

# A Race to the Bottom?

## Employment Protection and Foreign Direct Investment

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### Abstract

A common critique of globalization is that it leads to a race to the bottom. Specifically, it is assumed that multinationals invest in countries with lower regulatory standards and that countries competitively undercut each other's standards in order to attract foreign capital. This paper tests this hypothesis and finds robust empirical support for both predictions. First, a reduction in employment protection rules leads to an increase in foreign direct investment (FDI). Furthermore, changes in employment protection legislation have a larger impact on the relatively mobile types of FDI. Second, there is evidence that countries are competitively undercutting each other's labor market standards.

*Keywords:* foreign direct investment; employment protection; race to the bottom

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# 1 Introduction

A frequent critique of globalization is that it can lead to a race to the bottom, where countries lower their labor standards, environmental standards, or tax rates in order to attract foreign capital.<sup>2</sup> More specifically, the race to the bottom hypothesis hinges on two important predictions. First, multinational enterprises (MNE) choose to invest in countries with less restrictive standards. Second, foreign countries competitively undercut each other's standards in order to attract foreign direct investment (FDI). While these are common fears associated with globalization, there is relatively little empirical evidence supporting either of these predictions. This paper tests these assumptions by examining the impact of employment protection rules on inward FDI and on labor market standards in other countries. The results provide compelling support for both predictions of the race to the bottom hypothesis. However, whether a race to the bottom is an undesirable outcome is a normative question that is outside the scope of this paper and ultimately depends on one's view of employment protection rules.

Anecdotal evidence suggests there is an important relationship between FDI and labor standards. For instant, in 1993 Hoover, an American multinational firm, relocated a vacuum cleaner plant from Dijon, France to Cambuslang, Scotland. At the time, Britain was encouraging inward investment by highlighting it's relatively flexible hiring and firing rules. In addition, a Hoover executive said that the significantly higher non-wage labor costs in France relative to Scotland was a factor in the company's decision to relocate.<sup>3</sup> The French government indicated that this was a case of "social dumping" in which the competitive undercutting of labor standards was used to attract foreign investment and asked the European Commission to investigate.<sup>4</sup> This and other highly publicized cases led to concern among European Union officials that countries were lowering labor standards in order to attract large multinational companies.<sup>5</sup> This paper examines whether stories like this are

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<sup>2</sup>The origins of the phrase race to the bottom are often traced to U.S. Supreme Court Justice Louis Brandeis in his dissenting opinion in *Liggatt v Lee* where he describes how firms were formed in U.S. "states where the cost was lowest and the laws least restrictive" which led to a race "not of diligence but of laxity" (Louis K. Liggett CO v. Lee, 288 U.S. 517, 1933).

<sup>3</sup>See Rodrik (1997) and "Social dumping - hardly an open and shut case: The arguments about switching jobs between countries are not so simple" by David Goodhart, Financial Times, February 4, 1993.

<sup>4</sup>"French promise to make Hoover pay dear" by David Buchan, Financial Times, February 4, 1993.

<sup>5</sup>"EU looks to extend laws on worker consultation," by Caroline Southey, Financial Times, September

indicative of a more general race to the bottom in employment protection rules.

A preliminary check of the data seems to support these types of anecdotes. Foreign direct investment has increased substantially in the last twenty five years. For instance, the share of U.S. direct investment in OECD countries relative to U.S. gross domestic product has increased from 4.3% in 1985 to 14.5% in 2007 (see Figure 1).<sup>6</sup> In addition, employment protection rules in OECD countries have decreased from an average of 2.45 in 1985 to 2.04 in 2007 (see Figure 1). Certainly there are many other factors that can influence both FDI and labor standards and thus the goal of this paper is to examine to what extent these trends in the data are related.

According to the first prediction of the race to the bottom hypothesis, a reduction in labor market standards will increase FDI. As employment protection rules become less strict, the cost of operating a foreign affiliate falls, and thus multinationals will shift production activities to that country. Taking this prediction a step further, the response of multinationals to employment protection rules likely depends on the type of FDI. Relatively mobile types of FDI will be more likely to respond to changes in labor market standards than FDI that is tied to a specific location. For instance, vertical FDI, which is motivated by the desire to take advantage of low foreign factor prices, can be relocated to less expensive locations relatively easily. However, horizontal FDI, which is motivated by the desire to access a foreign market, needs to be near the foreign consumers and is thus less mobile.

The second key prediction of the race to the bottom hypothesis is that countries lower their labor standards in order to undercut their competitors and attract FDI. As the average labor standards among your competitors decreases, the foreign host country will lower their own labor standards in response. Thus, the average employment restrictions in other foreign countries should have a positive impact on the employment protection rules in the host country. While the race to the bottom hypothesis is a common fear of globalization and the intuition is relatively straightforward, there is little empirical research studying either of these predictions.

This paper tests these predictions using data on U.S. FDI and data on employment pro-

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23, 1996.

<sup>6</sup>If non-OECD countries are included, the increase is even larger.

tection legislation in twenty six foreign countries which collectively account for over three quarters of U.S. outward FDI. FDI is measured using data from the Bureau of Economic Analysis (BEA) on U.S. MNE's foreign affiliate sales. This is appealing because it allows horizontal, export-platform, and vertical FDI to be separately identified based on the ultimate destination of these affiliate sales. The measure of employment protection used in this analysis is a composite index of hiring and firing costs obtained from the OECD. This provides a consistent and objective measure of differences in employment protection legislation across countries and over time. Spanning twenty six countries and twenty three years, the data set provides the scale and scope necessary to examine both predictions of the race to the bottom hypothesis.<sup>7</sup>

To test the first prediction, the impact of employment protection on FDI is estimated after controlling for time fixed effects, country fixed effects, and a wide variety of foreign country characteristics that influence FDI. This alleviates concerns that changes in employment protection rules could be inadvertently capturing other types of institutional or economic changes which are correlated with FDI. In addition to the baseline ordinary least squares (OLS) estimation strategy, an instrumental variables (IV) and a dynamic panel generalized methods of moments (Arellano-Bond GMM) are also used which more carefully address endogeneity concerns. The results are remarkably robust across all specifications and indicate that employment protection has a significant, negative impact on the foreign affiliate sales of U.S. multinationals. This is consistent with the prediction that a reduction in employment protection rules will decrease the costs of production in the host country and thus increase U.S. FDI to that foreign country.

Even more compelling is that the impact of employment protection rules vary across different types of FDI in the manner predicted. While employment protection legislation has a negative effect on all types of FDI, the impact is relatively small on affiliate sales to the local market (horizontal FDI) but relatively large on affiliate sales back the U.S. (vertical FDI). These contrasting results verify that employment protection rules have the largest effect on the relatively more mobile types of FDI. Thus, there is evidence that FDI

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<sup>7</sup>Unfortunately, there is not employment protection data for other developing countries. However, focusing on relatively similar OECD countries should, if anything, attenuate the results.

responds to labor market restrictions and that this response is strongest among the most footloose types of FDI. This confirms the first prediction of the race to the bottom hypothesis and provides a motive for countries to competitively undercut each other's employment protection rules in order to attract FDI.

To test the second key prediction of the race to the bottom hypothesis, this paper examines whether host country employment protection rules depend on labor market standards in other countries. Specifically, an unweighted average, a weighted average based on distance, and a weighted average based on U.S. affiliate sales is used to quantify the employment protection rules in other competing foreign countries. A baseline OLS estimation strategy is used, as well as IV and Arellano-Bond GMM specifications which more carefully identify causality. The results indicate that labor market standards in other foreign countries have a significant positive impact on host country employment protection legislation. As competitors lower their labor standards, the foreign host country responds by lowering their own employment protection rules. This result is robust to all three weighting schemes and all three empirical specifications. Thus, this paper finds compelling empirical evidence supporting both predictions of the race to the bottom hypothesis.

Previous research has found little evidence of a race to the bottom in labor standards. Brown, Deardorff, and Stern (1996) and Martin and Maskus (2001) examine the theoretical implications of international labor standards on trade and are skeptical of the race to the bottom hypothesis. The few empirical studies that test this hypothesis typically just examine the first prediction by looking at the relationship between employment protection and FDI.<sup>8</sup> For instance, Rodrik (1996), OECD (2000), and Kucera (2002) find a positive correlation between FDI and labor standards in a cross section of countries, contrary to the predictions of the race to the bottom hypothesis. Thus, in surveys of the literature Bhagwati (2007) and Brown, Deardorff, and Stern (2013) argue that there is no evidence that multinationals are attracted to countries with lower labor standards. Relative to these earlier studies, this paper makes a number of important contributions such as using a panel data set that is able to control for unobserved country and year characteristics and using IV and GMM

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<sup>8</sup>A number of other papers have looked at how labor market standards affect domestic factors such as employment (Lazear 1990, Acemoglu and Angrist 2001, Di Tella and MacCulloch 2005, Boeri and Jimeno 2005) and output (Besley and Burgess 2004).

approaches to address endogeneity concerns.

More recent related studies, which are not explicit tests of the race to the bottom hypothesis, find that less restrictive employment protection rules do in fact increase FDI (Gorg 2005, Dewit et al. 2009, Javorcik and Spatareanu 2005, Benassy-Quere et al. 2007). While similar in spirit, these papers typically rely on more subjective measures of hiring and firing costs than the employment protection measured used in this analysis. Furthermore, none of these papers examine the impact of labor market standards on different types of FDI. An important contribution of this paper is the finding that the impact of labor standards on foreign investment depends crucially on the type of FDI. While Azemar and Desbordes (2010) also look at different types of FDI, their measure of labor standards has no annual variation. In contrast, this paper uses a consistent and objective measure of employment protection rules that varies across countries and over time.

Tests of the race to the bottom hypothesis tend to focus on whether multinationals invest in countries with lower regulatory standards. As mentioned, the evidence regarding this first prediction is mixed. Tests of the second prediction of the race to the bottom hypothesis are even rarer. While admittedly this is more difficult to prove empirically, it is an important component of the race to the bottom hypothesis. To the best of my knowledge, the only other study to examine whether countries competitively undercut one another's labor standards is Davies and Vadlamannati (2013). Using an alternate sample and a different measure of labor standards, they also find evidence that countries are competitively undercutting one another's labor standards. Thus, their findings complement the results of this paper. However, Davies and Vadlamannati (2013) do not examine the cause of this competition in labor standards or specifically whether it is motivated by the desire to attract FDI. Thus, by examining both the first and second predictions of the race to the bottom hypotheses, this paper is the first comprehensive test of this theory.

The remainder of the paper proceeds as follows. Section 2 discusses the predictions of the race to the bottom hypothesis. The estimation strategy is described in Section 3, while the data and descriptive statistics are presented in Section 4. The results are discussed in Section 5 and extensions, such as an industry level analysis, are presented in Section 6. Finally, Section 7 concludes.

## 2 Race to the Bottom

### 2.1 Hypothesis 1

The first prediction of the race to the bottom hypothesis is that multinationals choose where to invest based in part on the labor market standards within the foreign country. Less strict employment protection rules will reduce operating costs for the MNE and thus make investing in that particular foreign country more appealing. Taking this important first prediction a step further, the responsiveness of FDI to employment protection legislation will depend crucially on the type of FDI. Specifically, FDI that is relatively more mobile, in the sense that it can be equally effective in a variety of different countries, should be more responsive to labor standards. Thus, as further confirmation of this first race to the bottom hypothesis, it is worth examining the impact of employment protection rules on different types of FDI.

Horizontal FDI occurs when a multinational invests in a country in order to sell to that foreign market and avoid transport costs associated with exporting (Markusen 1984). The MNE shifts the entire production process to the foreign country and then sells the output to local consumers. With horizontal FDI, the choice set facing the multinational is to produce at home and export or to produce in the foreign country and sell directly to that market. Since the goal of horizontal FDI is to access a foreign market, there is little reason for a MNE to shift production activities from one foreign country to another. Given limited outside options, horizontal FDI will be the least sensitive to employment protection legislation in the foreign country.

Export-platform FDI occurs when a multinational sells to a foreign market by setting up an affiliate in a neighboring country and exporting to the desired country (Ekholm, Forslid, and Markusen 2007). The motivation is still to access a foreign market but now one foreign affiliate can export to a variety of neighboring countries. Thus, the multinational can serve multiple markets with one well placed foreign affiliate. With export-platform FDI, the relevant choice set facing the MNE is to produce at home and export or to produce in one of many potential host countries and export to the rest of the region. Since there are more options available to the MNE, export-platform FDI will be more sensitive to employment

protection legislation than horizontal FDI.

Finally, vertical FDI occurs when multinationals invest in a country in order to take advantage of low foreign factor prices and minimize costs (Helpman 1984). The MNE shifts part of the production process to the foreign affiliate and then ships the output back to the home country for further processing or for final sales. Unlike horizontal and export-platform FDI which need to be near a specific foreign market, vertical FDI can be located in any foreign country regardless of location. The MNE simply chooses to invest in the country that generates the greatest cost savings. If the costs associated with operating in one foreign country decrease, the MNE can relocate production activities from other foreign locations to that particular low cost country. Given that the motivation for vertical FDI is to take advantage of low foreign factor prices, vertical FDI will be especially sensitive to changes in employment protection rules.

The ordering of FDI types according to their mobility, with horizontal FDI being the least mobile and vertical FDI being the most mobile, is a fairly intuitive result that has been referred to often in the literature (Blonigen 2005). Furthermore, Yeaple (2003b) finds evidence that is consistent with vertical FDI being more footloose than horizontal FDI. Also, Azemar and Desbordes (2010) show that export-platform FDI and vertical FDI are more spatially interdependent than horizontal FDI. Thus, the empirical analysis that follows will not only examine whether employment protection rules reduce FDI, but also whether these labor market standards have a relatively larger impact on the more mobile types of FDI.

## **2.2 Hypothesis 2**

The second prediction of the race to the bottom hypothesis is that countries competitively undercut each other's labor market standards in order to attract foreign investment. Given that FDI is often associated with increases in production, capital stock, infrastructure, and knowledge spillovers, attracting foreign investment is particularly appealing for many countries. If, according to hypothesis one, multinationals are attracted to countries with less restrictive labor standards, then each country has an incentive to lower their employment protection rules slightly below that of their competitors. By undercutting the employment standards in other foreign countries, each host country has the ability to lure FDI away from



its competitors. Thus, the race to the bottom hypothesis also predicts that as the weighted average of employment protection rules among a country’s competitors falls, the foreign country will reduce its own employment protection rules in response. The analysis that follows discusses how this weighted average is constructed and examines whether countries competitively undercut each other’s labor standards.

### 3 Specification

The goal of the empirical analysis is to examine whether there is evidence supporting either prediction from the race to the bottom hypothesis. This section outlines the benchmark OLS specification for each prediction as well as the IV and dynamic panel Arellano-Bond GMM estimation strategies which more carefully address endogeneity issues.

#### 3.1 Testing Hypothesis 1

First, the impact of employment protection on FDI is examined. To test this first prediction, the following baseline equation will be estimated using OLS:

$$(1) \quad FDI_{c,t} = \alpha_1 EP_{c,t-1} + X_{c,t-1} \alpha_2 + \lambda_c + \theta_t + \epsilon_{c,t}$$

where  $FDI_{c,t}$  is U.S. foreign affiliate sales in country  $c$  in year  $t$ ,  $EP_{c,t-1}$  is employment protection in foreign country  $c$  in year  $t - 1$ , and  $X_{c,t-1}$  is a vector of host country control variables that includes GDP, population, trade costs, skill level, tax rate, investment costs, wages, and trade agreements. These independent variables are lagged to account for the fact that multinationals cannot immediately adjust FDI in response to these host country characteristics.<sup>9</sup> The natural logarithm of all variables is used in the empirical analysis. Finally,  $\lambda_c$  and  $\theta_t$  are country and year fixed effects respectively.

Despite the inclusion of country and year fixed effects, the inclusion of a wide variety of control variables, and lagging all the independent variables, there may be lingering en-

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<sup>9</sup>The results that follow are robust to using longer lags.

dogeneity concerns.<sup>10</sup> In order to identify a causal impact of employment protection on FDI, this analysis will estimate equation (1) using an IV approach. This second empirical strategy uses the strength and political ideology of the ruling party and the unionization density as instruments for employment protection legislation in the foreign host country. A country that elects a relatively powerful liberal ruling party will be more likely to implement labor standards. In addition, a country may respond to a declining union presence by implementing employment protection legislation.<sup>11</sup> These instruments will identify variation in employment protection rules which is driven by election cycles, political parties, and long-run labor market characteristics that are plausibly exogenous to FDI. The results that follow indicate that both instruments are strong predictors of employment protection legislation. Furthermore, the overidentification test indicates that the instruments only affect FDI through their impact on employment protection rules. The construction of both instruments will be discussed in greater detail in section 4.4.

The third empirical strategy estimates a dynamic panel model, where current FDI also depends on the lagged value of FDI. This accounts for the possibility that FDI is persistent over time. Thus, adding lagged FDI to equation (1) and first differencing leads to the following estimation equation:

$$(2) \quad \Delta FDI_{c,t} = \beta_1 \Delta EP_{c,t-1} + \Delta X_{c,t-1} \beta_2 + \beta_3 \Delta FDI_{c,t-1} + \Delta \theta_t + \Delta \epsilon_{c,t}$$

where the country fixed effects are subsumed by the annual differences. The issue with estimating this equation is that the differenced residual,  $\Delta \epsilon_{c,t}$ , is by construction correlated with the lagged dependent variable,  $\Delta FDI_{c,t-1}$ , since both are functions of  $\epsilon_{c,t-1}$ . Similarly,  $\Delta EP_{c,t-1}$  and the control variables  $\Delta X_{c,t-1}$  may also be correlated with  $\Delta \epsilon_{c,t}$ . Therefore, OLS regressions of equation (2) can produce inconsistent estimates. To avoid this problem and to address potential endogeneity concerns, equation (2) will be estimated using

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<sup>10</sup> However, it is not clear whether endogeneity would generate a spurious positive or negative bias. Perhaps an increase in FDI encourages host countries to increase employment protection rules in order to protect local workers from being exploited by foreign multinationals or maybe increases in FDI encourage host countries to decrease employment protections further to attract more FDI.

<sup>11</sup> Besley and Burgess (2004) also use unionization rates as an IV for labor regulations.

the Arellano-Bond GMM estimator (Holtz-Eakin et al. 1988, Arellano and Bond 1991). The most general Arellano-Bond GMM specification possible is utilized, which instruments all right hand side variables with all their respective lagged levels.<sup>12</sup> This approach also identifies a causal impact of employment protection legislation on FDI.

Given the predictions discussed in section 2, we expect  $\alpha_1 < 0$  and  $\beta_1 < 0$ . As employment protection rules decrease, operating costs fall, multinationals shift production activities to that foreign host country, and thus foreign affiliate sales increase. In addition, the magnitude of  $\alpha_1$  and  $\beta_1$  will depend crucially on the type of FDI. Thus, each empirical specification will be separately estimated using total foreign affiliate sales, horizontal sales, export-platform sales, and vertical sales as the dependent variable. The coefficients on employment protection should be more negative as the degree of mobility exhibited by each type of FDI increases. Specifically,  $\alpha_1$  and  $\beta_1$  should be most negative in the vertical sales regression, it should be least negative in the horizontal sales regression, and it should fall between these extremes in the export-platform sales regression.

### 3.2 Testing Hypothesis 2

To test the second prediction of the race to the bottom hypothesis, this paper examines whether employment protection rules in the host country depend on labor standards in other foreign countries. Specifically, the following baseline equation is estimated using OLS:

$$(3) \quad EP_{c,t} = \phi_1 \text{Competitor\_} EP_{c,t-1} + X_{c,t-1} \phi_2 + \lambda_c + \theta_d + \epsilon_{c,t}$$

where the dependent variable,  $EP_{c,t}$ , is employment protection in foreign country  $c$  and  $\text{Competitor\_} EP_{c,t-1}$  is the weighted average of employment protection in other foreign countries not including country  $c$  itself. This key independent variable is constructed using three different weighting techniques which will be discussed in greater detail in section 4.5.  $X_{c,t-1}$  is the vector of host country characteristics discussed earlier,  $\lambda_c$  are country fixed

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<sup>12</sup>The results that follow are robust to a wide variety of alternate GMM specifications, including instrumenting for fewer right hand side variables, including fewer lagged levels as instruments, and using system GMM instead of difference GMM.

effects, and  $\theta_d$  are decade fixed effects. Including year fixed effects is not possible in this analysis because they would subsume the  $Competitor\_EP_{c,t-1}$  variable. Specifically, if year fixed effects were included, then the only variation left in  $Competitor\_EP_{c,t-1}$  would come from the exclusion of the host country’s own employment protection value from the weighted average. Since  $EP$  is correlated over time, then  $EP_{c,t}$  and  $Competitor\_EP_{c,t-1}$  would be negatively correlated by construction.<sup>13</sup> This is a common issue in spatial econometric analyses (Davies and Vadhnamannati 2013), and thus decade fixed effects are used instead which will capture long run trends in the data. Finally, all variables are in natural logarithms and the independent variables are lagged to account for the fact that changes in employment protection legislation take time to implement.

Despite the controls, lags, and fixed effects in equation 3, endogeneity may still be a concern. For instance, it may be important to disentangle a common trend across countries towards greater labor market flexibility from the competitive undercutting of labor standards. To address these endogeneity concerns, an IV analysis identifies an exogenous source of variation in competitor employment protection. An instrument is constructed by identifying, in each foreign country, the variation in their employment protection rules that is driven by country specific factors. Specifically, employment protection is first regressed on the ideology and union variables used previously. The fitted values from this regression are kept and represent the change in employment protection that is due to these exogenous country specific factors. Then the weighted average of these fitted values are calculated and used as an instrument for the analogously weighted  $Competitor\_EP$ .

The second prediction of the race to the bottom hypothesis will also be tested using a dynamic panel estimation strategy, which accounts for the possibility that employment protection is persistent over time. Thus, the following equation is estimated using the Arellano-Bond GMM estimator:

$$(4) \quad \Delta EP_{c,t} = \gamma_1 \Delta Competitor\_EP_{c,t-1} + \Delta X_{c,t-1} \gamma_2 + \gamma_3 \Delta EP_{c,t-1} + \Delta \theta_d + \epsilon_{c,t}.$$

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<sup>13</sup>Section 6.2 discusses this issue in greater detail and uses alternate time fixed effects.

where  $\Delta EP_{c,t-1}$  is the change in lagged employment protection in country  $c$ . Again, the Arellano-Bond GMM estimation strategy overcomes potentially inconsistent estimates and instruments the right hand side variables with all their lagged levels. This identifies a causal impact of competitors labor standards on the host country’s employment protection rules.

Given the discussion in section 2, the race to the bottom hypothesis predicts that  $\phi_1 > 0$  and  $\gamma_1 > 0$ . As other foreign countries lower their employment protection rules, country  $c$  will respond by reducing its own employment protections in order to undercut its competitors. Ideally, the results will be consistent across all three weighting schemes and across all three empirical specifications.

## 4 Data

### 4.1 Foreign Direct Investment

This analysis measures FDI using U.S. data from the Bureau of Economic Analysis (BEA). Focusing on multinationals from one country is appealing because it minimizes parent country characteristics that may influence outward FDI. In addition, data on U.S. multinational companies is far more comprehensive and detailed than FDI data from other countries.

Another especially appealing aspect of the BEA data is that they provide information on the ultimate destination of the sales of U.S. foreign affiliates. Measuring FDI using foreign affiliate sales allows different types of FDI to be identified. Specifically, affiliate sales to the local market measures horizontal FDI, affiliate sales to other foreign countries measures export-platform FDI, and affiliate sales back to the U.S. measures vertical FDI.<sup>14</sup> Finally, these affiliate sales variables are converted into real dollars using the chain-type price index for gross domestic investment.<sup>15</sup>

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<sup>14</sup>There are many other types of ‘complex’ FDI that are variations of these three basic components (Yeaple 2003a). While these three categories may include more complex types of FDI, this will not fundamentally change the basic ordering of these types of FDI from less-mobile to more-mobile.

<sup>15</sup>This price deflator is found in the Economic Report of the President (<http://www.gpoaccess.gov/eop/tables10.html>).

## 4.2 Employment Protection

Data on employment protection legislation comes from the Organisation for Economic Co-operation and Development (OECD). The OECD constructs a composite index of employment protection rules from seventeen individual measures which can be grouped into two broad categories, rules regarding firing workers and rules on hiring temporary workers. The firing restrictions include measures such as the notification process and timing of dismissals, the severance pay required, and the procedures for contesting an unfair dismissal. The hiring restrictions include measures such as the allowable number and duration of fixed term contracts, the type of work that temporary workers can do, and whether regular and temporary workers are treated equally.<sup>16</sup> The composite employment protection index is measured on a scale of zero to six with six representing the most restrictive rules.

This measure of employment protection has some important limitations that are worth noting. First, employment protection legislation is one component of what we think of more broadly as labor market standards. However, given the inclusion of country fixed effects, the estimation strategy identifies changes in employment protection rules within a country. As long as these changes in employment protection legislation are positively correlated with other types of labor market standards, which seems plausible, this will be a useful proxy for labor standards more generally. Second, this employment protection measure is only available for OECD countries and thus many less developed countries are not included in the sample. However, these OECD countries account for over three quarters of US outward FDI. Furthermore, using a sample of relatively similar rich countries where immobile horizontal FDI is more pronounced should, if anything, lead to insignificant or attenuated results. The fact that this paper finds significant and plausible results among these OECD countries suggests that the relationships identified in the paper are important and perhaps would be even larger with a more diverse set of countries in the sample.

Despite these two caveats, there are many aspects of this data that are especially appealing and that more than compensate for these drawbacks. First and foremost, this is an objective and consistent estimate of employment protection regulations in a wide variety

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<sup>16</sup>For further details on the components of these measures and how they are calculated, see the methodology section of the OECD Indicators of Employment Protection website at [www.oecd.org/employment/protection](http://www.oecd.org/employment/protection).

of countries.<sup>17</sup> Changes in this measure of employment protection represent legislative and policy changes in the host country that are more likely exogenous to foreign affiliate sales. Although changes in employment protection legislation is infrequent in some countries, when these changes occur, they represent an important shift in labor market standards. Second, this employment protection measure is available for thirty countries and twenty three years (1985-2007). The scale and scope of this variable represents an important improvement over other measures.

### 4.3 Control Variables

The estimation strategy implemented in this analysis controls for both country and time fixed effects. To account for factors that may vary within a country over time, a variety of additional control variables are included in the empirical specifications that follow. This includes the host country's real GDP and population both of which were obtained from the OECD. Following Blonigen et al. (2007), I measure host country trade costs as the inverse of the openness measure reported by the Penn World Tables (PWT).

Data on skill level are from the Barro and Lee (2010) Educational Attainment Dataset. They report the average year of schooling for those over 25 years old every five years from 1950-2010. The intervening years are calculated using linear interpolation. Host country corporate income tax rates come from the OECD. Investment costs are measured using data from the Business Environment Risk Intelligence (BERI). Investment costs are calculated as the inverse of the composite index which includes the operations risk index, the political risk index, and the remittance and repatriation factor index. This will account for institutional changes that could influence FDI. Wages are measured using the unit labor cost index from the OECD and will account for any potential compensating wage differentials in response to employment protection rules.

Although all countries in the sample were members of the GATT/WTO, the expansion of the EU and the ratification of NAFTA represent important changes during this period.

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<sup>17</sup>Other authors (Gorg 2005, Dewit et al. 2009, Di Tella and MacCulloch 2005) have used data from the Global Competitiveness Report (GCR) produced by the World Economic Forum. This measure is obtained from surveying local business managers about the hiring and firing practices in their country. This is a relatively subjective and noisy measure which may include lots of factors other than changes in labor market legislation in the foreign host country.

Thus, a dummy variable equal to one if the country was part of the EU and a dummy variable equal to one if the country joined NAFTA are also included as controls.<sup>18</sup> Overall, the inclusion of this comprehensive set of controls in the regressions that follow limit concerns that changes in employment protection rules are inadvertently capturing other institutional and economic changes that could be correlated with FDI.

#### 4.4 Instruments

The IV analysis uses the political ideology and strength of the ruling party and unionization density as instruments for employment protection. Data used to construct the political ideology variable comes from the Political Constraint Index (POLCON) Dataset (Henisz 2002). First, I identify the ideology of the political party that controls the executive branch of the government as either liberal, neutral, or conservative.<sup>19</sup> Then this ideology variable is interacted with a measure of political constraint which reflects the relative strength of the ruling party. Specifically, the political constraint variable takes into account the number of branches within the government that have veto power over policy changes, the party alignment across the branches of government, and the party heterogeneity within the legislative branches of government. This modified political ideology variable takes on values between one and three. Values close to three indicate that a relatively powerful liberal party is in control, values close to two indicate a relatively weak or neutral party is in control, and values close to one indicate that a relatively powerful conservative party is in control. A ruling party that is more liberal and powerful is more likely to implement employment protection legislation.

Following Besley and Burgess (2004), I also instrument employment protection with the unionization rate. Data on the unionization rates in foreign host countries comes from the OECD and is calculated as the share of total wage and salary earners that are union members. As discussed previously, a country may respond to a declining union presence by

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<sup>18</sup>The results that follow are robust to the inclusion of other trade agreement dummies including those between the EU and other countries in the sample and between the US and other countries in the sample. Data on regional Trade Agreements was obtained from the WTO:

<http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx>

<sup>19</sup>My definition of party ideology is virtually identical to those produced by the World Bank in their 2010 Database of Political Institutions. The results are robust to the use of either definition.



implementing employment protection legislation. Furthermore, since unions are more common in industries that typically have less inward FDI, such as the public sector, a declining union presence is unlikely to affect MNEs directly. However, more general employment protection rules will affect all sectors and thus impact multinationals' decisions to pursue FDI.

#### 4.5 Competitor Employment Protection

The employment protection measure from the OECD is used to construct the average labor market standards in other foreign countries. Specifically, for country  $c$  the *Competitor\_EP* variable is calculated as the weighted average of employment protection in all other foreign countries in the sample, not including country  $c$  itself. There are three different methods used to construct this spatially lagged term.

First, this variable is constructed as the unweighted average of employment protection in the other foreign countries. This method weights equally all other foreign countries. The second approach calculates *Competitor\_EP* as a weighted average using the inverse of the distance between country  $c$  and the other foreign host countries. Thus, the employment protection legislation in countries that are closer in proximity to country  $c$  are weighted more heavily. So for instance, using this method France's employment protection rules are assumed to be more sensitive to labor market standards in Germany than in Australia. The weights are normalized to one to account for the fact that the sample of countries changes over this period.<sup>20</sup>

The third method weights more heavily those countries that are more likely to be competing with country  $c$  for FDI. Specifically, the average vertical and export-platform FDI sales in each foreign country is used as a weight. The weights are normalized so that employment protection in those countries that have a greater share of vertical and export platform FDI sales are weighted more heavily. This approach assumes that country  $c$  will be more responsive to changes in employment protection rules in countries that have a larger share of these relatively mobile types of FDI. For example, using this method Switzerland's

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<sup>20</sup>The results that follow are similar if the sample is restricted to countries that have data for the entire period.

employment protection rules will be more sensitive to labor market standards in Ireland, which has a lot of U.S. vertical and export platform FDI, than in Turkey.

## 4.6 Descriptive Statistics

Combining these various measures, generates an unbalanced panel data set that spans twenty six countries and twenty three years (1985-2007).<sup>21</sup> The twenty six countries in this sample accounted for 78% of U.S. FDI in 2000. Table 1 reports the summary statistics of the variables used in this analysis. While the sample includes only OECD countries, Table 1 indicates there is substantial variation in all of these measures. For instance, real affiliate sales varied from \$1,165 million in Turkey in 1985 to \$586,295 million in the United Kingdom in 2007. On a scale of zero to six with six being the most restrictive, employment protection ranges from 0.6 in the United Kingdom in the 1990s to 4.2 in Portugal in the late 1980s.

Figure 2 plots the annual average of employment protection against the annual average of real affiliate sales. A significant negative relationship between employment protection and affiliate sales is evident in Figure 2. This is consistent with Figure 1, and indicates that over time there has been a downward trend in employment protection rules and an upward trend in U.S. foreign affiliate sales.

Figure 3 plots the country average of employment protection against the country average of real affiliate sales. The U.K. and Canada have relatively lax employment protection rules and have high foreign affiliate sales, and countries such as Portugal, Turkey and Greece have strict employment protection rules and low levels of U.S. foreign affiliate sales. On the other hand, France and Germany have strict employment protection rules but high levels of affiliate sales. Again, there is a strong negative relationship between employment protection and affiliate sales. Countries that have strict employment protection rules typically have less U.S. foreign affiliate sales.

Figure 4 plots the country average of employment protection against the country average

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<sup>21</sup>The countries are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Mexico, New Zealand, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

of different types of real affiliate sales. Two observations are worth noting. First, there is interesting variation across countries in terms of which type of FDI is most important. Not surprisingly, Japan and Australia have relatively large shares of horizontal U.S. FDI, Ireland and Switzerland have relatively large shares of export-platform U.S. FDI, and Mexico has a relatively large share of vertical U.S. FDI. Second, a negative relationship between employment protection and all three types of FDI is evident in Figure 4. In addition, the relationship between employment protection and FDI is more negative and significant in the export-platform and vertical FDI scatter plots. This is consistent with the prediction that these mobile types of FDI are more sensitive to employment protection rules.

Figures 2-4 provide insight into the dimensions and characteristics of the data set used in this analysis. It is interesting that such a strong negative relationship emerges in these raw cuts of the data. However, there are some important limitations of these scatter-plots which the empirical analysis that follows is able to overcome. First, the country and year fixed effects will capture much of the variation evident in these figures. The analysis that follows exploits country variation over time to examine the impact of employment protection on foreign affiliate sales. Second, these figures do not account for other factors that are changing over time and may be affecting both affiliate sales and employment protection. As discussed previously, a wide array of control variables will be included in the empirical analysis. Third, this negative correlation does not imply causation. Fortunately, the GMM and IV estimation strategies will identify a causal impact of employment protection on foreign affiliate sales. With these caveats in mind, it is encouraging that such a consistently negative relationship emerges in Figures 2-4. The section that follows examines whether this relationship is robust to a more careful and rigorous analysis.

To gain a sense of the variation in labor standards exploited in this analysis, Figure 5 plots country specific employment protection rules over time. The top panel shows all twenty six countries, while the bottom two panels show the countries that implemented the largest decreases and largest increases in employment protection over the sample period. There has been a downward trend in employment protection rules, which is consistent with countries competitively undercutting one another's labor standards. However, Figure 5 illustrates substantial variation across countries and over time. For instance, Germany

and Spain relaxed their employment protection rules while France and New Zealand implemented stricter rules during this period. In the bottom panel of Figure 5, we also see the large difference in employment protection rules between France and the UK, which Hoover indicated was one of the factors that led them to relocate their production activities.

Figure 5 also shows that while changes in employment protection rules can be infrequent in some countries, many implement substantial changes which occur at different years within the sample. For instance, Spain, in 1994, relaxed their procedural requirements for dismissals and permitted temporary work agencies. Then in 1997, they reduced the compensation for an unfair dismissals and also redefined the definition of a fair dismissal. However, in 2001 Spain tightened the rules governing when fixed term contracts can be used. In contrast, France saw an increase in employment protection rules over the sample despite the fact that they eliminated the administrative authorization necessary for dismissals in 1986. They limited the permissible use and duration of fixed term contracts and temporary work agencies in 1990 and then increased severance pay entitlements in 2001.<sup>22</sup> The analysis that follows examines the impact of these changes in employment protection rules on FDI and on other countries labor standards.

## 5 Results

This section reports the empirical results. Specifically, for each race to the bottom hypothesis the baseline OLS results are presented first and then the IV and GMM results are reported and discussed.

### 5.1 Hypothesis 1: OLS

The benchmark OLS results obtained from estimating equation (1) are reported in Table 2. All regressions include country fixed effects, year fixed effects, and have robust standard errors in brackets. The results in column 1 indicate that a reduction in employment protection rules leads to a significant increase in foreign affiliate sales. Specifically, a one percent decrease in employment protection leads to a 0.2 percent increase in foreign affiliate sales.

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<sup>22</sup>See Table 2.A2.6 in Chapter 2 of the OECD Employment Outlook (2004) for additional details.

This is consistent with the first prediction which states that laxer employment protection rules, decrease operating costs, and thus increases U.S. FDI to that foreign country.

Columns 2-4 of Table 2 separate foreign affiliate sales by the ultimate destination of these sales. The results indicate that employment protection has a significant negative impact on all types of foreign affiliate sales. Furthermore, the magnitude of the employment protection coefficient across these specifications is consistent with the intuition discussed in section 2.

Specifically, in column 2 employment protection has a relatively small negative impact on sales to the local market (horizontal FDI). This is consistent with the prediction that horizontal FDI is less sensitive to host country employment protection rules. U.S. multinationals want to access that foreign market and are thus less responsive to changes in employment restrictions in the host country.

In column 3, employment protection has a slightly more negative impact on affiliate sales to other foreign countries (export-platform FDI). With export-platform FDI, a U.S. multinational can choose among a variety of different countries that all provide access to the same regional market. Thus, as the employment protection rules become less strict in one particular country, multinationals will shift FDI from elsewhere in the region to that particular foreign host country.

Finally, in column 4 employment protection has a large, negative, and significant impact on affiliate sales back to the U.S. (vertical FDI).<sup>23</sup> Specifically, a one percent decrease in employment protection leads to a 0.8% increase in foreign affiliate sales to the U.S. With vertical FDI, U.S. multinationals are not constrained geographically by the need to access a foreign market. Thus, if the costs of production decrease, due to less strict employment protection rules, multinationals will shift FDI towards that relatively less expensive country.

The coefficients on the control variables are significant and of the expected sign. Total foreign affiliate sales increases with GDP, wages, and EU membership but decrease with trade costs, skill level, tax rates, and investment costs. Not surprisingly, there are important differences in how these factors affect different types of FDI. For instance, GDP has a more

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<sup>23</sup>Columns 2-4 were also estimated simultaneously using a Seemingly Unrelated Regression approach, which generates virtually identical results to those reported in Table 2. Subsequent Wald Tests indicate that the employment protection coefficients in columns 2 and 3 are not significantly different from one another. However, both are significantly different from the coefficient on employment protection in column 4.

positive impact on horizontal sales while trade costs, skill, and investment costs have a more negative impact on vertical sales. Also consistent with the theoretical predictions, horizontal sales increase with wages but vertical sales decrease with wages. Table 2 also indicates that the tax rate has a more negative impact on vertical sales than on horizontal sales, which is consistent with a race to the bottom in corporate tax rates. However, this finding is only significant at the ten percent level and is not robust to the other estimation strategies.

Overall, two important results emerge from Table 2. First, after controlling for country fixed effects, year fixed effects, and a wide variety of control variables, employment protection has a significant negative impact on foreign affiliate sales. Second, as expected, employment protection legislation has a more negative impact on the relatively more mobile types of FDI. Thus, the results in Table 2 provide clear and convincing evidence in support of the first race to the bottom hypothesis.<sup>24</sup>

## 5.2 Hypothesis 1: IV and GMM

To address endogeneity concerns, Table 3 reports the IV results obtained from estimating equation (1) and the Arellano-Bond GMM results obtained from estimating the dynamic panel model specified in equation (2). The IV results are reported in Panel A of Table 3. Employment protection has a negative impact on total foreign affiliate sales, which is significant at the one percent level (see column 1). In addition, the impact of employment protection on different types of affiliate sales is consistent with the predictions from section 2. Employment protection has an increasingly negative impact on local sales (column 2), sales to other foreign countries (column 3), and sales back the U.S. (column 4). Thus, as expected, the negative impact of employment protection on affiliate sales is increasing with FDI mobility.

The first stage IV results are reported in Panel B of Table 3. As expected, the political ideology variable has a positive impact on employment protection. A strong liberal government is more likely to implement labor market restrictions. Also consistent with

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<sup>24</sup>In addition, analogous results show that both the hiring and firing components of employment protection are significant individually.

expectations, the unionization rate has a negative affect on employment protection. As the prevalence of unions decreases, government feel the need to protect workers through employment protection rules. The F-stat on the excluded instruments is above 50 in all the regressions, which indicates relatively strong instruments. Furthermore, the high Hansen J p-values indicate a failure to reject the null hypothesis that the instruments are valid and satisfy the exclusion restriction.

Finally, the Arellano-Bond GMM results are reported in Panel C of Table 3. The implied long-run elasticity on employment protection is reported at the bottom of Panel C (Arellano and Bond 1991). In column 1, a one percent increase in employment protection decreases total foreign affiliate sales by 0.5% which is almost identical to the analogous IV result in Panel A. In addition, the impact of labor market restrictions on different types of FDI is consistent with expectations. Employment protection has an insignificant impact on horizontal sales (column 2), a small negative impact on export-platform sales (column 3), and a large negative impact on vertical sales (column 4). The lagged sales coefficients in all of the regressions in Panel C are positive and significant which indicates that affiliate sales are persistent over time. Furthermore, the lagged sales coefficient is larger in the horizontal sales regression than the vertical sales regression. This indicates that horizontal FDI is more persistent over time than vertical FDI which is consistent with the assumption that vertical FDI is relatively more mobile. The high p-values on the Hansen J and second order autocorrelation (AR2) tests indicate that the lags of the independent variables are in fact exogenous and are thus good instruments.<sup>25</sup>

These IV and GMM results in Table 3 support the benchmark OLS findings in Table 2. The coefficients on employment protection in the IV and GMM specifications are, if anything, slightly more negative which suggests that there is a spurious positive bias in the OLS results. This is consistent with a scenario in which host countries increase employment restrictions in order to protect local workers from being exploited by foreign multinationals. However, even in light of this spurious positive bias, the attenuated OLS results are still

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<sup>25</sup>However, the Hansen J test can be weakened when, as a rule of thumb, the number of instruments exceeds the number of groups (i.e. countries). This is the case in this analysis because there are a relatively large number of years which increases the instrument matrix. However, this does not affect the coefficient estimates (Roodman 2006) and the results in Table 5 are not sensitive to reducing the number of lagged instruments used in the GMM estimation strategy.

negative and significant. Comparing the IV and GMM results, the coefficients on employment protection in the total sales regressions (column 1) are virtually identical. However, in columns 2-4 the IV results are more negative than the analogous results in the GMM specification. This may be due to the fact that the dynamic panel GMM specification controls for lagged affiliate sales.

Despite utilizing very different estimation and identification strategies, the key results in Tables 2 and 3 are remarkably similar and robust. Overall, these results support the first prediction of the race to the bottom hypothesis and provide compelling evidence that employment protection legislation decreases FDI. In addition, these results also show that employment protection rules have a more negative impact on the relatively mobile types of FDI. This is an important result and indicates that the response of multinational firms to employment protection rules depends on the type of FDI.

### 5.3 Hypothesis 2: OLS

The results so far indicate that FDI increases as labor standards are relaxed, which provides a motivation for countries to competitively undercut each other's labor standards. To test this second race to the bottom hypothesis, I estimate the impact of employment protection rules in competing foreign countries on the host country's own employment protection rules.

Table 4 reports the baseline OLS results from estimating equation 3. The dependent variable is host country employment protection and the key independent variable is *Competitor\_EP* which is the average of employment protection in other foreign countries. As discussed previously, *Competitor\_EP* is constructed as an unweighted average in column 1, a weighted average based on the inverse of distance in column 2, and a weighted average using affiliate sales in column 3. In all specifications, the coefficient on *Competitor\_EP* is positive and significant at the one percent level. Specifically, a one percent reduction in *Competitor\_EP* leads the host country to lower their own employment protection rules by 1.8% in the unweighted specification and 1.1% in the weighted specifications.

In addition, the coefficients on the control variables are significant and of the expected sign. Employment protection is increasing with GDP, population, tax rate, and ideology and is decreasing with skill, wages, NAFTA, and unions. Overall, the results in Table 4



provide strong support for the second prediction of the race to the bottom hypothesis and indicate that countries are competitively undercutting each other's labor standards.<sup>26</sup>

#### 5.4 Hypothesis 2: IV and GMM

Table 5 reports the IV results from estimating equation (3) and the Arellano-Bond GMM results from estimating the dynamic panel model in equation (4). The IV results in Panel A indicate that the employment protection rules in other countries have a positive and significant impact on the host country's employment protection rules. This finding is robust to all three weighting measures. Specifically, a one percent decrease in *Competitor\_EP*, leads to between a 1.6 and a 2.9 percent decrease in the host country's employment protection rules depending on which weighting method is used.

Panel B reports the first stage IV results. As discussed previously, *Competitor\_EP\_IV* is constructed by first regressing employment protection on ideology and union. The fitted values from this regression are then averaged using the same three weighting methods used to construct *Competitor\_EP*. This instrument identifies the variation in competitors employment protection rules that is driven by country specific changes in ideology and unions. The results in Panel B show that the instrument has a positive and significant impact on the analogously weighted *Competitor\_EP*. The first stage F-stat on the instrument is above 30 in all of these specifications, which indicates a relatively strong instrument.

Finally, Panel C in Table 5 reports the Arellano-Bond GMM results with the implied long-run elasticity on *Competitor\_EP* reported at the bottom of the table. Once again, *Competitor\_EP* has a positive impact on the host country's employment protection rules. In addition, the coefficients on the lagged host country employment protection variable are positive and significant which indicates, as expected, that these labor market regulations are persistent over time. The high p-values on the Hansen J and second order autocorrelation (AR2) tests indicate that the lags of the dependent variables are in fact exogenous and are thus good instruments.

The coefficients on *Competitor\_EP* in these IV and GMM specifications are slightly

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<sup>26</sup>In addition, analogous results show that both the hiring and firing components of competitor employment protection are significant individually.

more positive than the OLS results in Table 4. Thus, if anything, the OLS results are attenuated which indicates no evidence of a spurious positive bias in these baseline results. This mitigates concerns that the results are driven by a common trend across countries towards greater labor market flexibility which would lead to a spurious positive bias in the OLS coefficients and might not be accounted for due to the inability to include year fixed effects. The IV and GMM specifications overcome this concern by identifying exogenous sources of variation in *Competitor\_EP*. Thus, the IV and GMM specifications eliminate these endogeneity concerns and still show that *Competitor\_EP* has a positive and significant impact on the host country’s employment protection rules.

Overall, the results in Tables 4 and 5 provide strong support for the second prediction of the race to the bottom hypothesis. The significant positive coefficients on *Competitor\_EP* and the fact that employment protection rules are on average decreasing (see Figure 1) indicate that countries are competitively undercutting each other’s labor standards. This key finding is robust to three different weighting schemes and to three different estimation strategies.<sup>27</sup>

## 6 Extensions

The following extensions and robustness checks provide additional insight into the key relationships identified in this paper. Specifically, an industry level analysis, an alternate time fixed effects estimation strategy, and a restricted European sample are discussed.

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<sup>27</sup>In a related paper, Buera, Monge-Naranjo, and Primiceri (2011) find that countries learn about how market oriented policies affect GDP from their own past experiences and those of their neighbors. My paper has a narrower focus that examines how one type of market oriented policy, namely labor market flexibility, affects one component of GDP, namely FDI. However, the results in Table 5 could be interpreted more broadly as countries *learn* from their past experiences and other country’s experiences that lowering employment protection rules attracts FDI. Alternatively, it would be more troubling if this learning about market oriented policies is a separate channel that might explain the downward trend in employment protection. However, the inclusion of numerous institutional controls (including a measure of openness which is used by Buera et al. (2011) as their proxy for market oriented policies), the inclusion of time fixed effects (discussed in greater detail in section 6.2), and the use of IV and GMM approaches to address endogeneity, mitigate concerns that trends in labor market flexibility are driving my results.

## 6.1 Foreign Affiliate Sales by Industry

This section examines whether the impact of employment protection on foreign affiliate sales differs across industries. For instance, changes in employment protection rules should have a larger impact on sales in labor intensive industries than on sales in capital intensive industries. Thus, this industry level analysis will provide an additional check on the first prediction of the race to the bottom hypothesis.

There are a number of issues with the industry level data from the BEA that complicate this types of analysis. First, the publicly available BEA data only provides U.S. total affiliate sales for 13 industries at the foreign country level. Second, the BEA provides data on affiliate sales by country and destination or by country and industry, but not by country, destination, and industry. So the distinction between horizontal, export platform, and vertical FDI is not possible in the industry analysis. Third, due to a change in industry classification, affiliate sales data by industry are only available post 1998 which significantly reduces the sample. Finally, due to confidentiality concerns the BEA withholds some of the industry level FDI data.

Equation (1) is modified so that total affiliate sales now varies by country, year, and industry. In addition, industry fixed effects are included and the standard errors are clustered at the country-year level to account for the possibility that the error terms are now correlated since the dependent and independent variables are at different levels of aggregation. This industry level analysis is estimated using the more conservative and transparent OLS specification.

The results from this industry level analysis are reported in Table 6. Column 1 includes all 13 industries in the 26 countries in the sample and spans the 9 years for which data is available. The results in column 1 confirm earlier findings that employment protection rules reduce affiliate sales. Specifically, a one percent increase in employment protection decreases total affiliate sales by 0.5%.

Columns 2-4 in Table 6 separately estimate the impact of employment protection on affiliate sales in labor intensive, middle intensity, and labor unintensive industries.<sup>28</sup> Not

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<sup>28</sup>The labor intensity of these industries is measured using data from the U.S. Census Bureau: <http://www.census.gov/econ/census02/data/ratios/index.htm>.

surprisingly, employment protection rules have a large, negative, and significant impact on affiliate sales in labor intensive industries (column 2). Employment protection has a smaller but still negative impact on sales in the middle intensity industries (column 3) but no impact on sales in the labor unintensive industries (column 4). Thus, FDI in labor intensive industries, such as machinery manufacturing and professional services, is quite sensitive to employment protection rules, while FDI in labor unintensive industries, such as food manufacturing and chemical manufacturing, is unaffected by employment protection rules. Overall, these industry level results are consistent with expectations and provide additional support for the first race to the bottom hypothesis.

## 6.2 Time Fixed Effects

One potential concern with using decade fixed effects when testing the second race to the bottom prediction is that this may not adequately control for trends in the data. Ideally year fixed effects would be included, however, as is noted in the spatial econometrics literature (Davies and Vadlamannati 2013), this is problematic when spatial lags are included in the specification.

The issue is that with year fixed effects, the only variation in *Competitor\_EP* comes from the composition of the countries included in the average. For instance, a country with a high employment protection level will have a relatively low *Competitor\_EP* value because it's own value is not included in the average. Conversely, a country with a low employment protection level will have a relatively a high *Competitor\_EP* value. Thus, by construction there is a negative relationship between host employment protection and *Competitor\_EP* when year fixed effects are included.

To more clearly illustrate this point, Panel A in Table 7 reports results from estimating equation (3) using year fixed effects rather than decade fixed effects. In all three columns a negative relationship is evident between host employment protection and *Competitor\_EP*. In addition, not surprisingly the unweighted average (column 1) generates the most negative

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According to the Census data, Professional Services, Information, Machinery Manufacturing, and Metal Manufacturing are labor intensive industries. Computer Manufacturing, Electrical Equipment Manufacturing, Finance & Insurance, Transportation Equipment Manufacturing, and Mining are middle intensity industries. Finally, Utilities, Food Manufacturing, Chemical Manufacturing, and Wholesale Trade are labor unintensive industries. The results in Table 6 are robust to alternate industry classifications.

results. The results in column 2 and 3 are less negative because the distance and sales weighting methods of construction generate additional variation in *Competitor\_EP* other than simply the exclusion of the host countries own employment protection value. Therefore, the built in negative relationship between host country employment protection rules and *Competitor\_EP* is less pronounced. Overall, the results in Panel A indicate that, as expected, including year fixed effects is problematic when estimating a spatial econometric specification.

Panel B of Table 7 includes five year period fixed effects instead. This is a compromise between the annual fixed effects from Panel A and the decade fixed effects used in the baseline specification. It controls for trends in the data but avoids the issues associated with including year fixed effects. With the five year fixed effects, once again the coefficient on *Competitor\_EP* is positive and significant in all the specifications. These results are reassuring and indicate that the negative relationship in Panel A is an artifact of the construction of the *Competitor\_EP* variable and quickly dissipates when longer time fixed effects are used.

### 6.3 European Sample

Given the concerns about pooling a diverse set of countries (Blonigen et al. 2007), the sample is limited to just European countries in this robustness check. This addresses fears that the response of FDI to employment protection or the spatial dependence of employment protection is sensitive to the composition of countries used in the analysis.

First, the implications of employment protection on FDI is examined. Specifically, Panel A of Table 8 tests the first prediction of the race to the bottom hypothesis using just the European countries. Like the baseline results in Table 2, employment protection has a negative and significant impact on total foreign affiliate sales. Furthermore, employment protection has an increasingly negative impact on horizontal, export-platform, and vertical affiliate sales. Thus, despite significantly reducing the sample size, the results including just European countries are consistent with the baseline results and provide additional evidence in support of the first race to the bottom hypothesis.

Second, Panel B of Table 8 tests the second prediction from the race to the bottom

hypothesis. The results using just these European countries are consistent with the baseline results reported in Table 4. The coefficient on *Competitor\_EP* is positive and significant at the one percent level regardless of which weighting method is used. As competitor's labor standards are lowered, the foreign host country decreases their own employment protection rules in response. Overall, the results in Tables 8 indicate that the key findings of the paper are robust to restricting the sample to just European countries.

## 7 Conclusion

There are two implicit assumptions in the race to the bottom hypothesis. The first is that multinationals increase FDI in response to reductions in employment protection rules in the foreign host country. The second assumption is that countries competitively undercut each other's labor standards in order to attract FDI.

The empirical results presented in this paper are consistent with both predictions of the race to the bottom hypothesis. First, employment protection rules have a significant negative impact on FDI. In addition, employment protection rules have a more negative impact on the relatively mobile types of FDI. Specifically, employment protection legislation in the host country has small impact on horizontal FDI, a more substantial negative impact on export-platform FDI, and a large, negative impact on vertical FDI. These results are consistent across a variety of different estimation strategies.

Second, this paper examines whether labor standards in other foreign countries affect the employment protection rules in the foreign host country. Regardless of the weighting method or the estimation strategy, the results indicate a significant positive impact on the host country's own employment protection rules. Thus, there is evidence that countries are competitively undercutting each other's labor standards in order to attract foreign investment. Overall, this paper finds support for both predictions of the race to the bottom hypothesis. Multinationals invest in countries with lower labor standards and countries respond by competitively undercut one another's labor standards in order to attract FDI. At the very least, the results in this paper indicate that a race to the bottom in labor standards cannot be easily dismissed by economists, as is often the case.

Whether a race to the bottom is a desirable outcome depends on one's view of employment protection rules. If labor market standards are necessary to protect the rights of workers, then these results are discouraging. Multinationals are investing in countries with the least restrictive regulatory standards and this is promoting a race to the bottom. However, if labor standards are undesirable and hinder economic flexibility and growth, then the finding that countries are competitively lowering employment protection rules is encouraging. Attracting foreign investment provides an incentive for countries to liberalize their labor markets. Regardless of ones perspective on labor standards, this paper provides important new evidence that employment protection rules decrease FDI and that countries are competitively lowering their labor standards.

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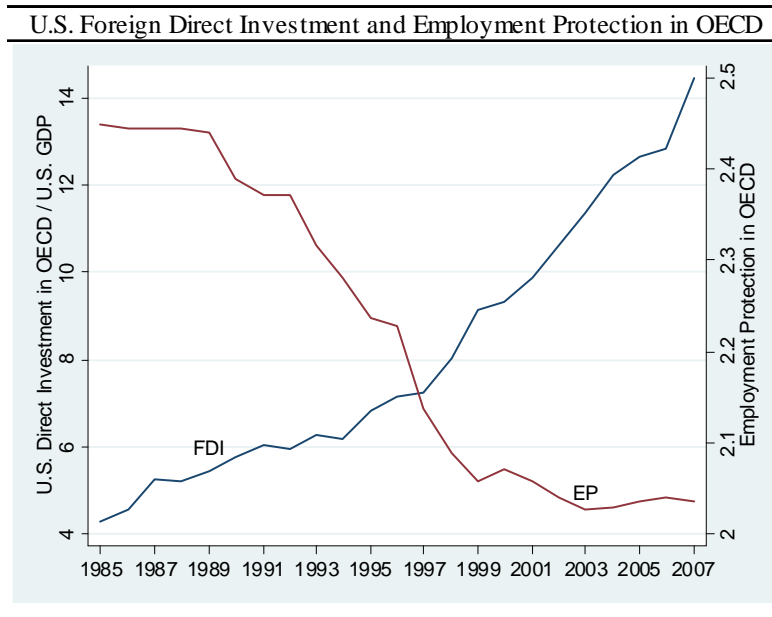
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FIGURE 1



Data on U.S. Direct Investment to OECD countries is obtained from the BEA. Employment protection is a composite index of hiring and firing costs obtained from the OECD.

TABLE 1

Variable	Summary Statistics				
	Observations	Mean	Standard Deviation	Minimum	Maximum
Total Affiliate Sales (\$m)	556	71,364	96,918	1,165	586,295
Employment Protection	560	2.2	1.0	0.6	4.2
GDP (\$m)	582	627,057	709,352	43,425	3,618,565
Population (thousands)	598	31,543	31,937	3,272	127,787
Trade Costs	593	0.021	0.011	0.006	0.068
Skill	598	9.4	1.9	4.0	13.1
Tax Rate	549	33.4	9.7	8.5	56.0
Investment Costs	590	0.018	0.003	0.012	0.027
Wages (Index)	570	80.5	24.0	0.0	121.8
Union	558	35.2	20.0	6.6	83.9
Ideology	590	2.1	0.5	1.2	3.0

The sample includes 26 OECD countries and 23 years (1985-2007).

FIGURE 2

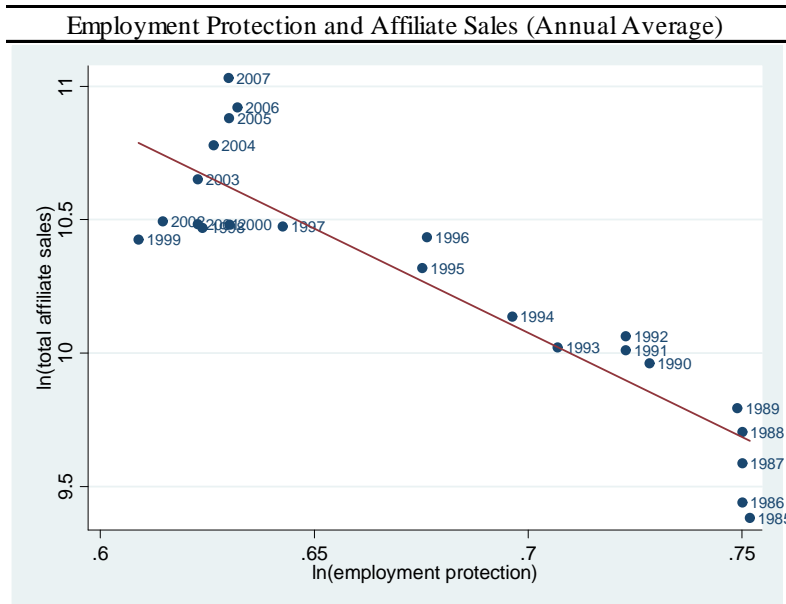


FIGURE 3

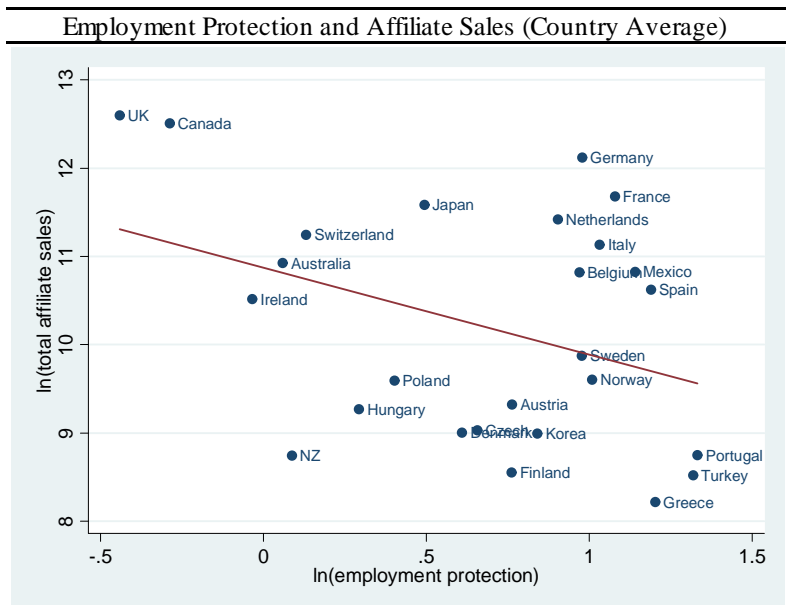


FIGURE 4

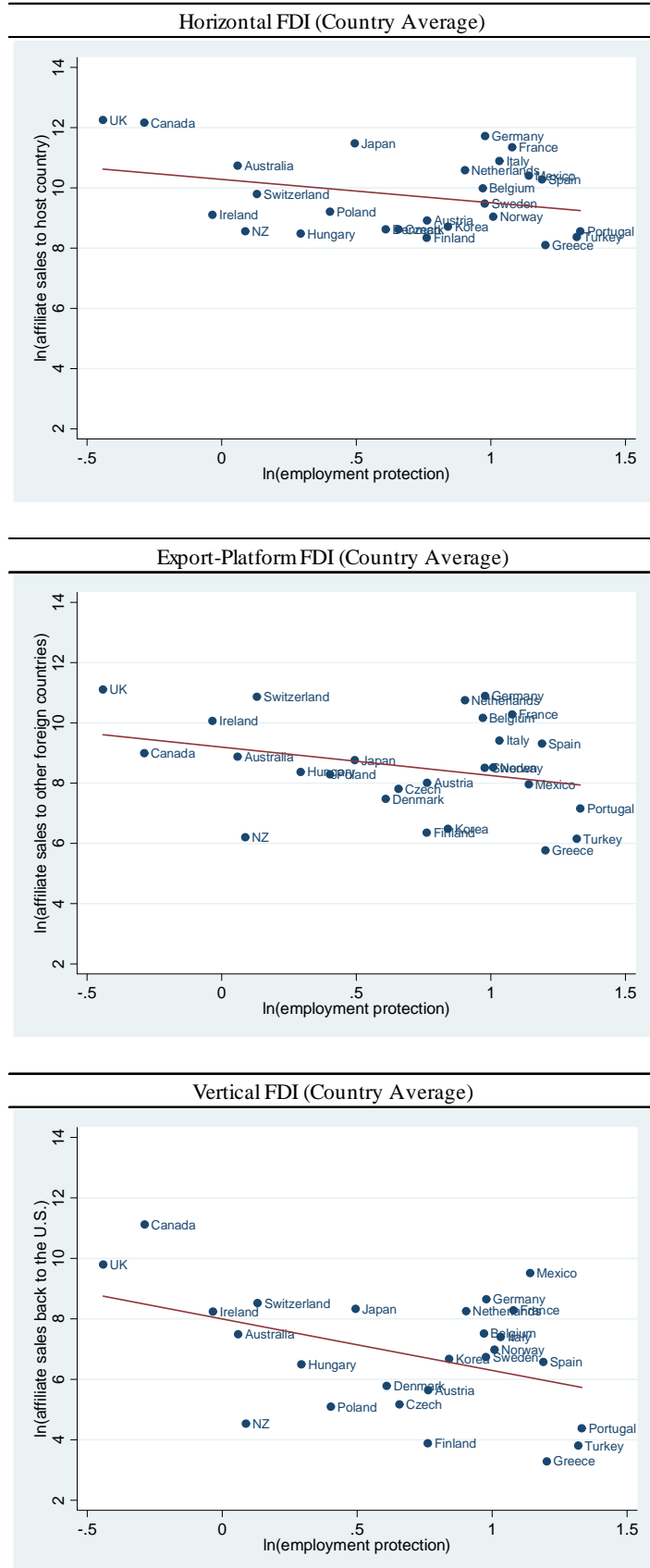


FIGURE 5

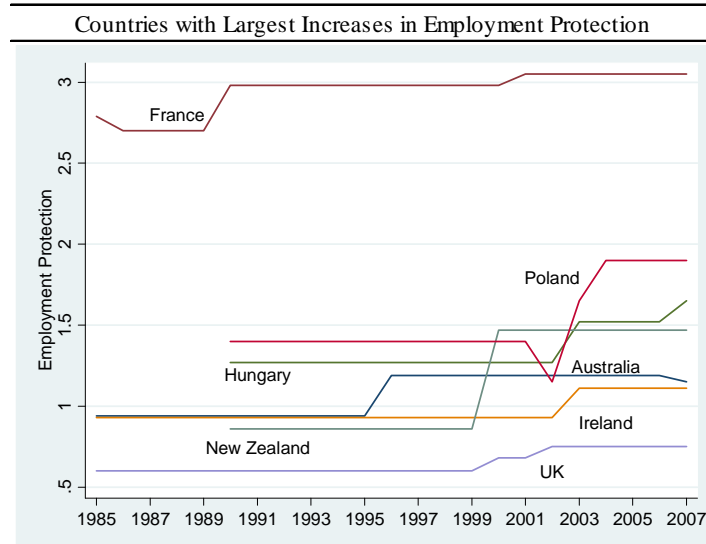
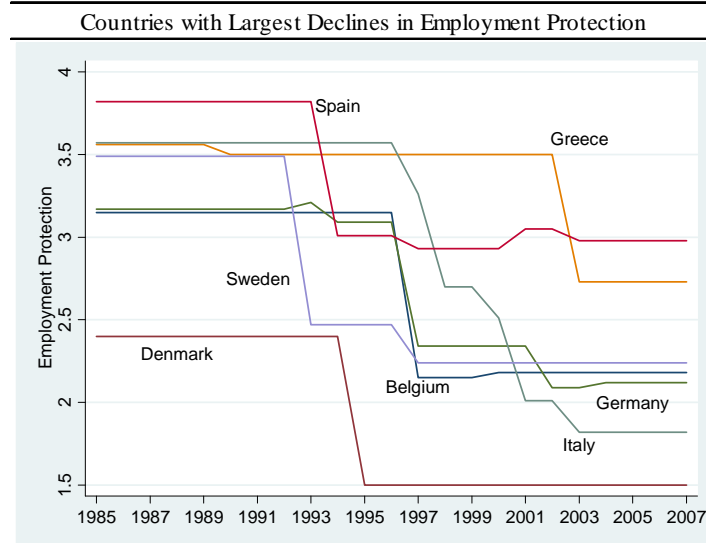
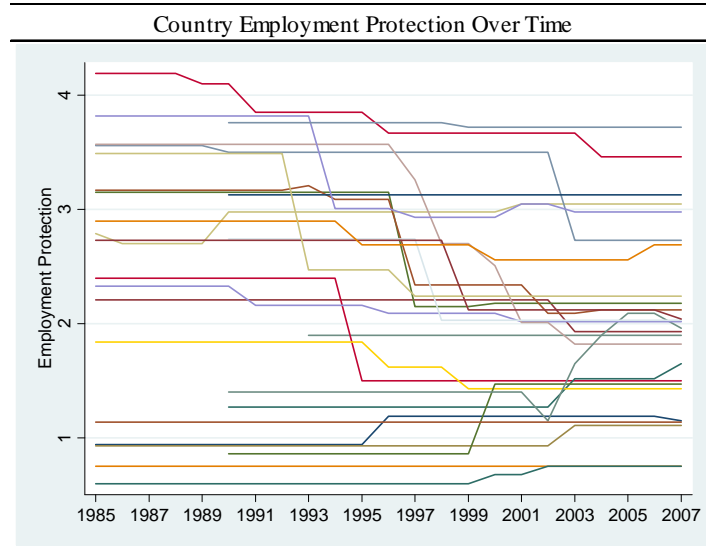


TABLE 2  
Impact of Employment Protection on Foreign Affiliate Sales by Destination (OLS)

	Total Sales	Local Sales	Foreign Sales	U.S. Sales
	(1)	(2)	(3)	(4)
Employment Protection $t-1$	-0.217*** [0.054]	-0.192*** [0.049]	-0.219* [0.120]	-0.802*** [0.217]
GDP $t-1$	1.681*** [0.136]	1.974*** [0.146]	0.104 [0.329]	0.968 [0.708]
Population $t-1$	-0.045 [0.483]	-0.309 [0.514]	2.941*** [1.003]	1.839 [1.785]
Trade Costs $t-1$	-0.613*** [0.121]	-0.327** [0.128]	-1.852*** [0.252]	-2.021*** [0.448]
Skill $t-1$	-0.746*** [0.129]	-0.516*** [0.119]	-1.568*** [0.314]	-2.168*** [0.613]
Tax Rate $t-1$	-0.106* [0.055]	-0.084* [0.050]	-0.078 [0.128]	-0.428* [0.244]
Investment Costs $t-1$	-0.289* [0.164]	-0.285* [0.166]	-1.573*** [0.552]	-3.339*** [1.083]
Wages $t-1$	0.127*** [0.045]	0.200*** [0.043]	0.039 [0.117]	-0.576** [0.227]
NAFTA $t-1$	-0.028 [0.058]	-0.016 [0.065]	-0.065 [0.135]	-0.097 [0.186]
EU $t-1$	0.192*** [0.040]	0.080** [0.032]	0.577*** [0.107]	0.690*** [0.248]
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	485	467	477	459
R-squared	0.991	0.991	0.967	0.93

Robust standard errors in brackets. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All variables, except the NAFTA and EU dummies, are in natural logs. The dependent variable is U.S. foreign affiliate sales. 'Total Sales' are affiliate sales to all locations, 'Local Sales' are affiliate sales within the host country, 'Foreign Sales' are affiliate sales to other foreign countries not including the U.S. or the host country, and 'U.S. Sales' are affiliate sales back to the U.S.



TABLE 3  
Impact of Employment Protection on Foreign Affiliate Sales by Destination (IV & GMM)

Panel A: IV Results				
	Total Sales	Local Sales	Foreign Sales	U.S. Sales
	(1)	(2)	(3)	(4)
Employment Protection $t-1$	-0.557*** [0.124]	-0.394*** [0.125]	-1.219*** [0.415]	-2.376** [0.984]
Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	477	459	469	451
R-squared	0.99	0.991	0.963	0.925
Hansen J p-value	0.0833	0.0776	0.342	0.0272
Panel B: First Stage IV Results (Dep. Var. - Employment Protection $t-1$ )				
Ideology $t-1$	0.083*** [0.024]	0.081*** [0.024]	0.082*** [0.024]	0.080*** [0.024]
Union $t-1$	-0.428*** [0.044]	-0.420*** [0.044]	-0.426*** [0.045]	-0.420*** [0.045]
Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
F-Stat, Instruments	54	51	53	50
Panel C: Arellano - Bond GMM				
Employment Protection $t-1$	-0.111** [0.051]	-0.072 [0.065]	-0.182** [0.088]	-0.573*** [0.196]
Lagged Sales	0.794*** [0.032]	0.671*** [0.056]	0.663*** [0.040]	0.566*** [0.110]
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	456	415	432	395
Hansen J p-value	1	1	1	1
AR2 p-value	0.607	0.0901	0.184	0.988
Implied Long-Run Elasticity:				
Employment Protection $t-1$	-0.540** [0.257]	-0.218 [0.197]	-0.540* [0.281]	-1.320** [0.640]

Robust standard errors in brackets. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All variables are in natural logs. The dependent variable in panels A and C is U.S. foreign affiliates sales in period  $t$ . 'Total Sales' are affiliate sales to all locations, 'Local Sales' are affiliate sales within the host country, 'Foreign Sales' are affiliate sales to other foreign countries not including the U.S. or the host country, and 'U.S. Sales' are affiliate sales back to the U.S.

TABLE 4  
Impact of Competitor Employment Protection on Host Employment Protection (OLS)

	Unweighted Average	Distance Weighted	Sales Weighted
	(1)	(2)	(3)
Competitor EP $t-1$	1.835*** [0.195]	1.123*** [0.125]	1.057*** [0.203]
GDP $t-1$	0.313*** [0.078]	0.228*** [0.076]	0.295*** [0.084]
Population $t-1$	1.944*** [0.308]	1.790*** [0.298]	1.348*** [0.294]
Trade Costs $t-1$	-0.081 [0.071]	-0.039 [0.069]	0.036 [0.073]
Skill $t-1$	-0.434*** [0.089]	-0.448*** [0.085]	-0.577*** [0.095]
Tax Rate $t-1$	0.289*** [0.042]	0.257*** [0.041]	0.277*** [0.046]
Investment Costs $t-1$	0.008 [0.120]	-0.016 [0.120]	0.013 [0.127]
Wages $t-1$	-0.075** [0.031]	-0.064** [0.031]	-0.055* [0.032]
NAFTA $t-1$	-0.069** [0.030]	-0.102*** [0.030]	-0.040 [0.031]
EU $t-1$	0.026 [0.023]	0.049** [0.024]	0.013 [0.024]
Ideology $t-1$	0.059** [0.023]	0.052** [0.023]	0.030 [0.024]
Union $t-1$	-0.419*** [2.950]	-0.392*** [2.745]	-0.395*** [2.718]
Country FE	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes
Observations	489	489	489
R-squared	0.962	0.962	0.959

Robust standard errors in brackets. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All variables are in natural logs. The dependent variable is employment protection in the host country. The competitor's employment protection variable is the average of employment protection in other foreign countries, which is calculated as an unweighted average, a weighted average using the inverse of distance, and a weighted average using affiliate sales.

TABLE 5  
Impact of Competitor Employment Protection on Host Employment Protection (IV & GMM)

Panel A: IV Results			
	Unweighted Average	Distance Weighted	Sales Weighted
	(1)	(2)	(3)
Competitor EP $t_{-1}$	1.609** [0.728]	1.711*** [0.483]	2.859*** [0.670]
Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes
Observations	489	489	489
R-squared	0.962	0.96	0.952
Panel B: First Stage IV Results (Dep. Var. - Competitor EP $t_{-1}$ )			
Competitor EP IV $t_{-1}$	0.873*** [0.115]	1.087*** [0.179]	1.177*** [0.176]
Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes
F-Stat, Instruments	58	37	45
Panel C: Arellano - Bond GMM			
Competitor EP $t_{-1}$	0.444*** [0.123]	0.241*** [0.083]	0.178* [0.097]
Lagged EP	0.856*** [0.025]	0.860*** [0.025]	0.878*** [0.023]
Controls	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes
Observations	463	463	463
Hansen J p-value	1	1	1
AR2 p-value	0.286	0.429	0.337
Implied Long-Run Elasticity:			
Competitor EP $t_{-1}$	3.085*** [0.841]	1.729*** [0.580]	1.462 [0.883]

Robust standard errors in brackets. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All variables are in natural logs. The dependent variable is employment protection in the host country. The competitor's employment protection variable is the average of employment protection in other foreign countries, which is calculated as an unweighted average, a weighted average using the inverse of distance, and a weighted average using affiliate sales.

TABLE 6  
Impact of Employment Protection on Foreign Affiliate Sales by Industry (OLS)

	All Industries	Labor Intensive	Middle	Labor Unintensive
	(1)	(2)	(3)	(4)
Employment Protection $t-1$	-0.538*** [0.194]	-0.747*** [0.175]	-0.505** [0.223]	-0.231 [0.467]
Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	3,039	854	1,379	806
R-squared	0.767	0.804	0.753	0.834

Robust standard errors clustered at the country-year level in brackets. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All variables are in natural logs. The dependent variable is total U.S. foreign affiliate sales. Column (1) includes all 13 industries, column (2) includes the 4 most labor intensive industries (Professional Services, Information, Machinery Manufacturing, and Metal Manufacturing), column (3) includes the 5 middle intensity industries (Computer Manufacturing, Electrical Equipment Manufacturing, Finance & Insurance, Transportation Equipment Manufacturing, and Mining), and column (4) includes the 4 least labor intensive industries (Utilities, Food Manufacturing, Chemical Manufacturing, and Wholesale Trade).

TABLE 7  
Impact of Competitor Employment Protection on Host Employment Protection with Time FE (OLS)

Panel A: With Year FE			
	Unweighted Average	Distance Weighted	Sales Weighted
	(1)	(2)	(3)
Competitor EP <sub>t-1</sub>	-15.134*** [1.013]	-0.295 [0.199]	-7.590*** [0.482]
Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	489	489	489
R-squared	0.984	0.971	0.979
Panel B: With 5-Year Time FE			
Competitor EP <sub>t-1</sub>	1.084*** [0.301]	0.698*** [0.154]	0.473** [0.228]
Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
5-Year Period FE	Yes	Yes	Yes
Observations	489	489	489
R-squared	0.965	0.965	0.964

Robust standard errors in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All variables are in natural logs. The dependent variable is employment protection in the host country. The competitor's employment protection variable is the average of employment protection in other foreign countries, which is calculated as an unweighted average, a weighted average using the inverse of distance, and a weighted average using affiliate sales.

TABLE 8  
European Sample (OLS)

Panel A: RTB 1				
	Total Sales	Local Sales	Foreign Sales	U.S. Sales
	(1)	(2)	(3)	(4)
Employment Protection $t-1$	-0.178*** [0.062]	-0.131** [0.055]	-0.212* [0.127]	-0.966*** [0.245]
Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	381	366	373	358
R-squared	0.992	0.993	0.974	0.911

Panel B: RTB 2			
	Unweighted Average	Distance Weighted	Sales Weighted
	(1)	(2)	(3)
Competitor EP $t-1$	1.809*** [0.224]	1.121*** [0.143]	1.010*** [0.228]
Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes
Observations	388	388	388
R-squared	0.957	0.956	0.953

Robust standard errors in brackets. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All variables are in natural logs. The sample is restricted to only European countries. Panel A tests the first race-to-the-bottom hypothesis while Panel B tests the second race-to-the-bottom hypothesis.