delta}{2}, \frac{\Delta}{2}]$.[11]

The fact that all Southern economies have the same pattern of $a_z^j$ realizations together with the fixed cost for operating in any location imply that each firm will operate in at most one Southern economy. This avoids the very substantial complications of choosing an optimal subset of host countries as in Antras, Fort and Tintelnot (2017). We will assume throughout that the parameters are such that each firm chooses to operate both in the North and in one Southern economy.

The model plays out over time as follows. First, each country's government announces policy, which determines the strength of collective bargaining rights, as described below. Second, each entrepreneur who wishes to enter the differentiated-products sector must incur the fixed entry cost $F^e$. Third, firms learn the values of their idiosyncratic costs, choose a host economy, and sunk their cost in that economy. Fourth, each firm bargains with the workers in its chosen host economy, determining what share of the quasi-rent will go to host-country workers and what share will stay with the firm, based on the

[10]The reason to add this feature of the model is that otherwise the policy game has a degenerate character, where a small change in policy causes that country to lose all FDI or to capture all of the FDI in the world. A similar device is used in Davies and Vadlamannati (2013).

[11]The uniform distribution allows us to avoid a modelling nuisance. If the idiosyncratic shock had full support, there would be a positive probability of firms exiting after having paid their entry cost $F^e$. This would substantially complicate the model without adding anything of interest to the questions at hand.

collective-bargaining rights that were established in Stage 1. Finally, all firms produce, wages are paid, and consumption occurs.

## 3.1 Bargaining.

Consider a firm $i$ that has sunk its cost to operate in host country $j \geq 1$. It must then bargain with local workers in order to produce. If the bargaining is efficient, it will choose the allocation of tasks between countries 0 and $j$ as well as the quantity of labor to hire and the price of final output to maximize the joint surplus. This means that the firm will allocate each task to the country where it can be done at the lowest cost in terms of the opportunity cost of labor, which is the unit wage in both countries. Therefore, a task will be done in $j$ if $\delta^j a_z^j < a_z^0$ and will be done in 0 otherwise.

From Anderson et al. (1987), this cost-minimizing allocation of tasks to the two countries is equivalent to minimizing the cost of producing a unit of $x(i)$ output, where:

$$x(i) = \phi \left\{ (L^0)^\rho + \left( \frac{L^{ij}}{\delta^j} \right)^\rho \right\}^{\frac{1}{\rho}}, \tag{1}$$

with $\rho = \nu/(1+\nu)$ and $\phi = (\Gamma(1+1/\nu))^{-1}$, where $\Gamma(\cdot)$ is the gamma function and where $L^{ij}$ is the amount of country-$j$ labor employed by firm $i$. Thus, the problem for the firm is equivalent to cost minimization with a CES production function with elasticity of substitution equal to $\sigma \equiv 1/(1-\rho) > 1$.

This implies a marginal cost of production equal to:

$$c^{0j} = \left( 1 + (\delta^j)^{\frac{-\rho}{1-\rho}} \right)^{\frac{-(1-\rho)}{\rho}}. \tag{2}$$

Given the demand structure, the elasticity of demand is constant, and maximization of the profit for variety $i$, which is the same as maximization of the bargaining surplus, will imply a constant markup of price over marginal cost. The demand curve is:

$$x^i = \frac{\alpha I^W}{P^{\frac{\eta}{\eta-1}}}(p(i))^{\frac{1}{\eta-1}}, \tag{3}$$

where $I^W$ is world income, and:

$$P = \left( \int p(i')^{\frac{\eta}{\eta-1}} di' \right)^{\frac{\eta-1}{\eta}} \tag{4}$$

is the composite price of differentiated goods. In the case of a symmetric equilibrium where $p(i) = p \forall i$, this reduces to

$$P = n^{\frac{\eta-1}{\eta}} p, \tag{5}$$

where $n$ is the number of firms. Given the profit-maximizing markup rule $p(i) = c^{0j}/\eta$, the maximized variable profit for firm $i$ is:

$$\pi^{ji} = \frac{\alpha I^W}{P^{\frac{\eta}{\eta-1}}}(1-\eta)\left(\frac{\eta}{c^{0j}}\right)^{\frac{\eta}{1-\eta}}. \tag{6}$$

Since this value will be the same for all firms using country $j$ as a host, henceforth we will drop the firm indicator from the superscript and write $\pi^j$.

This value, $\pi^j$, is then the quasi-rent over which the firm and its workers will bargain. Following Davies and Vadlamannati (2013), bargaining by the workers and firm is governed by generalized Nash bargaining where the workers' threat point is employment in the numeraire sector at a unit wage, and the threat point

for the firm is zero, since it has already committed to production in country $j$ by that point with its sunk investment. The workers' bargaining power is given by $\beta^j$; this is the fraction of the quasi-rent that goes to the workers. We assume that the rules chosen by the government in Stage 1 determine $\beta^j$, so for the workers and the firm, $\beta^j$ is a fixed parameter that governs their bargaining game, but for the government it is a choice variable. For example, laws that make it easier for workers to form a union or for unionized workers to strike, and rules that make it harder for an employer to fire striking workers or to replace them with temporary non-unionized workers, will increase $\beta^j$. Therefore, firm $i$'s variable profit is equal to $(1-\beta^j)\pi^j$, and the income to firm $i$'s workers in $j$ is equal to the country-$j$ opportunity wage per worker, which is unity, plus $\beta^j\pi^j$ for each multinational firm that produces in $j$, divided up among the workers.

Our assumption of efficient bargaining is, of course, not innocuous. For example, in this model there will never be strikes. Chau and Kanbur (2013) show how imperfect information in bargaining, which can give rise to strikes, interacts in complex ways with the multinational's option of moving capital to another host country. Those issues are potentially of great interest, but are beyond the scope of this paper.

## 3.2 Choosing a host country.

Before making a sunk cost in a host country, but after learning its idiosyncratic shocks, a firm that has entered the differentiated-products sector must choose the optimal host country. This means choosing the country $j$ that offers the

highest value of $(1-\beta^j)\pi^j - F - \epsilon^{ij}$. From here on in, we will drop the firm superscript $i$ in writing the idiosyncratic shocks, and simply write $\epsilon^j$ for the idiosyncratic cost shock that applies to host country $j$.

For analyzing a symmetric equilibrium, it is useful to look at a case where all Southern economies have the same parameters and policy choices except for one, to analyze whether or not it is profitable to deviate from the proposed Nash equilibrium. Suppose that all countries $j = 2, \ldots, N$ have the same values of $\delta^j$ and $\beta^j$, which we will denote as $\delta^2$ and $\beta^2$ respectively. Then, naturally, $\pi^j = \pi^2$ for $j = 2, \ldots, N$ as well. The probability that the best value of $(1-\beta^j)\pi^j - \epsilon^j$ for $j = 2, \ldots, N$ is less than $z$ is:

$$G(z) = \frac{\left(\frac{\Delta}{2} - (1-\beta^2)\pi^2 + z\right)^{N-1}}{\Delta^{N-1}}, \tag{7}$$

where $G(z)$ denotes the cumulative distribution function for the maximized value for all countries $j \geq 2$, which for the moment we denote as $z$. The probability density function is then:

$$g(z) = \frac{(N-1)\left(\frac{\Delta}{2} - (1-\beta^2)\pi^2 + z\right)^{N-2}}{\Delta^{N-1}}. \tag{8}$$

The probability that a firm will choose country 1, which is denoted $m^1$, is then the probability that $(1-\beta^1)\pi^1 - \epsilon^1 > z$, and can be computed as:

$$m^1 = \int_{(1-\beta^2)\pi^2 - \frac{\Delta}{2}}^{(1-\beta^1)\pi^1 + \frac{\Delta}{2}} \int_{-\frac{\Delta}{2}}^{(1-\beta^1)\pi^1 - z} \frac{(N-1)\left(\frac{\Delta}{2} - (1-\beta^2)\pi^2 + z\right)^{N-2}}{\Delta^N} d\epsilon dz \tag{9}$$

$$= \frac{\left((1-\beta^1)\pi^1 - (1-\beta^2)\pi^2 + \Delta\right)^N}{\Delta^N N}. \tag{10}$$

The integrand for (9) is the product of the pdf for $\epsilon^1$, namely $1/\Delta$, with $g(z)$. The limits of the inside integral are the possible values of $\epsilon^1$ where country 1 could be the best option, and the limits for the outer integral are the full range of possible values for $z$, the best possible payoff for countries other than 1. In a symmetric equilibrium where $\beta^1 = \beta^2$ and $\pi^1 = \pi^2$, this becomes simply $m^1 = 1/N$.

Naturally, in an equilibrium with many firms, by the Law of Large Numbers, $m^j$ will also be the fraction of firms that choose $j$ as a host country, a fact that will be important in what follows.

## 3.3 The entry decision and zero profits.

Understanding this choice problem, in the previous stage the firm must decide whether to enter or not to enter the sector. The zero-profit condition that results is:

$$E_{\{\epsilon^j\}}\left[\max_j\{(1-\beta^j)\pi^j - F - \epsilon^j\}\right] - F^e = 0. \tag{11}$$

This determines the measure $n$ of firms that enter. Any increase in firms will push down the price of the composite good by (5), which by (6) will push down the value of $\pi^j$ for each country $j$.

It will be useful shortly to know how the expected profit for a multinational will change when the profitability of locating in a given country changes. This is summarized in the following, where we use $\tilde{\pi}^j$ to stand for $(1-\beta^j)\pi^j$.

**Proposition 1.** Let $\Pi^*(\tilde{\pi}^1, \tilde{\pi}^2, \ldots \tilde{\pi}^N) \equiv E_{\{\epsilon^j\}}[\max_j\{\tilde{\pi}^j - \epsilon^j\}]$ denote the expected maximized profit for a multinational before it knows its idiosyncratic

shocks. Then:

$$\Pi_j^* = m^j, \tag{12}$$

where subscripts indicate partial derivatives.

**Proof:** See Appendix.

This is an envelope-theorem result. The change in a firm's expected profit if its variable profit in location $j$ increases by one dollar is simply equal to the probability that it chooses $j$, times one dollar.

Note that in models with the Dixit-Stiglitz structure as here, normally (11) will determine the output level of each firm, since the fixed cost in such models is a parameter and the equilibrium output level is just what is needed for a firm to cover its fixed cost. In this case, that is not so, because the expected fixed cost in this model is endogenous. The realized fixed cost for a firm choosing host country $j$ is equal to $F^e + F + \epsilon^j$, which will vary from firm to firm with the idiosyncratic realizations of $\epsilon^j$ as each firm chooses its host location to minimize its fixed cost. The expected fixed cost will therefore vary with policy choices and changes in the parameters. The following shows how this works out in a symmetric outcome:

**Proposition 2.** With symmetric policies, the expected variable profit net of the idiosyncratic part of the fixed cost is given by:

$$\Pi^*(\tilde{\pi}^1, \tilde{\pi}^1, \ldots \tilde{\pi}^1) = (1 - \beta^1)\pi^1 + \left(\frac{N-1}{N+1}\right)\frac{\Delta}{2}. \tag{13}$$

**Proof:** See Appendix.

Other things equal, the equilibrium profit per firm in increasing in $N$: The more countries there are, the more hosts there are from which each firm can

choose, and so the lower is the expected fixed cost. In the limit the expected value is $(1-\beta^1)\pi^1 + \frac{\Delta}{2}$ since with many countries, for any given firm the odds are good that there will be one country with costs near the minimum value of $-\frac{\Delta}{2}$.

In equilibrium, the expected value of profits must be equal to zero, so $\Pi^*(\tilde{\pi}^1, \tilde{\pi}^2, \ldots \tilde{\pi}^N)$ must be equal to $F^e + F$. In any symmetric Nash equilibrium, this implies:

$$(1-\beta^1)\pi^1 = F^e + F - \left(\frac{N-1}{N+1}\right)\frac{\Delta}{2}. \tag{14}$$

For a given number of countries, the firm's share of variable profits, the left-hand side of (14), is nailed down by the expected value of fixed costs, which is on the right-hand side.

## 3.4 Global equilibrium conditional on policy.

The income for Country 0 is labor income, equal to $L^0$ given the numeraire wage, plus the profit from the multinational sector, which is equal to zero because of free entry. The income for Country $j > 0$ is equal to labor income, which for each worker not employed in the multinational's value chain is equal to the unit wage per worker, and which for each worker in the value chain is equal to the worker's unit opportunity wage plus the worker's share of the quasi-rent. This yields national income in terms of the numeraire good equal to $I^j = L^j + \beta^j m^j n \pi^j$. Adding these across countries yields world income:

$$I^W = L^W + \Sigma_{j=1}^N \beta^j m^j n \pi^j, \tag{15}$$

where $L^W$ is the total world labor supply. In a symmetric equilibrium this becomes:

$$I^W = L^W + \beta^1 n\pi. \tag{16}$$

The second term of (16) is due to the fact that bargaining away a portion of the quasi-rent discourages entry of multinationals, which reduces the resources consumed in fixed cost, liberating those resources to produce more of the numeraire good.

In addition, the structure of consumer demand ensures that in any equilibrium the revenue of the differentiated-products sector will be equal to $\alpha I^W$. Since the price of each of these products is a markup $\frac{1}{\eta}$ over marginal cost, the variable profit $\pi$ of any firm is equal to $(1-\eta)$ times the firm's revenue, so $\pi/(1-\eta)$ is the firm's revenue. We must therefore have $\frac{n\pi}{(1-\eta)} = \alpha I^W$ in any symmetric equilibrium, and putting this together with (16) produces:

$$n\pi = \alpha I^W(1-\eta) = L^W \frac{\alpha(1-\eta)}{1-\alpha\beta(1-\eta)}. \tag{17}$$

## 3.5 Policy choices.

Now, to turn to Stage 1, consider country 1's choice of $\beta^1$, taking all other country's choices as given. In the symmetric framework, that means that each other Southern country has a value of $\beta^j$ equal to $\beta^2$, which for now we take as given. When country 1's government increases $\beta^1$, it will reduce each firm's expected net profits at the entry stage, requiring a reduction in the number $n$ of firms that enter, thereby increasing $P$ from (5), and thereby increasing $\pi^j$ for all host countries $j$, by (6). Note that this will not have any effect on the

price $p(i)$ charged by any firm for its product, because it will not change the marginal cost $c^{0j}$ for any choice of host country $j$, since the opportunity wage in each country is fixed at unity by the numeraire sector.

We can then examine the derivatives $\frac{dm^1}{d\beta^1}$, $\frac{dP}{d\beta^1}$, $\frac{d\pi}{d\beta^1}$, $\frac{dI^W}{d\beta^1}$ and $\frac{dn}{d\beta^1}$, of the five key endogenous variables with respect to country 1's choice of $\beta^1$.

First, from (10), we can derive:

$$\frac{dm^1}{d\beta^1} = Nm^1 \left[ \frac{-\pi^1 + (1-\beta^1)\frac{d\pi^1}{d\beta^1} - (1-\beta^2)\frac{d\pi^2}{d\beta^1}}{(1-\beta^1)\pi^1 - (1-\beta^2)\pi^2 + \Delta} \right]. \tag{18}$$

In the case of a symmetric Nash equilibrium, this becomes:

$$\frac{dm^1}{d\beta^1} = -\frac{\pi^1}{\Delta}. \tag{19}$$

In deriving this, it is important to recall that in a symmetric Nash equilibrium, $\frac{d\pi^1}{d\beta^1} = \frac{d\pi^2}{d\beta^2}$ because the change in $\beta^1$ affects variable profits in any country only through changes in $P$ and $I^W$, which affect operations in every country in the same way.

Second, note that in this case, (4) reduces to:

$$P = \left( \left(p^1\right)^{\frac{-\eta}{1-\eta}} nm^1 + \left(p^2\right)^{\frac{-\eta}{1-\eta}} (N-1)nm^2 \right)^{\frac{\eta-1}{\eta}} \tag{20}$$

$$= n^{-\frac{1-\eta}{\eta}} \left( \left(p^1\right)^{\frac{-\eta}{1-\eta}} m^1 + \left(p^2\right)^{\frac{-\eta}{1-\eta}} (N-1)m^2 \right)^{\frac{\eta-1}{\eta}}, \tag{21}$$

where $p^1$ is the price charged by any firm that uses country 1 as a host and $p^2$ is the price charged by any firm that uses any country $j = 2, \ldots, N$ as a host. Recall that $m^j$ is the fraction of firms that choose country $j$, and

$m^2 = m^3 = \ldots m^N$ by symmetry. Consequently, we can write:[12]

$$\frac{dP}{d\beta^1} = -\left(\frac{1-\eta}{\eta}\right)\frac{P}{n}\frac{dn}{d\beta^1}. \tag{22}$$

Importantly, changes in $\beta^1$ do not affect the individual product prices, because each one is a fixed mark-up of marginal cost (2), which is not affected by collective bargaining rights under efficient bargaining. This is why the composite price $P$ is affected only through product diverstiy $n$.

The three remaining derivatives need to be solved jointly. From (6) and (5), we can write the derivative of variable profit as:

$$\frac{d\pi^j}{d\beta^1} = \frac{\partial \pi^j}{\partial I^W}\frac{dI^W}{d\beta^1} + \frac{\partial \pi^j}{\partial P}\frac{dP}{d\beta^1} = \frac{\pi^j}{I^W}\frac{dI^W}{d\beta^1} - \frac{\pi^j}{n}\frac{dn}{d\beta^1}. \tag{23}$$

However, the zero-profit condition provides a different condition on the derivative of $\pi$. Using the notation of Proposition 1, we must have $\Pi^* = F^e + F$ in equilibrium, so the total derivative of $\Pi^*$ with respect to $\beta^1$ must be zero. Since the change in the variable profit is the same for each host country ($\frac{d\pi^j}{d\beta^1} = \frac{d\pi}{d\beta^1}$ for $j = 1, \ldots, N$), this amounts to a condition[13] that:

$$\frac{d\pi}{d\beta^1} = \frac{\pi m^1}{(1-\beta^1)} = \frac{\pi}{(1-\beta^1)N}. \tag{24}$$

In other words, if country 1 tightens its workers' bargaining power to get a

[12]Note that this expression is valid only in a symmetric equilibrium where marginal costs are the same in all host countries. In asymmetric settings, a change in $\beta^1$ will also change $P$ by changing the mix of goods produced, which will differ in their prices.

[13]The total derivative of $\Pi^*$ is equal to $\Pi_1^*(-\pi^1 + (1-\beta^1)\frac{d\pi^1}{d\beta^1}) + (N-1)\Pi_2^*(1-\beta^2)\frac{d\pi^2}{d\beta^1}$. Given symmetry, $\Pi_j^* = \Pi_1^*$ and $\frac{d\pi^j}{d\beta^1} = \frac{d\pi}{d\beta^1}$ for all $j = 1, \ldots, N$, setting this total derivative equal to zero yields the result.

larger share of the quasi-rent, the quasi-rent must rise in order to restore zero profits, and the needed increase is proportional to country 1's initial share of the market.

From (15), we can write the derivative of world income with respect to Country 1's policy choice as:

$$\frac{dI^W}{d\beta^1} = \pi\beta^1 \frac{dn}{d\beta^1} + n\beta^1 \frac{d\pi}{d\beta^1} + n\pi m^1 \tag{25}$$

To derive $\frac{dn}{d\beta^1}$, we need to combine (23), (24), and (25), to yield:

$$\frac{dn}{d\beta^1} = -\left[\frac{L^W - (1-\beta^1)n\pi}{L^W}\right] \frac{n}{(1-\beta^1)N} < 0. \tag{26}$$

The numerator in the square brackets of (26) is positive, because $(1-\beta)n\pi$ is the value of labor absorbed in fixed costs for the multinationals, so that the fraction is the fraction of world labor absorbed in everything other than fixed costs. Using (17), (26) can be re-written:

$$\frac{dn}{d\beta^1} = -\left[\frac{1-\alpha(1-\eta)}{1-\alpha\beta(1-\eta)}\right] \frac{n}{(1-\beta^1)N} < 0. \tag{27}$$

*Summary.* Holding other countries' policies fixed at some common level, strengthening collective bargaining rights in Country 1 above that level (raising $\beta^1$) will (i) chase some multinationals away from Country 1 toward other countries that are not strengthening workers' rights (equation (19)); (ii) discourage entry of firms (equation (27)), resulting in lower product diversity ($n$), and therefore (iii) a worldwide rise in the real utility cost-of-living index $P$ (equation (22)). At the same time, the smaller share of variable profits that

multinationals expect *ex ante* requires that the variable profit $\pi$ rise (equation (24)).

## 3.6 Nash equilibrium in policies.

We can use this information to evaluate the optimal policy choice for country 1 and characterize a symmetric Nash equilibrium in policy. The utility of country-1 workers together is:

$$U^1 = \left(L^1 + \beta^1 \pi^1 m^1 n\right) P^{-\alpha}. \tag{28}$$

Workers not employed by multinational firms produce the numeraire good for the unit wage. Workers employed in the value chain of multinational firms receive their opportunity wage, 1, plus the additional share of the quasi-rent that they receive from collective bargaining. As a result, national income is given by the sum in parentheses. Given the Cobb-Douglas preferences, the consumer price index is $P^\alpha$.

The derivative of utility with respect to $\beta^1$, holding $\beta^j$ constant for $j \neq 1$ is then:

$$\begin{aligned} \frac{dU^1}{d\beta^1} &= \left(\pi^1 m^1 n + \beta^1 \pi^1 n \frac{dm^1}{d\beta^1} + \beta^1 m^1 n \frac{d\pi^1}{d\beta^1} + \beta^1 \pi^1 m^1 \frac{dn}{d\beta^1}\right) P^{-\alpha} \\ &- \alpha \left(L^1 + \beta^1 \pi^1 m^1 n\right) P^{-\alpha-1} \frac{dP}{d\beta^1} \end{aligned} \tag{29}$$

The first term within the large parentheses is the direct benefit to Country-1 workers of an increase in $\beta^1$: The increased quasi-rent that they receive for each increase in their share parameter. The second term is a cost that we might

call the 'competition effect:' The reduction in the share of multinationals who choose Country 1 as their host. The next two are general-equilibrium effects, the effect on each firm's quasi-rent $\pi$ and on the number $n$ of firms that enter, which together determine the aggregate size $n\pi$ of the quasi-rent for which host countries are competing. Outside of the large parentheses, the last term shows the general-equilibrium effect on the real utility cost of living due to the reduction in product variety. Importantly, the governments make their policy decisions at the same time, so there is no change in any other government's policy in this expression.

Setting this equal to zero and using the conditions (19), (27), (22), and (24) discussed above, this can be simplified to:

$$\frac{n\pi}{N} - \frac{\beta n\pi^2}{\Delta} + \frac{\beta n^2\pi^2}{N^2 L^W} - \frac{\alpha\left(L^1 + \beta n\pi/N\right)}{(1-\beta)N}\left(\frac{1-\eta}{\eta}\right)\left(\frac{1-\alpha(1-\eta)}{1-\alpha\beta(1-\eta)}\right) = 0. \quad (30)$$

This is a condition for a symmetric Nash equilibrium. The first two terms represent the direct benefit and the competition effect, and the remaining terms represent the various general-equilibrium effects.

We can now discuss the effects of globalization on equilibrium labor rights. Two distinct types of globalization are worth considering. Consider first a particular form of globalization in which $\delta^j \equiv \delta$ is the same for all countries and its value falls, so that the marginal cost of production (2) falls for every multinational. We might call this 'globalization at the intensive margin.' Consider how (30) changes for a fixed value of $\beta$. By (17), the total amount of quasi-rent $n\pi$ in the world economy does not change. That is determined by the fraction $\alpha$ of income that world consumers spend on differentiated products and other

parameters. In addition, from the zero-profit condition (14), for a given value of $\beta$, $\pi$ will also be unchanged. These two findings imply that $n$ will also be unchanged. (Note that in (6), the composite price $P$ will fall in exactly the same proportion as the marginal cost $c$, leaving each firm's variable profit unchanged.) Consequently, the value of $\beta$ that satisfied (30) before the drop in $\delta$ is still an equilibrium value after the change.

We conclude that this form of globalization has, in this model, *no* effect on labor standards, ether a race-to-the-bottom effect or its opposite. The reduction in transaction costs across borders merely produces a drop in consumer prices in terms of the numeraire, which raises the real income of every consumer everywhere. This raises the stakes in policy setting without changing the optimal choice: The real value of each term in the derivative (29) increases as the cost of living decreases, so that the marginal benefit of raising $\beta^1$ goes up exactly in proportion to the marginal cost.

Note that this form of globalization *will* affect the allocation of tasks between the home country and the host. Since the wage in each country remains at unity, (1) shows that when $\delta$ falls, each firm will substitute host-country labor for home-country labor, which implies expanding the range of tasks done in the host country. Since the elasticity of substitution between home- and host-country labor is greater than 1, this implies that the amount of labor hired by multinationals in each host country will rise. This should be reflected in data by an increase in the fraction of host-country GDP that comes from hiring by multinationals. But this increase in multinational value-added in those countries does not generate an incentive for those governments to change labor policy. To summarize these findings on the intensive-margin effect of

globalization:

**Proposition 3.** If $\delta^j = \delta$ for $j = 1, \ldots, N$, then in a symmetric Nash equilibrium, if $\delta$ falls: (i) The values of $n$, $\pi$, and each country's GDP will be unchanged. (ii) The fraction of each host country's income that is derived from multinational supply chains increases. (iii) The price of each differentiated product falls, and so does the composite price $P$, and so all workers everywhere see an increase in real income. (iv) No country changes its labor standard.

On the other hand, consider a different form of globalization, in which the number $N$ of potential host countries increases. For example, economic reform in a Communist country may lead to that country joining the world economy after an autarchic existence. We might call this 'globalization at the extensive margin.' Inspecting (30), all terms have $N$ in the denominator except for the second one, which quantifies the competition effect. The derivative of a country's share of value-chain employment with respect to that country's policy variable does not fall to zero as the number of competitor countries becomes large. This suggests that the arrival of a sufficiently large number of host countries can result in much lower labor standards, and that is indeed the case:

**Proposition 4.** If $N \to \infty$, in a symmetric Nash equilibrium, $\beta \to 0$.

**Proof.** Consider a sequence of values for $N$, $N(k), k = 0, \ldots, \infty$ such that $N(k) \to \infty$ as $k \to \infty$. Let $n(k)$, $\pi(k)$, and $\beta(k)$ be the corresponding equilibrium values for each $k$. From (17), it is clear that $n(k)\pi(k)$ is bounded, so from the symmetric Nash equilibrium condition (30), we must have:

$$-\frac{\beta(k)n(k)\pi(k)^2}{\Delta} - \frac{\alpha\left(L^1 + \beta(k)n(k)\pi(k)/N(k)\right)}{(1-\beta(k))N(k)}\left(\frac{1-\eta}{\eta}\right)\left(\frac{1-\alpha(1-\eta)}{1-\alpha\beta(k)(1-\eta)}\right) \to 0.$$

From (14), $(1-\beta(k))\pi(k)$ takes a limit of $F^e + F - \frac{\Delta}{2}$, so we can conclude, multiplying all terms by $(1-\beta(k))$:

$$- \quad \beta(k)\left((1-\beta(k))\pi(k)\frac{n(k)\pi(k)}{\Delta}\right)$$
$$- \quad \frac{\alpha\left(L^1 + \beta(k)n(k)\pi(k)/N(k)\right)}{N(k)}\left(\frac{1-\eta}{\eta}\right)\left(\frac{1-\alpha(1-\eta)}{1-\alpha\beta(k)(1-\eta)}\right) \to 0.$$

The second term takes a limit of zero (since everything other than the $N(k)$ in the denominator takes a finite limit). The contents of the large parentheses in the first term take a strictly positive limit, and so we conclude that $\beta(k)$ must take a limit of zero. **QED.**

As the number of rival countries becomes large, the dominant effect on the incentives for any one host country is the fact that any tightening of that country's labor standards will induce multinationals to choose one of the wide variety of alternative countries for its value chain. We can thus identify a 'race-to-the-bottom' effect from this second kind of globalization.

*A comment on robustness.* It should be underlined that the results described here depend on the specific structure of the model, including numerous functional-form assumptions. We make no claim that the zero effect of intensive-margin globalization would hold for models with different assumptions. The point is that we have identified three forces affecting governments' incentives: the direct effect, which is a benefit of labor rights at the margin, and the competition effect and general-equilibrium effects, which are both costs; all three are magnified by globalization at the intensive margin. In our model, these changes cancel out exactly, but more generally we have shown that there is no credible presumption that any one of these effects would generally domi-

nate the others. We now turn to empirical evaluation.

# 4 Empirical investigation.

Naturally, the effects described in the theory model above are difficult to measure empirically, since we have no controlled experiments in globalization and all of these effects can be observed only at the country level, with numerous confounding variables and with the added complication that every control variable is endogenous. Here we describe an imperfect approach that attempts to deal with these issues as well as possible. Details of variables and estimation will be presented in the next section, but here we sketch the approach. We have two approaches to measuring globalization, which correspond roughly to Propositions 3 and 4.

In our main specification, we regress the strength of a country's collective-bargaining labor rights on a country fixed effect; a year fixed effect; some country controls; and the main variable of interest, a measure of inward FDI. Inward FDI is a proxy for globalization, and in the context of the model it can be interpreted as a proxy for a reduction in $\delta^i$ as in the intensive-margin effect of Proposition 3, since in equilibrium such a reduction leads to an increase in inward FDI relative to GDP for each host country. The interpretation will be that the coefficients on FDI will measure the effect of an exogenous increase in availability of FDI on the country's labor rights. Inward FDI is of course an endogenous variable, and we use an instrumental-variable strategy for it as described below. We deal with the endogeneity of country controls by using only initial-period values of the controls for each country and interacting them

with dummies for each subsequent year. Thus, each regression will measure the effect on labor rights of an exogenous rise in FDI, relative to the typical time-path of labor rights for a country with the same initial conditions. To allow for heterogeneous effects, we also run a version in which the FDI variable is interacted with a measure of how distant are the country's competitors for FDI, as described below. This yields the following regression equation:

$$Labor\ Rights_{it} = \alpha + \beta_1 lnFDI_{it} + \beta_2 lnFDI_{it} * lncompdist_{i0} + X'_{it}\gamma + \mu_i + \xi_t + \varepsilon_{it}, \quad (31)$$

where $i$ indicates a country and $t$ time; the dependent variable is a measure for collective-bargaining labor rights; $lnFDI_{it}$ is the ratio of the stock of FDI to GDP (%) in logarithm; $lncompdist_{i0}$ is a measure of 'how far' country $i$ is from the countries with which country $i$ competes for FDI, either geographically or in product space (omitted in the basic specification), at an initial year; $X'_{it}$ is the row vector of control variables; $\mu_i$ is a country fixed effect; $\xi_t$ is a year fixed effect; and $\varepsilon_{it}$ a random variable.[14] The interaction term allows for the possibility that countries with closer competitors are more likely to be those for which globalization pushes down labor standards; this idea can be captured as the hypothesis that $\beta_2 < 0$.

An alternative specification is closer to the extensive-margin effect of Proposition 4, where 'globalization' is an increase in the number of countries with which country $i$ is competing for FDI. Hence, instead of using the FDI ratio as an independent variable, we measure and use the number of competing countries as follows. For country $i$, for each source country $j$ that sends some FDI

[14]Note that $lncompdist_{i0}$ is dropped because of a country fixed effect in equation (31).

to $i$, count up all of the other countries to which $j$ has sent FDI. Then, add up all of those countries across $j$, and divide by the number of source countries $j$ to get the average number of competitor countries. We use this measure in place of the FDI ratio as an alternative approach.

The difference between what we attempt here and previous empirical work can be summarized as follows. Consider a simplified two-country model of Nash equilibrium in government labor rights-setting as shown in Figure 1. Country 1's choice of labor rights is measured on the horizontal axis while Country 2's is on the vertical, and the two countries' reaction functions are displayed as solid curves with a Nash equilibrium at point $E$. Both Davies and Vadlamannati (2013) and Olney (2013) regress country $i$'s labor standard (or rights) on the other's standard, finding a coefficient strictly between zero and one, implying strategic complements and a unique equilibrium. What we do instead is to ask how the equilibrium moves when globalization increases, meaning that FDI or access to international value chains becomes more available. In the figure, a hypothetical increase in globalization is shown as shifting country 1's reaction function to the left and country 2's down, so that the equilibrium moves to point $E'$ with lower labor rights for both. That would imply a race-to-the-bottom effect, but of course the opposite could occur as discussed above. It is this movement in the equilibrium outcome that we attempt to measure, rather than the slope of the reaction function.

## 4.1 Exogenous variation in access to globalization.

As a variable of interest, we use FDI inward stock data from the United Nations Conference on Trade and Development (UNCTAD). This data is available annually and covers above 200 countries. In estimation, we use the ratio of FDI stock to GDP, which is also available from the UNCTAD.

To extract the portion of variation in FDI that is exogenous to host-country shocks, we employ a Bartik shift-share instrument variable. For the host county $i$, we construct the weighted average of FDI from all source countries net of FDI into the host country:

$$\frac{\sum_j \left( FDI_{j,i,0} \sum_{k \neq i} FDI_{j,k,t} \right)}{\sum_j FDI_{j,i,0}}. \tag{32}$$

Here $FDI_{j,k,t}$ is the FDI from source country $j$ in host country $k$ as of date $t$. If we add up all of the FDI from $j$ to anywhere in the world except for host $i$, we get $\sum_{k \neq i} FDI_{j,k,t}$, which is in the numerator. That can be thought of as exogenous to country-$i$ shocks, and represents source-country $j$ shocks over time. Expression (32) is the weighted average of this for all source countries $j$, where the weights are given by $j$'s *initial*-period share of FDI in host $i$ (i.e., the FDI stocks at $t = 0$).[15] In other words, country $i$'s total initial FDI is the denominator, $\sum_j FDI_{j,i,0}$, and country $j$'s share of that initial stock is:

$$\frac{FDI_{j,i,0}}{\sum_j FDI_{j,i,0}}. \tag{33}$$

Since we use FDI as the ratio to GDP, we use expression (32) as the ratio to

[15] Although our FDI data begin in 2000, the number of source countries is small. Thus, we take 2005 as the initial year for all countries to maximize the number of source countries.

initial GDP in estimation.[16]

To construct the instrument variable, we need bilateral FDI data, whose limited availability is well known in the literature. We use the outward FDI stock data from the Organisation for Economic Co-operation and Development (OECD) international direct investment database.[17] One limitation of using this database is that source countries are constrained to the OECD countries, though host countries include both developed and developing countries. We find that the OECD data covers about 60% of world total FDI stocks in 2000.[18] Hence, we believe that the OECD data provide reasonable estimates of world bilateral FDI.

## 4.2 Effective distance from competitor countries.

To examine heterogeneous effects, we introduce a measure of how close or how similar are the countries that are competing with country $i$. Some accounts of 'race-to-the-bottom' stories are focussed on competition between countries that are very close to each other geographically, or similar in nature. For example, Chan and Ross (2003) describe competition between different cities

[16]We have experimented with many other instrument variables, such as natural disasters, civil violence, and the Feyrer's (2019) instrument variable based on air and sea distance. We conjecture that natural disasters or civil violence in countries that are neighbors to country $i$ could lead potential multinational enterprises to shift some of their investment that would have gone to those neighboring countries to $i$ instead. In other words, they are exogenous but correlated with FDI in country $i$. Also, we have used Feyrer's instrumental variable for trade flows as a measure of the effective economic proximity of each country to its potential partners in globalization or an instrument for FDI flows. However, these instrument variables turn out to be weak in estimations.

[17]This is available at https://stats.oecd.org/index.aspx?DataSetCode=FDI_FLOW_PARTNER.

[18]According to the UNCTAD, world total outward FDI stocks are $7,409 billions in 2000. The OECD data reports them as $4,367 billions for the same year.

within China for foreign capital through lowering minimum wages,[19] and Ahn et al. (2022) show evidence that Korean multinationals shifted employment specifically to foreign markets closer to Korea in response to the increase in minimum wages.

We measure distance between a host country and its potential competitors as follows. For a country $i$ that would like to be a recipient of FDI from source country $j$, we could first compute how far away the average competitor $k$ is from $i$, weighted by $FDI_{j,k}$, which is the FDI each country $k$ receives from source country $j$:

$$\frac{\sum_k FDI_{j,k} DIST_{i,k}}{\sum_k FDI_{j,k}}. \tag{34}$$

If this is a big number, then $i$ does not compete very much with other countries for FDI from $j$, since the other countries that $j$ finds attractive for investment are mostly far away from $i$. Then we can take the average of this over all possible source countries $j$ (weighted by $FDI_{j,i}$, which is the FDI country $i$ receives from source country $j$):

$$compdist_i \equiv \frac{1}{\sum_j FDI_{j,i}} \sum_j \left( FDI_{j,i} \frac{\sum_k FDI_{j,k} DIST_{i,k}}{\sum_k FDI_{j,k}} \right) \tag{35}$$

If this is a big number, then $i$ does not have a lot of competition for its inward FDI, since its major potential competitors from any source tend to be far away. We call this $compdist_i$ because it measures the average distance of potential

[19] They also quote a labor leader summarizing the situation as follows: '... intense competition between countries to attract foreign investment is undermining respect for the labour standards... And it is particularly in labour-intensive industries that the competition is most vicious, not between North and South, but among nations of the South.' (Chan and Ross (2003, p.1023))

competitors to $i$.

In computing $compdist_i$ the term $DIST_{i,k}$ is defined in two ways. The first way is simply the great-circle distance between the two counties. Implicit in computing things this way is the idea that if $i$ and $k$ are far away, it would be more difficult for a multinational firm to switch a plant in $i$ off and replace it with a plant in $k$, or there are likely to be different advantages to the two locations because of different geography so they would be likely to be used for different and non-substitutable purposes. We call this formulation the 'geographic' formulation of $compdist_i$. The second way of defining $DIST_{i,k}$, is as the difference between the two economies, such as, for example, the Euclidean distance between the vector of GDP shares of industries in $i$ and in $k$:

$$DIST_{i,k} \equiv \left( \sum_n (s_n^i - s_n^k)^2 \right)^{\frac{1}{2}}, \tag{36}$$

where $s_n^i$ is industry $n$'s share of GDP in country $i$. We call this formulation the 'industry' version of $compdist_i$. We use both the geographic and industry formulations in what follows. In principle, $compdist_i$ varies by country and time. Because it is possible that $compdist_i$ and labor rights are simultaneously determined for a given country, we use $compdist_i$ of the initial year for country $i$ in estimation in order to avoid simultaneity bias.[20]

We again use the outward bilateral FDI stock data from the OECD to construct geographic or industry measure of $compdist_i$. Geographic distance is the bilateral distance between most populated cities of two countries, which is obtained from the CEPII database.[21] For the Euclidean distance between

[20]The initial year for $compdist_i$ is set to 2005 as in the instrument for FDI.

[21]This is available at http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6.

the vector of GDP shares of industries in two countries, we use the UNCTAD database.[22] Specifically, for a given country, we use the share of value added of GDP for seven industries.[23] Finally, we use the log of $compdist_i$, denoted $lncompdist_i$ since it seems to fit better.

## 4.3 Measuring labor rights.

Kucera (2002) originally developed indicators of freedom of association and collective-bargaining (FACB) rights based on the coding of violations in textual sources. Recently, Kucera and Sari (2019) have constructed new labor rights indicators with a more rigorous and comprehensive method.[24] Specifically, they use nine textual sources, including six from the International Labor Organization's (ILO) supervisory system and texts from national legislation. The coding template records violations in the 108 evaluation criteria of five broad categories. The five categories are (i) fundamental civil liberties; (ii) right of workers to establish and join organizations; (iii) other union activities; (iv) right to collective bargaining; and (v) right to strike. A different weight is given to each evaluation criterion based on the Delphi method of expert consultation. The indicators of FACB rights or labor rights range from 0 to 10.[25] The lower the indicators are, the stronger labor rights are. They are available for 185 countries for 2000 and 2017 at intervals.

[22]This is available at https://unctadstat.unctad.org/wds/TableViewer/dimView.aspx.

[23]They are agriculture; manufacturing; mining and utilities; construction; whole sale, retail, hotels and restaurants; transport, storage, and communication; and other service activities.

[24]Refer to Kucera and Sari (2019) for details. The new data is available at http://labour-rights-indicators.la.psu.edu/.

[25]We use the "overall default scores" of the database for labor rights indicators in our analyses.

## 4.4 Controls.

In line with our strategy of excluding time-varying control variables that are likely correlated with country-specific shocks, we include year dummies interacted with the logarithm of initial GDP per capita to allow for richer economies to have a different time path for labor rights than poorer ones, and also year dummies interacted for a dummy for post-communist transition economies. We obtain data on GDP per capita from the World Bank's World Development Indicator database and use classification of transition economies from the International Monetary Fund.

## 4.5 Descriptive statistics.

Table 1 shows descriptive statistics for the variables. We have an unbalanced panel of 185 countries observed between 2000 and 2017. The most important features of the data are summarized in Figure 2. This is a scatter plot that shows for each country the difference between 2000 and 2017 in our measure of inward FDI on the horizontal axis and the difference in our measure of labor rights on the vertical axis. The largest concentration of dots is in the first quadrant, indicating a strong trend toward increased FDI and weaker labor rights during this period. Some naive observers might interpret this as evidence of a causal relationship between these two trends. However, there is no discernible relationship between the two variables (the correlation between the two variables is -0.017), so it is not the case that countries that saw a greater increase in globalization saw a greater decline in labor rights. As will be seen, this point more or less holds up after instrumenting for FDI and adding

controls, leading us to suggest that there is no real evidence for FDI availability as a driving force for movements in labor rights in either direction.

# 5 Results.

Table 2 shows the regression results from the FDI specification, corresponding to the intensive-margin effect of Proposition 3. All regressions have country and year fixed effects. (Coefficients of controls interacted with time dummies and intercepts are not shown.) In each column, the dependent variable is the measure of labor rights by country and year; recall that a higher value of the dependent variable indicates weaker labor rights. The first three columns use OLS, while the remaining columns use TSLS with the Bartik shift-share instrument for FDI. We begin running regressions without interactions and then include the interaction term between FDI and the initial geographic or industy *lncompdist*. Note that the interaction term is instrumented by the interaction between the Bartik shift-share instrument and the initial value of *lncompdist*. We allow errors to be correlated within a country and so provide robust standard errors clustered at the country level in all estimations.

The first row of Columns (1) and (4) in Table 2 shows that the average effect of FDI on labor rights is statistically insignificant in both OLS and TSLS. When including the interaction term between FDI and the geographic *lncompdist*, it is negative and significant in OLS (Columns (2)), which is in line with the prediction that countries with closer competitors are more likely to be those for which globalization lowers labor rights. However, this interaction term is insignificant in TSLS (Column (5)). Next, we use the industry measure of

*lncompdist* and interact it with FDI, and the interaction term is negative but insignificant in both OLS and TSLS (Columns (3) and (6)). We find that our instruments are weak, as the first-stage $F$ statistics are below 10.

Because labor rights do not vary every year and need some time to adjust to globalization shocks, we repeat the estimation with a subsample at about five-year intervals (2000, 2005, 2009, and 2015). The results are reported in the bottom panel of Table 2, and are similar to those from the full sample. The average effects of FDI are again insignificant. There are no heterogeneous effects over *lncompdist* either, except for the geographic *lncompdist* in OLS.

Table 3 shows the results when we use the average number of competing countries instead of the FDI ratio, to capture the extensive-margin effect of Proposition 4. The first three columns use the full sample and the remaining ones use the subsample of four years. We find that the average effects of the number of competitors are significantly positive in both the full sample and the subsample. This result suggests a race-to-the-bottom effect: As the number of competitors for a host country increases, labor rights weaken, which is consistent with Proposition 4. However, the economic magnitude of the effects of the number of competitors is rather small: The coefficient for either specification (columns (1) or (4)) is close to 1, so a one-standard-deviation increase in the log number of competitors (that is, 0.21, from Table 1) implies an increase in the labor-rights variable of about 0.2, which, from Table 1, is dwarfed by the standard deviation of labor rights, 2.90. On the other hand, the interaction terms between the number of competitors and geographic or industry *lncompdist* are all insignificant.

*Summary.* The overall story of these empirical exercises is that, although

the general pattern over the data is for FDI to increase over time and collective-bargaining rights to be weakened over time, there is no tendency for a country with a larger increase in FDI to see a larger erosion of the labor rights. This is true whether or not we use an instrumental variable to extract the exogenous portion of the variation in FDI. Consequently, the data do not support a story in which globalization leads government to water down labor rights. A different story emerges when the measure of globalization is the average number of competitors for FDI. As the number of competitors increases, a host country lowers labor rights, supporting for a race to the bottom. The effect is for all intents and purposes negligible in magnitude, however.[26]

# 6 Conclusion.

The question of a 'race to the bottom' in labor rights is a question of the comparative statics of a Nash equilibrium in policy decisions across countries as globalization proceeds. We have formalized a stylized model of multinational firms choosing host locations for their global value chains, while host-country governments choose the strength of collective-bargaining rights that allow their workers to receive a share of the quasi-rents generated by multinational firms locating operations there. In this model, the only motivation for government

[26]We have also used an old version of the indicators of labor rights. Mosley and Uno (2007) constructed panel data on the indicators of freedom of association and collective bargaining rights for 1985-2002, based on the Kucera's (2002) original methodology. Unfortunately, the old dataset is different from the current one in terms of coding schemes and the range of the indicators so that we cannot simply merge the two datasets. When using the old dataset, the main results are similar to those using the current one: the effects of FDI on labor rights are statistically insignificant. On the other hand, the effects of the number of competitors are not significant in the old dataset. These results are available upon request.

labor standards is to transfer income from foreign multinationals to workers, so in a closed economy there would be no such standards imposed. But in the presence of global value chains, each government must trade off the direct benefit of stronger bargaining rights, which transfer more rents to the local workers, against both the effect of discouraging multinationals from locating in that country and general-equilibrium effects of discouraging investment in the industry altogether. We find that an increase in globalization in the sense of lower transaction costs, leading to more offshoring from the headquarters country, has no effect on equilibrium collective-bargaining rights in our model. One might call this an 'intensive-margin' finding. On the other hand, globalization in the sense of adding more countries to the global trading system tends, in the limit, to *weaken* collective-bargaining rights. One might call this an 'extensive-margin' effect, and a 'race-to-the-bottom' finding. Thus, as a matter of theory, the effect of globalization on labor rights is ambiguous.

Looking at international data from 2005 to 2015, we find no robust evidence of any effect of globalization on labor rights in either an intensive-margin or an extensive-margin form. There is a strong tendency for labor rights to weaken over that period at the same time as FDI was rapidly increasing, but there does not seem to be any correlation across countries between the two, after controlling for exogenous trends, whether instrumental variables are used to correct it for the endogeneity of FDI or not. There is a weak correlation between increased numbers of competitors for FDI and weakened labor rights, but the magnitude is tiny. The 'race-to-the-bottom' phenomenon does not seem to be strongly present in the data.

# 7 Appendix.

**Proposition 1.** Let $\Pi^*(\tilde{\pi}^1, \tilde{\pi}^2, \ldots \tilde{\pi}^N) \equiv E_{\{\epsilon^{ij}\}}[\max_j\{\tilde{\pi}^j - \epsilon^j\}]$ denote the expected maximized profit for a multinational before it knows its idiosyncratic shocks. Then:

$$\Pi^*_j = m^j, \tag{37}$$

where subscripts indicate partial derivatives.

**Proof.** For the moment hold the $\tilde{\pi}^j$ values fixed. For any $N$-dimensional real-valued vector $\mathbf{a}$ and for any $i \in (1, \ldots, N)$, let $B^i(\mathbf{a})$ be the set of values of the real-valued $N$-dimensional vector $\epsilon$ such that $a^i - \epsilon^i \geq a^j - \epsilon^j$ for $j \in (1, \ldots, N)$. Consider the optimization problem:

$$max_{\mathbf{a}} \Sigma_{i=1,\ldots,N} \int_{\epsilon \in B^i(\mathbf{a})} \left(\tilde{\pi}^i - \epsilon^i\right) f(\epsilon) d\epsilon, \tag{38}$$

where $f(\cdot)$ is the density for $\epsilon$. Trivially, this expression is maximized by setting $a^i = \tilde{\pi}^i$ for $i = 1, \ldots, N$, and so the solution to this maximization problem is just $\Pi^*(\tilde{\pi}^1, \tilde{\pi}^2, \ldots \tilde{\pi}^N)$. By the envelope theorem, the derivative of this maximum with respect to $\tilde{\pi}^j$ is equal to:

$$\int_{\epsilon \in B^j(\tilde{\pi})} f(\epsilon) d\epsilon, \tag{39}$$

where $\tilde{\pi}$ is just the vector $(\tilde{\pi}^1, \ldots, \tilde{\pi}^N)$. This is simply the probability that $j$ is optimal, or $m^j$. **Q.E.D.**

**Proposition 2.**

With symmetric policies, the expected variable profit net of idiosyncratic

cost is given by:

$$\Pi^*(\tilde{\pi}^1, \tilde{\pi}^1, \ldots \tilde{\pi}^1) = (1-\beta^1)\pi^1 + \left(\frac{N-1}{N+1}\right)\frac{\Delta}{2}. \tag{40}$$

**Proof.**

Fix the value of $\beta^1$ and $\pi^1$. We need to compute the expected value of the maximum of $(1-\beta^j)\pi^j - \epsilon^j$ in the case where $\beta^j = \beta^1$ and $\pi^j = \pi^1$ for $j = 1, \ldots, N$. For any $z$ and $j$, the probability that $(1-\beta^j)\pi^j - \epsilon^j = (1-\beta^1)\pi^1 - \epsilon^j < z$ is equal to $\frac{\left(\frac{\Delta}{2} - \tilde{\pi}^1 + z\right)}{\Delta}$. Consequently, the probability that $(1-\beta^j)\pi^j - \epsilon^j < z$ for *every* $j$ can be written as:

$$G(z) = \frac{1}{\Delta^N}\left(\frac{\Delta}{2} - \tilde{\pi}^1 + z\right)^N.$$

This is, then, the cdf of the distribution of the highest value of $(1-\beta^j)\pi^j - \epsilon^j$. The derivative of this is the density:

$$g(z) = \frac{N}{\Delta^N}\left(\frac{\Delta}{2} - \tilde{\pi}^1 + z\right)^{N-1}.$$

The expected value of the maximum is then:

$$\int_{\tilde{\pi}^1 - \frac{\Delta}{2}}^{\tilde{\pi}^1 + \frac{\Delta}{2}} z g(z) dz = \frac{N}{\Delta^N}\int_{\tilde{\pi}^1 - \frac{\Delta}{2}}^{\tilde{\pi}^1 + \frac{\Delta}{2}} z\left(\frac{\Delta}{2} - \tilde{\pi}^1 + z\right)^{N-1} dz.$$

By Integration by Parts, this becomes:

$$\left[\frac{z}{\Delta^N}\left(\frac{\Delta}{2}-\tilde{\pi}^1+z\right)^N\right]_{\tilde{\pi}^1-\frac{\Delta}{2}}^{\tilde{\pi}^1+\frac{\Delta}{2}}-\frac{1}{\Delta^N}\int_{\tilde{\pi}^1-\frac{\Delta}{2}}^{\tilde{\pi}^1+\frac{\Delta}{2}}\left(\frac{\Delta}{2}-\tilde{\pi}^1+z\right)^N dz$$
$$=(1-\beta^1)\tilde{\pi}^1+\left(\frac{N-1}{N+1}\right)\frac{\Delta}{2}.$$

**Q,E.D.**

Table 1: Summary statistics.

| Variable | Obs | Mean | Std. dev. | Min | Max |
|---|---|---|---|---|---|
| Labor rights | 1,211 | 3.65 | 2.90 | 0.00 | 10.00 |
| FDI as a ratio of GDP (in logs) | 1,230 | 3.40 | 1.54 | -19.07 | 7.59 |
| Number of competitors (in logs) | 1,289 | 5.00 | 0.21 | 4.17 | 5.41 |
| Geographic compdist (in logs) | 1,232 | 8.73 | 0.45 | 7.21 | 9.65 |
| Industry compdist (in logs) | 1,253 | 3.26 | 0.52 | 2.28 | 4.37 |
| Initial GDP per capita (in logs) | 1,267 | 7.70 | 1.55 | 4.82 | 10.79 |
| Dummy for transition countries | 1,295 | 0.14 | 0.35 | 0.00 | 1.00 |

Table 2: The effect of inward FDI.

| **Full sample.** | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | OLS | OLS | OLS | IV | IV | IV |
| $\ln(FDI\_ratio)$ | -0.006 | 1.770* | 0.135 | 0.190 | 2.058 | 1.847 |
| | (0.019) | (1.039) | (0.400) | (0.521) | (2.775) | (1.621) |
| $\ln(Geographic\_compdist) \times \ln(FDI\_ratio)$ | | -0.208* | | | -0.213 | |
| | | (0.123) | | | (0.361) | |
| $\ln(Industry\_compdist) \times \ln(FDI\_ratio)$ | | | -0.035 | | | -0.429 |
| | | | (0.096) | | | (0.381) |
| Observations | 1,099 | 1,099 | 1,114 | 1,073 | 1,073 | 1,083 |
| R-squared | 0.050 | 0.054 | 0.052 | -0.013 | -0.049 | -0.011 |
| Number of countries | 170 | 170 | 173 | 166 | 166 | 168 |
| First-stage F stat. | | | | 3.350 | 2.165 | 1.975 |
| Country fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Time fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| | | | | | | |
| **Subsample.** | (1) | (2) | (3) | (4) | (5) | (6) |
| | OLS | OLS | OLS | IV | IV | IV |
| $\ln(FDI\_ratio)$ | -0.027 | 2.053* | 0.002 | 0.006 | 3.164 | 1.179 |
| | (0.034) | (1.170) | (0.399) | (0.326) | (2.401) | (1.343) |
| $\ln(Geographic\_compdist) \times \ln(FDI\_ratio)$ | | -0.244* | | | -0.361 | |
| | | (0.138) | | | (0.298) | |
| $\ln(Industry\_compdist) \times \ln(FDI\_ratio)$ | | | -0.007 | | | -0.309 |
| | | | (0.097) | | | (0.330) |
| Observations | 625 | 625 | 631 | 598 | 598 | 601 |
| R-squared | 0.076 | 0.081 | 0.077 | 0.066 | 0.055 | 0.043 |
| Number of countries | 169 | 169 | 172 | 157 | 157 | 158 |
| First-stage F stat. | | | | 4.425 | 2.352 | 2.501 |
| Country fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Time fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| | | | | | | |

*Dependent variable is the strength of collective bargaining rights. Coefficients of controls interacted with time dummies and intercepts are not shown. Robust standard errors that correct for clustering at the country level are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.*

Table 3: The Effect of the Number of Competitors for FDI.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Full sample | Full sample | Full sample | Subsample | Subsample | Subsample |
| $\ln(Number\_of\_competitors)$ | 0.904** | 4.358 | 2.663 | 1.266*** | 4.655 | 1.494 |
| | (0.411) | (4.622) | (1.837) | (0.442) | (4.490) | (1.792) |
| $\ln(Initial\_geo\_compdist)$ | | -0.397 | | | -0.389 | |
| $\times \ln(Number\_of\_competitors)$ | | (0.522) | | | (0.503) | |
| | | | | | | |
| $\ln(Initial\_industry\_compdist)$ | | | -0.556 | | | -0.053 |
| $\times \ln(Number\_of\_competitors)$ | | | (0.568) | | | (0.568) |
| Observations | 1,149 | 1,149 | 1,166 | 660 | 660 | 668 |
| R-squared | 0.056 | 0.057 | 0.060 | 0.093 | 0.094 | 0.096 |
| Number of countries | 172 | 172 | 175 | 171 | 171 | 174 |
| Country fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Time fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |

*Dependent variable is the strength of collective bargaining rights. Coefficients of controls interacted with time dummies and intercepts are not shown. Robust standard errors that correct for clustering at the country level are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.*

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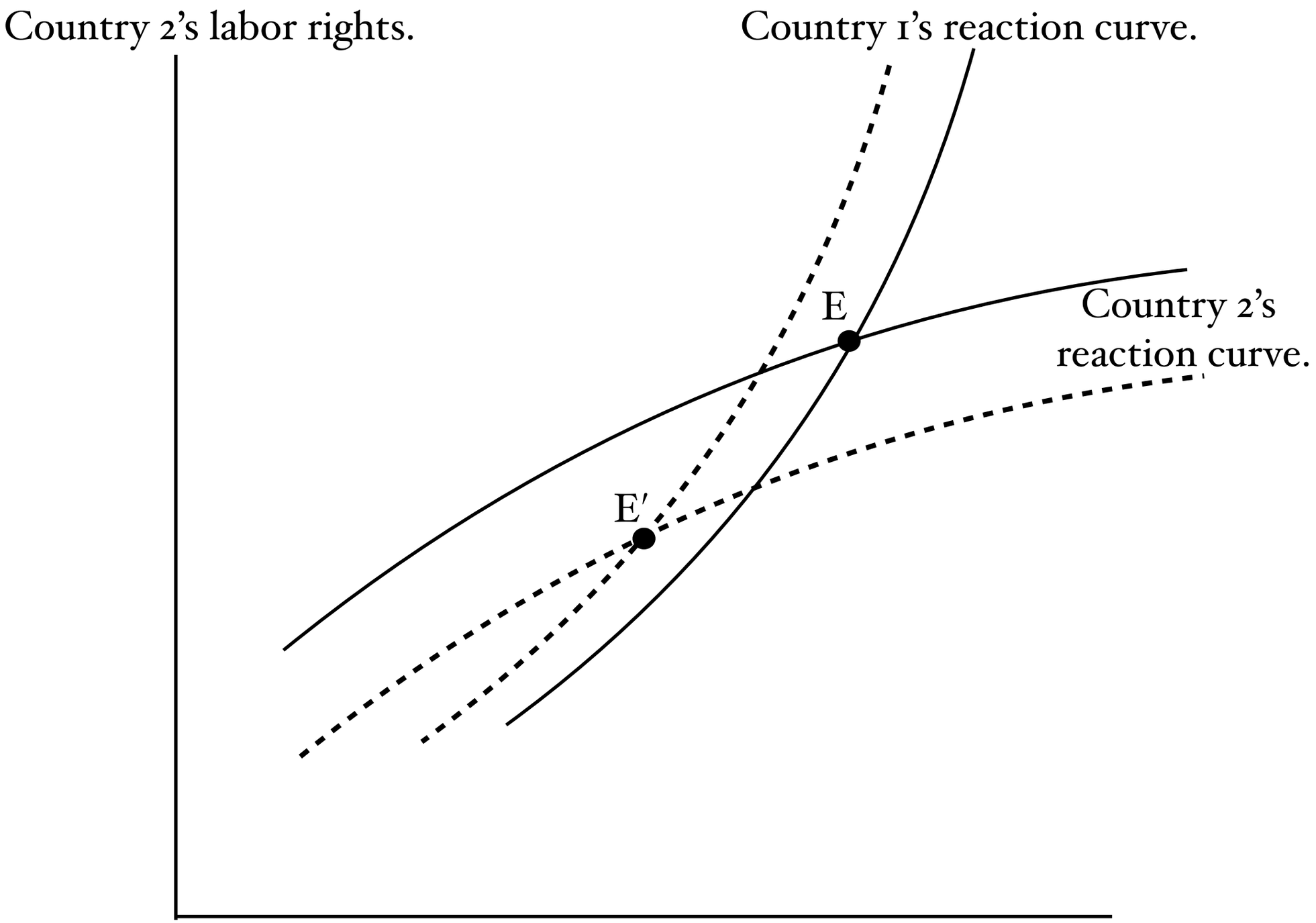


Figure 1: Interpretation of the empirical exercise.

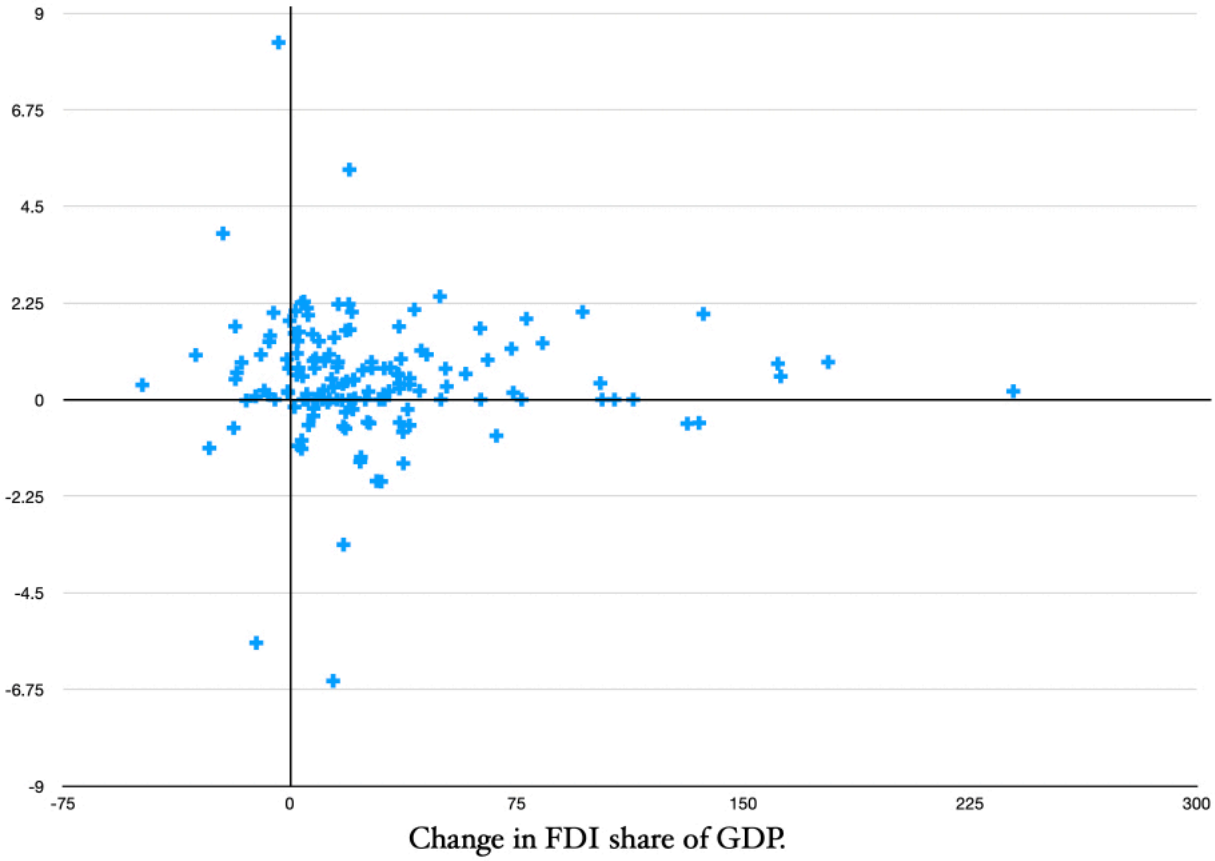


Figure 2: Changes in labor rights and in FDI, 2000-2015.