Coen Louis Buvelot
No. 386654
Master thesis

Faculty: Economics and Business Economics
Supervisor: dr. J. Emami Namini

# The effect of import tariffs on the race to the bottom in employment protection standards

ABSTRACT: This paper tests the effect of import tariffs on the race to the bottom in employment protection standards (EPS). It builds in the hypothesis that countries compete for FDI and use depreciation of EPS as a means to lure MNEs. The paper first tests the effect of tariff rates and EPS on FDI inflow on a panel dataset of twenty six countries covering twenty three years. The marginal effects were opposite in signs as predicted: positive for tariff rates and negative EPS. Thereafter, it constructs a spatial autoregression model correlating EPS in the host country to a space time lag of EPS in foreign countries. The effect is positive, confirming the race to the bottom hypothesis. The interaction term between the space time lagged EPS and tariff rates is added to the model, which shows that the autoregressive strength increases as tariff rates decrease.

*For my parents*

# CONTENTS

# 1. INTRODUCTION

In recent Western and specifically European history, international trade has been used as a mechanism to promote peace. Immediately after the Second World War, international institutions emerged, fostering trade, prosperity and equally important: interdependence. Most prominently, these aims resulted in the foundation of the European Coal and Steel Community, which was the first of a series of supranational European institutions ultimately resulting in what we now call the European Union (Fontaine, 2000). Although such institutions' prime functions were of economic nature, their ultimate purpose were to "make war not only unthinkable but materially impossible" (Schuman, 1950). Their efforts have borne fruit. Western Europe has been spared of armed conflict since the commencement of the integration project, and expanding global trade has raised global incomes (Anon., 2016).

Despite the implied accomplishments of the institutionalization of international trade and the imminent reduction of trade barriers, enthusiasm for globalization now seems to be receding (Stiglitz, 2016; Greenberg, 2016). In its 2016 article *The consensus crumbles*, the British newspaper the Economist refers to the Brexit vote in June of that year as a recent example of decreasing enthusiasm on trade and international integration. Additionally, even just in the year 2016, there have been myriad events indicating an international popular movement in the same spirit. In the Netherlands, the population voted against a trade and association agreement between the European Union and Ukraine in a national referendum on the issue in April (Antoaneta & Kortenska, 2017). In the United States, Democratic presidential candidate Hillary Clinton, searching for popular support denounced the draft of TTIP and TTP in August, after her opponent the Republican Donald Trump had done so since the beginning of his campaign, leaving hopes for the transatlantic trade deal much advocated by incumbent president Barack Obama all but dead (Jain, 2017). As one of his first moves in office, Trump ordered the withdrawal of TPP by decree, signalling he will indeed "put trade protectionism at the heart of his economic policy" (Sevastopulo, et al., 2017). In Europe, Clinton's and Trump's words regarding TTIP were echoed by German vice chancellor Sigmar Gabriel, facing federal elections in 2017, stating that: "[i]n [his] opinion, the negotiations with the United States have de facto failed, even though nobody is really admitting it" (as cited by Wallace, 2016). By contrast, the trade deal between the European Union and Canada, CETA, is likely to become implemented despite the Wallonian parliament passing a resolution against the deal, which requires unanimous agreement of all 28 EU member states (Rankin, 2016). On the day that Donal Trump withdrew the United States from the TTP agreement, the European Parliament endorsed the preliminary CETA agreement in a first vote to have it adopted mid-February. However crucially, CETA is qualified as a 'mixed-agreement' which requires it to be ratified by all 36 national- and regional parliament before becoming permanent legislation (Kleimann & Kübek, 2016). With elections taking place in various member states in 2017 and Eurosceptics polling well, the future of CETA is yet unclear (Farrell & Newman, 2017).

Although the pattern may be obvious, the causes of the popular uprising against free trade are not. Within the wide variety of objections in the social discourse coined by a diverse spectrum of social groups against the trade deals, the fear of devaluation of labour standards seems to be a common denominator. Regarding both TTIP and TTP Sachs (2016) explains the turning sentiment by stating that "[t]he protection to workers on labor standards and human rights seem to many to be very weak and insufficient". Interestingly, criticism along the same lines is voiced at the other side of the Atlantic. Jeremy Corbyn, leader of the labour party in the United Kingdom, publically addressed prime minister David Cameron demanding him to block TTIP on the grounds that it "threatens our public services, our consumer and employment rights and that hands over power to giant corporations to override democratically elected governments" (Corbyn, 2016). He shares these concerns with the head of the British Trade Union Congress (TUC), Frances O'Grady, who states that US workers are "disadvantaged compared to social provisions in the EU" (as cited in Bermingham, 2014) and that the deal would lead to a levelling down of labour standards as a result. Scottish National Party MP Alyn Smith goes even further when he states that the trade deals give advantages to multinationals "that then set state against state in a game of who can pay the least tax, and use labour laws as a race to the bottom" (Smith, 2016). In the Wallonian parliament, where the implementation of the CETA agreement between Canada and the European Union was blocked, the prime minister, Paul Magnette, defended the vote by stating that the trade agreement "is full of good intentions, on human rights, environmental protection, labour law, on the capacity to regulate, [...] [t]his all goes into the right direction. But as it is framed today this interpretative declaration is not enough" (as cited in Brunsden, 2016). Also in the Netherlands, protection of labour standards were a topic in the public debate on the association agreement with Ukraine. Schrijver (2016 expressed his concerns as: "Ukraine will slowly be integrated in the European internal market, which is in essence a race to the bottom. [...] It is usually defended by stating it's 'good for the Dutch economy', but tends to benefit those who are well off to begin with, whereas the wages and the labour laws of the common man will be under pressure" (Schrijver, 2016)[1].

So where does this popular need to have increasing international trade integration go hand in hand with labour standard protection come from? In the work of Dani Rodrik one may find a suggestion on the latent relation between economic integration and national legislation regarding labour standards. In the article *How Far Will Economic Integration Go?* (2000), he postulates that the deepening of economic integration requires laws and regulations to be harmonized between countries. Rodrik speaks of a 'trilemma': societies cannot be (1) democratic; (2) completely sovereign; and (3) globally integrated – they will have to opt for two of the three. In the case of the subject of this thesis that implies that societies will either have to (1) accept an erosion of their democracies, and the aforementioned popular movements against further international integration to be ignored. Alternatively, they can (2) follow up

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[1] Translated from Dutch

to the popular demand to obstruct the process of further integration, or (3) infringe on the idea that the sovereignty of the nation state is absolute, and accept that laws regulating the labour standards must be regulated on a supranational level.

The aim of this paper is to see if Rodrik's globalisation trilemma holds, if one accepts the social desirability of a basic level of labour standards. It does so, by building on a model developed by William Olney (2012) in the article *A Race to the Bottom? Employment Protection and Foreign Direct Investment*. In this article, Olney shows that Foreign Direct Investment (FDI) and labour standards are negatively correlated and as such, individual countries may attract FDI by decreasing the level of their labour standards. For there are a variety of benefits for countries in the attraction of FDI, countries adopt these policies. Olney continues to show that labour standards among countries are interconnected, and they are engaged in what he calls 'a race to the bottom' in their competition for FDI (Olney, 2013).

This research expands the model of Olney by also introducing import tariffs to the models. Firstly, it will show that while the level of national employment protection standards is indeed negatively correlated with FDI inflow, the level of protection of the economy in the form of import duties is actually positively correlated with FDI. Secondly, it will show that as the import duties between countries decrease, the interconnectedness of their labour standards increases. Returning to Rodrik's globalisation trilemma, this means that societies are steering towards a fundamental choice. Popular uprising against economic integration is becoming more vocal, and already in the Netherlands we have seen the democratic consequences of a referendum to be ignored. However, there are two more possible outcomes: we may maintain control over the level of labour standards by turning the tide on economic integration and return to protectionist measures. In his original paper, Rodrik advocates the third possibility: to pair increasing globalisation with supranational regulation. In this instance, this would imply that lower import boundaries should be supported by international agreements on labour standards.

This paper is organised as follows. Section two will provide the reader with an overview of the academic landscape. In section three the set-up of the hypotheses and their theoretical background are discussed, as well as the institutional and behavioural assumptions and how they may influence the results. Section four elaborates on the specification of the empirical model. Section five discusses the data used in the regression model, the sources and the construction of the variables. Section six provides the descriptive statistics, followed by the results in section seven. Finally, section eight concludes with a discussion of the results, the policy implications and a suggestion for further research.

## 2. LITERATURE REVIEW

There is a vast amount written about the potentially negative effects of globalization, and the spatial autoregressive correlation of potentially socially desirable policies (now: 'race to the bottom'). Davies

and Vadlamannati (2013) name taxation and environmental regulation as arenas empirically demonstrated to be subject to such forces (see section 2.3). The literature is a lot less generous in suggesting counterweights to these empirically established developments. To the best of my knowledge, this is the first paper testing for the interaction effect between tariff rates as a means of protectionism and the race to the bottom hypothesis. To provide an anthology of the relevant academic landscape, this section will explore: (1) what is written about the benefits of FDI; (2) examples in the literature of instances where a 'race to the bottom' in labour standards (as an extension of employment protection standards) were found and linked to the pursuit of FDI; (3) the empirical evidence that import tariffs may be used as a tool to attract FDI; and lastly (4) what is written about protectionism as a tool to decrease to competitive force leading towards the race to the bottom in labour standards.

*2.1 The benefits of Foreign Direct Investment*

The literature regarding the impact of FDI on the host country's economy is extensive and diverse. I will elaborate on four different channels through which FDI is found to affect the host country's economy. Firstly, through access to capital, which is easier for MNEs either through internal channels or connectedness and an internationally renowned reputation (Hill, 2000). Consequently, FDI triggers a crowding in effect of domestic capital, which is found to be complementary (Jenkins & Thomas, 2002; Bosworth & Collins, 1999). Secondly, through technology spill over effects, which is probably the most pronounced benefit of FDI over domestic capital. The general concept entails that MNEs introduce not only foreign capital but also foreign technologies and processes in an economy which are adopted by local firms, enhancing their efficiency. Empirical investigations on this attribute of FDI were conducted by Hamida (2013), Garcia, et al. (2012), Ascani & Gagliardi (2014), and Szent-Ivanyi (2012). Thirdly, through an impact on employment and wages, directly and indirectly. Directly, the presence of multinationals affects employment by hiring of local employees, increasing wages through market mechanisms and consequently labour market participation. Indirectly, the presence of MNEs affects employment by local sourcing from sub-contractors and increased spending from (international) employees from the MNE. Research by the United Nations Conference on Trade and Development (UNCTAD) (1999) has shown that those effects are valid for both developing- and developed countries, yet the former tend to benefit more. For empirical research on the effect of FDI on wages in Europe and the United Kingdom see Marelli, et al. (2014) and Girma, et al. (2001). Fourthly, through the effect on trade and consequently the balance of payments. Kurtishi-Kastrati (2013) identifies three potential channels through which FDI may affect the balance of payments: (1) a one-time positive impact of the capital account of the host country at the moment of the initial capital inflow; (2) in the case of horizontal FDI, the local production is a substitute for imports of goods and services and thus affects the current account of the host country's balance of payments; and (3) in the case of export platform FDI, the

subsidiary is a source of exports to neighbouring countries, directly affecting the current account. An analysis of the effect of FDI on the balance of payments of Bangladesh is done by Hossein (2008).

Disregarding the academic debate on the precise mechanisms, the general consensus in the literature states that FDI leads to economic growth – yet in some cases more than in others. One of the first panel data analyses correlating FDI with economic growth was executed by Olofsdotter (1998), who concluded that FDI resulted in higher levels of economic growth in any case, but that correlations were stronger if host countries were in a better position to adopt foreign technology. Position enhancing in this regard was institutional capability, and especially bureaucratic efficiency. In a similar research Johnson (2006) performed a cross section and panel data analysis of ninety countries over 23 years, testing the theoretical hypothesis that FDI enhances growth through technology and physical capital inflows. The results show that for his sample, the FDI-growth correlation was stronger for developing countries than for developed countries, which would substantiate his claim that technology transfers are of lesser importance in developed economies, and FDI there thus has the same effect as domestic investment. Yet other intermediary variables are suggested by Ewing & Yang (2009), who investigated why FDI has affected the economic growth rate differently in eight US regions between 1977 and 2001. For some regions, they could discern no relationship between FDI and growth, whereas others experienced a strong positive correlation. They first suggest that the relative availability of human capital played an intermediary role (a concept popularized by Borensztein, et al (1998) and strongly related to the capability of a domestic economy to adopt foreign technology or processes). However, the strong impact of FDI on relatively educated local economies as the Great Lake Area and the absence of effect in the well-educated Mideast region would go unexplained. Alternatively, they suggest that either the unionization rate could intermediate the effect (however, they seem unclear themselves in what direction that would be), or the population (and especially, manufacturing) density, as higher density rates would more easily allow spill overs. Based on a panel data analysis, Alfaro, et al. (2004) conclude that the degree of effectiveness of FDI is amplified by local financial markets. Precisely, businesses in countries with undeveloped financial markets are unable to absorb the spill overs from FDI and thus the benefits are limited to 'only' the physical capital inflow. Similar to this paper, Beugelsdijk & Smeets (2008) distinguish vertical and horizontal FDI and test their respective effects on growth on 44 host countries from 1983 to 2003. They find that both types have positive effects on growth in developed countries, and no effect on growth in developing countries. They find that horizontal FDI has a larger effect on growth than vertical FDI in developed economies, presumably because the spill overs are generated in a more advanced stage of the production process.

Thus far, the articles reviewed agreed that FDI was positive for growth, yet disagreed in the mediating variable of why some countries benefited more than others. As case specific literature is ambiguous on this, we turn to meta-analyses for answers. In line with my own findings, the two selected meta-analyses

come to comparable conclusions, yet through different techniques. Meyer & Sinani (2009) apply competitive dynamics theory in order to analyse the effect of local firms' characteristics on the ability to absorb spill overs. Firms' awareness, motivation and capability to react to MNEs were found to be essential characteristics for adequate absorption; as these characteristics varied by the stage of development of the host economy, so did the benefits of FDI. Irsova & Havranek (2013) also find that the benefits of FDI are mitigated by the level of development of the host economy. More precisely, the largest spill over effects are generated as the technology gap between the host economy and the home economy of the MNE is modest. They conclude that spill over effects are zero on average, and may be negative if the technology gap is sufficiently wide.

From this section we conclude that FDI generally contributes to economic growth of the host economy. The instrument through which growth is affected is debated, but consensus exists that the effect of FDI on growth for developed economies can only be positive. As the sample in this research consists only of high- and high middle income countries, one expects these countries to rationally compete for FDI. Yet, this conclusion entails limitations for the external validity, which will be addressed in the discussion section.

*2.2 A race to the bottom in labour standards*

If one concludes that FDI generates positive externalities for the host country's economy, and accepts the premise that employment protection legislation constitutes a production cost that MNEs will prefer to avoid (this section will not address this issue in detail, but for an elaboration see Addison & Texeira (2003)), it is plausible that national governments will reduce employment protection standards in order to attract FDI. As mentioned, similar concerns are voiced regarding the comparable case of tax legislation, exposed by Stewart and Webb (2006):

> The intuition is simple and, at least at the level of popular debate and policy discussion, compelling: when corporations face fewer barriers to locating in the lowest tax jurisdiction, revenues from corporate taxation will shrink as governments are forced to cut taxes to compete for mobile capital and companies take advantage of increased opportunities for international tax avoidance. The implication is that in an era of economic globalization - that is, international economic integration and an accompanying increase in capital mobility - governments may find themselves drawn into an internecine 'race to the bottom' in capital taxation, undermining the financing of the welfare state and the provision of public goods generally (p. 153).

Note how one can substitute taxes for employment protection standards in the quote above without loss of validity. Empirical evidence has been found by Rodeano (2007) who studies a sample of EU countries and shows that an autoregressive relationship exists for corporate income taxes, but far less for income taxes. Moreover, she shows that large foreign countries impose stronger effects than smaller foreign countries. Duncan and Gerrish (2014) use a global sample to study the spatial autoregressive relation of

income tax and do find a positive correlation. Moreover, they find that countries react to an increase in foreign income tax rates by increasing their own, indicating a weak Nash equilibrium. For a meta-analysis of the empirical literature of the effect of globalization on capital taxation, see Adam, et al. (2013), and for a meta-analysis of the literature on tax competition Genschel & Schwarz (2011). Similarly, the production cost increasing effect of environmental regulations would be expected to result in a race to the bottom in order to attract FDI. Meta analyses of empirical investigation with this regard are done by Elliot & Zhou (2013) and Erdogan (2014).

As countries actually compete for certain kinds of FDI (i.e. vertical and export platform FDI), one logically comes to the conclusion that labour standards may be spatially autocorrelated. I note the following landmark articles in this regard. The first paper of interest regarding this 'race to the bottom' hypothesis is by Olney (2013), because the empirical model he develops serves as a blueprint for the one employed in this research. Olney constructs a dataset consisting of twenty six OECD countries covering the period from 1985-2007. He splits the race to the bottom theory in two hypotheses: (1) there is a negative correlation between FDI inflow and a host country's employment protection standards; and (2) employment protection standards are positively spatially autocorrelated to employment protection standards in 'competitor' countries. In order to extricate the effect on horizontal-, vertical- and export platform FDI, Olney uses data on US foreign enterprise sales as proxy for US FDI. He concludes that employment protection standards are strongly negatively correlated with vertical FDI, weakly so with horizontal FDI, and moderately with export platform FDI. At the estimation of his second hypothesis, he finds that employment protection standards are indeed positively spatially autocorrelated with those in competitor countries, confirming a race to the bottom.

Davies & Vadlamannati (2013) use a different sample of 135 countries over seventeen years to test for spatial autoregression of labour standards (which has a wider definition than employment protection). They measure labour standards using three separate tools: (1) a comprehensive index based on Mosley (2011), (2) labour laws, and (3) labour practices. Contrary to Olney, their sample also consists of developing countries. They find that the correlation of domestic labour standards with those of foreign countries is positive for both developed and developing countries, but that the coefficient is stronger for the latter. Interestingly, this contradicts the general consensus on the benefits of FDI, which states that those are far less for developing countries. Davies & Vadlamannati (2013) attribute this difference to the empirical finding that labour practices deteriorate faster than labour laws in developing countries, which must thus be due to a corrosion in enforcement not experienced in developed countries.

*2.3 Import tariffs and Foreign Direct Investment*

Contrary to the employment protection-FDI relation, the literature suggests the tariff rates-FDI relation to be positive. In the literature, the basis of this relationship is known as tariff jumping. Essentially,

MNEs or exporting countries are stimulated to invest in local production facilities rather than export goods to foreign markets in order to avoid the payment of import tariffs (Blonigen, 2005). Despite the rather straightforward economic concept, empirical research of this relationship has been fairly limited – probably due to data constraints regarding tariff- and non-tariff measures. Belderbos (1997) examines the effect of European and American anti-dumping legislation on the establishment of local Japanese production sites. He employs a micro-econometric analysis controlling for industry- and firm capabilities, transport cost, market size, and production cycle effects. He concluded that anti-dumping policies had a positive and significant effects on the FDI confirming the hypothesis of tariff jumping FDI (moreover, he concluded that tariff jumping FDI in order to avoid anti-dumping measures defeated the purpose of their initial instigation). Blonigen (2002) confirms these findings using data from 1980-1990 and analysing all firms and product combinations subject to US anti-dumping legislation. He finds a significant positive correlation of anti-dumping measures and specific industry FDI, yet with smaller coefficients than found by Belderbos (1997). According to Blonigen, tariff jumping is only a real option for enterprises from industrialized countries (such as Japan) and the average effect is thus smaller. In this research, I investigate the effect of tariff rates on US FDI, which is also an industrialized country. Based on the findings of Blonigen (2002), we must thus entertain the possibility that the overall effect of tariff rates on FDI will be smaller, which will be noted in the discussion section. Tariff rates specifically affect investment that is related to production for the local market, specified as horizontal FDI. As noted before, Beugelsdijk & Smeets (2008) find that this component of FDI yield the highest spill overs. Hammoudi, et al. (2013) confirm that tariffs are an adequate means to stimulate FDI for countries of each stage of development. Developed countries are receptive to absorb spill overs, and countries in a lower stage of development benefit by employee training, staff turnover and the increase in human capital in the long run. In a recent reconstruction of the prevalence of tariff jumping FDI in protectionist-era Ireland, Barry, et al. (2016) find that the relatively large share of foreignly owned companies in Ireland is partly due to import-substitution industrialization measures instigated in the 1930s and lasted to the 1960s. Barry et al. state that the weakness of the opposition at the end of the protectionist era was not because the policy had not been effective. By contrast, the FDI that was attracted during this period prevailed under globalization, making its effect definite. In light of the upcoming Brexit, Barry et al. believe that Ireland may expect a new era of tariff jumping investments.

The literature discussed thus far addresses the effect of import tariffs on horizontal FDI. However, the effect on vertical FDI can be drastically different. Vezina (2014) provides empirical evidence based on data from 1988 to 2006 for seven emerging Asian economies that these countries are actually in a race to the bottom of import tariffs in order to attract FDI. These emerging, yet underdeveloped economies, compete for Japanese vertical FDI seeking for cost reductions. As Japanese plants require the imports of intermediates, components and capital goods, high import tariffs constitute a production cost. Developed countries have a disproportionally large share of horizontal investment (Olney, 2013), and

thus the example shows that the way that protectionism impacts FDI depends on the stage of development. The sample used in this research consists of well developed countries and therefore, I expect a positive effect of import tariffs on FDI. Yet again, the distinction must be accounted for when considering external validity. (Manger (2005) further elaborates on this issue, stating that Japanese MNEs actively lobby for preferential free trade agreements in the region. These companies intend to produce half fabricates in East Asia's low income countries and transport those back to Japan for final construction. Here, it is important to see that import tariffs are often bilaterally set, and that lower import tariffs of the host economy result in lower import tariffs of Japan on products imported from the host economy, ultimately increasing vertical FDI.

As tariff rates are expected to have opposite effects on horizontal and export platform FDI, the detailed characteristics on the nature of the FDI as documented by the Bureau of Economic Analysis comes in valuable. Due to the detailed specification of FDI in the dataset, it is possible to distinguish the effects of import tariffs on horizontal-, vertical- and export platform FDI.

*2.4 Effect of protectionism on labour standards*

The pool of empirical research on the tariff rate-labour standards relation is limited. However, there are various articles published on the broader relationship between globalization and labour standards (which will be used as an umbrella term including employment protection). Mosley & Uno (2007) measure the extent of economic globalization by an international investment ratio (FDI over GDP) and an international trade ratio (imports plus exports over GDP). Their panel data analysis correlates the degree of globalisation of ninety strictly developing countries to labour rights from 1986 to 2002. Using these measures of trade- and financial[2] globalization they conclude that the former generates a downward pressure on labour standards, whereas the latter is found to have an upward effect. Yet other results were obtained by Potrafke (2013) who investigates the relation between the erosion of labour market institutions and various measures of globalization. Using the KOF indices (see the footnote in section 5.3 for an elaboration), he tests for the effect of globalization on labour market institutions, which are measured using the Economic Freedom of the World (EFW) index. Besides employment protection standards, the EWF index consists of indicators covering minimum wages, centralized collective bargaining, mandated cost of worker dismissal and conscription and hours regulation. Based on a cross-country analysis covering 140 countries, he concludes that higher levels of globalization do not lead to deteriorating labour market institutions. These findings mirror Potrafke (2010) who, based on a dataset comprising 20 OECD countries from 1982 to 2003, concluded that the KOF indicators of globalization did not affect labour rights and benefits, including employment protection. Algan & Cahuc (2006) find

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[2] Note that their measure of financial globalization as FDI over GDP as a predictor for labour standards is simply the endogenous component of the first hypothesis of Olney's research, that estimates the predictive value of labour standards for FDI

that trade openness (measured as imports plus exports divided by GDP) has had a positive effect on employment protection standards (measured following Nickell, et al. (2003)) in Mediterranean countries between 1970 and 1977, while Häberli, et al. (2012) conclude based on a panel of ninety developing and developed countries between 1980 and 2005 that domestic labour standards have been negatively affected by entry into regional free trade agreements.

The empirical literature is thus inconclusive on the effect of globalization on labour standards, depending on the measure of globalization, the measure of labour standards, the set of countries, and the period of the time series. This research contributes to the literature in various ways. First it uses tariff rates as a measure of globalization, rather than a composite index (such as the KOF index which has components for social- political- and economic globalization) or openness (which is commonly measured as imports plus exports divided by the size of the economy). This distinction is important: other than the other measures of globalization, import tariffs are a direct consequence of political choices, thus enhancing the policy implications of the result. Second, it substantiates the effect of tariff rates on employment protection in two steps: first showing that tariff rates and employment protection have opposing effects on FDI, and thereafter that tariff rates have a positive effect on employment protection. Third, this paper foremost differentiates itself from the available academic literature by creating an interaction between the 'race to the bottom' and tariff rates. As such, it does not merely prove that tariff rates have a positive effect on employment protection standards or that employment protection standards spatially depend on foreign employment protection standards. It shows that the strength of the spatial autoregression of employment protection *depends* on the level of tariff rates, and that the pressing force of competition thus becomes fiercer as tariff rates decrease.

## 3. HYPOTHESES

To test the impact of tariff rates on the race to the bottom of employment protection, this research tests two separate hypotheses. The first regards the effect of employment protection and import tariffs on FDI. The second tests for spatial autoregression between employment protection, and the intermediary effect of tariff rates.

*3.1 Hypothesis 1: employment protection, tariff rates and FDI*

The predictions of the first hypothesis are that the investment decision of a multinational enterprise partly depends on (1) the level of the labour standards in the specific country; and (2) the ease of access to the specific market for foreignly produced goods. As such, the analysis will be conducted using a multiple linear regression model, further specified in the next section.

Prediction (1) of the first hypothesis is confirmed by Olney (2013), whose model is adopted as a baseline. The prediction logically follows from the assumption that employment protection rules constitute an

operating cost, and that a reduction makes investment in the country more appealing. However, one can expect that not all types of FDI will be equally sensitive to changes in operating costs. Consider the following three types of FDI:

1. Vertical FDI: This type of FDI is the result of an MNE investing in a country in order to profit from low factor prices aiming at cost minimization. The multinational offshores one or multiple processes of the production chain to the foreign affiliate, and subsequently transports the output back to the country of the mother company for either final sales or further processing. Note that decision for the location of the subsidiary is purely based on the purpose of the greatest cost savings, and irrespective of market access characteristics.

2. Horizontal FDI: This type of FDI is the result of an MNE aiming to access a specific market, while attempting to avoid transportation costs. The MNE transfers the production of the production processes to the foreign country while simultaneously maintaining the production at home for the domestic market. After finalizing production in the foreign country, the final goods are sold in the local market. Initially, the MNE faces the choice of continuing the production of the final goods at home and absorbing the export costs, opening a foreign production site, or producing in and selling to a foreign market directly.

3. Export platform FDI: This type of FDI has similarities to horizontal FDI, as it shares the objective of minimalizing the transport costs resulting from exports. However, the market that the subsidiary intends to serve is not restricted to the country borders. It extends to neighbouring countries, or countries that are for another reason easier to supply from the export platform than from the domestic market. For two or more countries which have low bi- or multilateral export costs, the MNE can serve multiple markets with one well-placed foreign affiliate.

Olney (2013) also differentiates between these three types of FDI, and definitions above are in line with Neary (2009), who further theorizes the effect of changing transport costs on the respective components. Vertical FDI is likely to be most strongly affected by an increase in production cost resulting from increasing employment protection. As the direct objective of vertical FDI is cost reduction, harming the cost efficiency directly violates the main objective of the investments. The location of the foreign affiliate is non-market specific, and therefore the investment of the MNE can easily be relocated if another country yields greater cost savings, making this the most mobile type of FDI. In contrast, horizontal FDI is the least mobile. Since its objective is market access the costs savings will continue to be positive as long as the foreign cost of production is lower than the cost domestic production plus export costs. Again, export platform FDI is a mix of both. The decision to build a subsidiary is made to avoid export cost, yet the choice for a specific country in an interlinked market is based on production cost. As such, it contains elements of both.

Prediction (2) of the same hypothesis relies on the same distinction between the three types of FDI. Contrary to employment protection standards, the sign of the effect of tariff rates on FDI is expected to differ per component. Countries maintaining protectionist policies in the form of (relatively) high import tariffs are particularly attractive for horizontal FDI. Remember that horizontal investment becomes attractive for the MNE once the production costs of the foreign affiliate become lower than the production costs of the home plant plus transport costs. Formally, when the following basic condition is met:

$$C_{P \neq L} + T_{PL} > C_L$$

Where $C_{P \neq L}$ is the cost associated with production of the good in any country not being the local market of final sale; $T_{PL}$ is the transportation cost of moving the good from the country of production to the local market of sale; and $C_L$ represents the cost of local production. In the more extensive model, production cost would be a function of inter alia costs associated with dismissal of employees.[3] As such, note how a change in employment protection standards influences the investment decision model through $C_L$, and tariff rates through $T_{PL}$. Transport cost $T_{PL}$ is a function of geographical distance between the country of production and the local market of sale, the available transport lines, and the import duties levied at the border. As transport costs increase due to higher tariff measures, the possibility that aforementioned condition is met increases, and thus the likelihood that the MNE opts to invest in a local affiliate.

In contrast, one expects vertical FDI to be negatively affected by higher import tariffs. The aim of vertical FDI is to export back for domestic finalization of the product, so here import tariffs of the foreign country of potential production matter in two cases: (1) if import tariffs among trading partners are bilaterally set. Then, high import tariffs of the country competing for vertical investment are matched by high import tariffs of the source country of FDI; and (2) if the production requires import of half fabricates which are also subject to import tariffs. Here, import tariffs enter the cost variable of the investment decision, making the country less interesting for vertical investment. Returning to the formal investment decision, we note that a multinational opts for vertical investment if:

$$C_{P \neq D} + T_{PD} < C_D$$

Note that the inequality sign has turned and the investment decision is not based on the local market of sales but the domestic market $D$. Import tariffs may positively affect the $C_{P \neq D}$ function if production

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[3] Besides, production costs would depend on import tariffs on half fabricates. However, the necessity of such import for local production (or for production in any other country of production) is case dependent. Working with the assumption that import tariffs on half fabricates are exclusively lower than import tariffs on final goods, they are excluded from the reduced form model.

requires import of half fabricates, and positively affect $T_{PD}$ if import tariffs are bilaterally set. Both effects suggest a negative correlation between import tariffs and vertical FDI.

Export platform FDI shares the main characteristics with horizontal FDI, as an increase in import tariffs makes it increasingly likely that the specific country is the most expensive to export to among a subset of countries, and thus the most attractive to host the export platform. However, if we assume that import tariffs on half fabricates increase proportionally with mean import standards and that the MNE needs to import half fabricates for production, the vertical and horizontal aspects of export platform FDI yield opposing affects. The investment decision now has two steps, first the horizontal step:

$$C_{P \neq M} + T_{PM} > C_M$$

Where the decision to produce is not made for each individual country but for a specific market *M* of countries with multilateral transport costs sufficiently low that they are outweighed by the economies of scale of a single production site. Once the multinational has decided to invest in a production site in one of the countries sharing low multilateral transport costs, it will confront part two of the investment decision, regarding the specific location. Formally, it will maximize its cost saving by:

$$\max_{i \in M} \left( \frac{S_i}{S_M} T_i - C_{HF} * \frac{S_M}{S_M} * \tau_i \right)$$

Where $S_i$ denotes the sales in country *i*; $S_M$ the total sales in market of countries subject to the export platform investment decision; $T_i$ ($= TC + \tau_i$) the transport cost associated with transporting from one country to another in the market which consists of costs of physical transportation and import tariffs (the former is assumed to be constant between countries); $C_{HF}$ is the costs of half products, multiplied by 1 to indicate that the costs are incurred for the products sold in the entire market; and $\tau$ denotes import tariffs on the half fabricates. As such, the impact of tariff rates on the investment decision depends on (1) the size of the market *i* compared to the total market; (2) the costs of imported half fabricates required for production; and (3) the relative level of import tariffs on half fabricates to import tariffs on final goods.

In conclusion, the first hypothesis of this research states that employment protection is strongly negatively correlated with vertical FDI, weakly negatively correlated with horizontal FDI, and that the effect on export platform FDI must be in between. Our second explanatory variable, import tariffs, is expected to be negatively correlated to vertical FDI, and positively correlated to horizontal FDI. Again, the effect on export platform FDI is expected to be in between, for it depends relative markets sizes and foreign import policies.

*3.2 Hypothesis 2: the effect of tariff rates on the race to the bottom*

The second hypothesis of this research consists of two components: (1) countries competitively undercut each other's employment protection standards in order to attract FDI; and (2) this competition for FDI becomes fiercer as countries become more economically integrated. The first component of this hypothesis was also investigated by Olney (2010), who showed that as the weighted average of employment protection among a country's competitors falls, the country will decrease its regulatory standards regarding employment protection in response.

The second component is a result of the increased competition for export platform FDI if import tariffs are multilaterally decreased among a subset of foreign countries. As foreign countries become more economically integrated in a common market, i.e. by decreasing bi- or multilateral import tariffs, export platform FDI will increase in absolute value relative to horizontal FDI, and countries within this subset will compete with each other for export platform FDI, but not with countries outside of the subset. As such, the second prediction of the second hypothesis is that the strength of the spatial autoregressive relation between employment protection standards (i.e. the race to the bottom) increase, as import tariffs decrease.

## 4. SPECIFICATION

The goal of the empirical analysis is to examine if the data supports the notion that increasing economic integration amplifies the race to the bottom effect in labour standards. To do so, two baseline empirical models are constructed, in order to test the two hypotheses. Note that the construction and definition of the variables are addressed in section 5.

*4.1 Hypothesis 1: OLS*

First, impact of employment protection and import tariffs on FDI is estimated according to the following equation, using OLS:

$$(1) \quad FDI_{c,t} = \alpha_1 EP_{c,t-1} + \alpha_2 IT_{c,t-1} + \alpha_3 X_{c,t-1} + \lambda_c + \theta_t + \epsilon_{c,t}$$

In this equation, $FDI_{c,t}$ defines FDI inflow in country $c$ for year $t$. In order to test the first hypothesis, the model is first estimated for total FDI, and subsequently for horizontal-, vertical-, and export platform FDI. $EP_{c,t-1}$ defines the employment protection standards in country $c$; $IT_{c,t-1}$ defines the mean height of import tariffs of country $c$; $X$ is a vector of host country control variables. Following Olney, it includes skill level, tax rate, investment costs, trade agreements, trade costs, and wages. The independent variables are lagged by one year to account for the fact that the investment activities of MNE's require time to adjust for changing host countries' characteristics. $\lambda_c$ constitutes the country fixed effects; $\theta_t$

the year fixed effects; and finally $\epsilon_{c,t}$ constitutes the error term. Ultimately, A comparison between the coefficients $\alpha_1$ and $\alpha_2$ generated in the three estimations, estimating for the three types of FDI, allows one to make claims about the validity of hypothesis 1. To control for consistency of FDI over time and to introduce the intrinsically endogenous weighted mean tariff rates, we compare the results of equation 1 with the results from the Arellano-Bond GMM estimation specified by equation 2.

*4.2 Robustness check 1: GMM*

The Arellano-Bond Generalized Method of Moments estimator has two very appealing aspects to check the OLS estimation. Firstly, it includes a lag of the dependent variable as an explanatory variable, controlling for the likely possibility that FDI is persistent over time. Secondly, it allows for the inclusion of endogenous explanatory variables, what makes it possible to introduce the intrinsically endogenous weighted mean tariff rates in the estimation (see section 5.3 for an elaboration on the difference between weighted and simple mean tariff rates). The equation estimated is thus denoted as:

$$(2) \quad FDI_{c,t} = \beta_1 FDI_{c,t-1} + \beta_2 EP_{c,t-1} + \beta_3 IT_{c,t} + \beta_4 X_{c,t-1} + \lambda_c + \theta_t + \epsilon_{c,t}$$

Compared to equation (1) we note that $FDI_{c,t-1}$ enters the equation, and that tariff rates are weighted, no longer lagged and made endogenous to FDI. There are various theories in the academic landscape explaining the persistency of FDI over time, mostly based on agglomeration economies. For an anthology, please be referred to Cheng & Kwan (2000), Kinoshita & Campos (2003), Albuquerque (2003) and Levchenko & Mauro (2007). Using the GMM technique, it is possible to capture the persistence in the $FDI_{c,t-1}$ variable. Apart from the endogenous tariff rates and the lagged dependent variable, the employment protection variable and controls stay similar to the OLS estimation.

Despite the aforementioned benefits of GMM, this research will mostly rely on the results obtained by the OLS estimation and GMM is employed as robustness check. GMM yields the best results when the number of instruments is small compared to the sample size. As the number of instruments increases, the finite sample property of the estimator increases bias, labelled by Hayakawa (2007) as the 'many instruments problem'. Hayakawa (2007) proceeds to note that "[w]hat is important with regards to using many instruments is the trade-off between the efficiency and the bias of the estimator. Although using many instruments is desirable to improve the efficiency of the estimator in terms of conventional first order asymptotic theory, it is problematic in terms of bias." As a rule of thumb, it is suggested to have the number of instruments not exceed the number of groups. In order to limit the number of instruments, only a second order lag of the endogenous variables is included in the model, yet the number of instruments still exceeds the number of objects due to the large number of years compared to the number of countries in the dataset. As is noted by Hayakawa, this minimization of the number of instruments results in a relatively inefficient model compared to OLS, as the result section will indicate.

*4.3 Hypothesis 2: OLS*

To test the second hypothesis, i.e. whether a host country's employment protection standards are increasingly dependent on competitor's labour standards as their import tariffs decrease, this paper proceeds by estimating equation 3. Using OLS the correlation between the host country's- and its competitors' employment protection rules is estimated as

$$(3) \qquad EP_{c,t} = \gamma_1 cep_{c,t-1} + \gamma_2 TR_{c,t-1} + \gamma_3 (cep * TR)_{c,t-1} + \gamma_4 X_{c,t-1} + \lambda_c + \theta_d + \epsilon_{c,t}$$

Here, $EP_{c,t}$ defines the employment protection standards in country $c$ in year $t$, and $cep_{c,t-1}$ denotes the spatially lagged variable that defines the weighted average of employment protection standards in 'competitor' countries not including $c$ itself, the year before. Following common practice in spatial econometrics, foreign values are lagged by the inverse distance to the home economy, as 'near things are more related than others', for detailed information on the construction of the competitor employment protection variable $cep$, be referred to the data section (section 5.5). Following the race to the bottom theory, $EP_{c,t}$ and $cep_{c,t-1}$ are expected to be positively correlated. $TR_{c,t-1}$ denotes the simple mean tariff rates of the home country a year earlier. Following the theory, we predict a positive $\gamma_2$: as tariff rates increase, countries are more expensive to export to and cost of local production may thus increase with less loss of FDI. $cep * TR$ denotes the interaction term between tariff rates and competitor employment protection standards. As mentioned, both terms individually are expected to be positively correlated to employment protection standards. Yet, the interaction term is predicted to be negative, as the effect of either variable is expected to decrease as the other increases. In the case of high foreign employment protection standards, this results in a relatively small positive marginal effect of tariff rates. However, in the case of decreasing foreign employment protection standards, as in the race to the bottom hypothesis, we expect the effect marginal effect of tariff rates to increase. As such this hypothesis predicts that the race to the bottom effect resulting from a positive correlation between labour standards (where following the trend of competitors' labour standards is a weakly dominant strategy) may be increasingly decreased in strength by tariff rates as foreign labour standards deteriorate.

To return to the regression estimation: $X_{c,t-1}$ is a vector of host country control variables as discussed in the section for equation 1, plus two additional variables in the form of unionization and political ideology (construction of both variables is elaborated on in the data section); $\lambda_c$ are country fixed effects; and $\theta_d$ are decade fixed effects.[4] Finally, $\epsilon_{c,t}$ constitutes the error term.

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[4] Following Davies and Vadlamannati (2013) who argue that year fixed effects absorb all the variance of the spatially lagged variable and make a case for the utilization of decade fixed effects instead.

*4.4 Robustness check 2: GMM*

Mirroring the estimation strategy of hypothesis 1, we again turn the Arellano-Bond GMM technique to allow for employment protection standards to be persistent over time. Again, one can argue that labour standards are indeed persistent, as that the past level defines the present, even if all other determinants can be perfectly captured by indicators. Historically acquired rights are hard to change in democracies, either towards more liberalization or more protection. As people are creatures of habits, we tend to value future regulations based on what we currently have, alterations are objected by stake-holders policy makers are answerable to, and changes come slow if at all. As such, including a time lagged dependent variable at the right hand side of the equation seems justifiable:

$$(4) \quad EP_{c,t} = \gamma_1 EP_{c,t-1} + \gamma_2 cep_{c,t-1} + \gamma_3 TR_{c,t-1} + \gamma_4 (cep * TR)_{c,t-1} + \gamma_5 X_{c,t-1} + \lambda_c + \theta_d + \epsilon_{c,t}$$

This equation thus equates employment protection standards to the time lagged and space time lagged values of the dependent variable. Further, the interaction term is similar to the interaction term in equation (3), as are the control variables and fixed effects. Following the considerations postulated in section 4.2 regarding efficiency, the GMM estimator is included in this research as a robustness check for equation 3.

# 5. DATA

The variables employed in the estimations are mimicked from Olney's race to the bottom estimation. Where identical data wasn't available, it is specified at the specific variable subsection. Furthermore, the variables on tariff rates are added as they are unique for this research. For a full comparison between the dataset employed in this research and Olney's paper, be referred to Appendix B.

*5.1 Foreign direct investment*

Following Olney (2010) this study uses data with a single focus on US FDI. The data, extracted from the Bureau of Economic Analysis[5], has the merit that it measures FDI as foreign affiliate sales. It indicates the ultimate destination of such sales and we can thus define the FDI as horizontal-, vertical- and export platform investments. Precisely, sales to the local market indicates horizontal FDI; sales to foreign markets indicates export platform FDI; and sales back to the United States indicates vertical FDI. As mentioned in the previous section, the three types of FDI are expected to react differently to changes in both employment protection and import tariffs. The former is expected to have a stronger negative effect as the mobility of FDI increases, thus we expect decreasing negative effects in the order

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[5] Yearly data from 1983-2013 can be downloaded from the BEA archives accessible at: https://www.bea.gov/international/di1usdop.htm

vertical-, export platform, and horizontal investments. The latter is expected to have the strongest positive effects on horizontal investments, weaker positive effects on export platform investments, and no or negative effects on vertical investments.[6] Besides, measuring FDI from a single source country holds the advantage that it minimizes source country characteristics that may affect FDI outflow over time.

Finally, again following the variable construction technique of Olney, the FDI measures are converted to real dollars employing the chain-type price index for gross domestic investment. The conversion index is provided by the U.S. Government Publishing Office[7] and benchmarked at 2005.

*5.2 Employment protection*

The measurement for employment protection is extracted from the OECD database[8]. The readymade indicator measures the legislation regarding costs and procedures involved in dismissing both groups of employees and individuals. Furthermore, it rates the procedures involved in hiring workers on temporary work agency contracts versus fixed term contracts. The measurement is typically synthetic, and an index score of a complex set of legislative standards may be subject to arbitrary measurements. The website of the OECD reads that: "[t]he indicators have been compiled using the Secretariat's own reading of statutory laws, collective bargaining agreements and case law as well as contributions from officials from OECD member countries and advice from country experts." The index is measured on a scale ranging from zero to six, with a six indicating the most restrictive legislations (and as such the highest degree of labour protection).

A clear limitation is the availability of the indicator, which is only specified for OECD countries. Of course, this group of countries is far from a perfect random sample, including two middle income countries (i.e. Turkey and Mexico) and all others classified as high income countries by the World Bank. As such, questions on external validity may arise. For Olney's research, the misbalance of the dataset is justified by stating that the effect of labour standards on FDI would be smaller for more developed countries, and the effect would thus be expected to be larger outside of the dataset. As OECD countries receive a relatively large fraction of horizontal- and export platform FDI compared to vertical FDI, which is considered to be the most mobile and easily affected by increasing production costs, their FDI inflows are expected to be less sensitive. The correlation between labour standards and FDI as a whole would be stronger for less developed countries with a higher fraction of vertical FDI.

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[6] See the hypotheses section for an elaboration on the causes of the effects.
[7] Conversion tables are published in the Economic Report of the President, accessible at: https://www.gpo.gov/fdsys/pkg/ERP-2012/content-detail.html
[8] Indicator data for employment protection standards from the OECD can be accessed at: http://stats.oecd.org/

In the model section, it was further explained how tariff rates are expected to target horizontal and export platform FDI, more than vertical FDI. Following the same logic, it is expected that the coefficient between tariff rates and FDI is actually stronger in the sample of the dataset than outside. The dataset limiting aspect of the OECD indicator for Employment protection standards thus becomes more relevant for this coefficient. For a further elaboration on the impact on the external validity, be referred to the discussion section of this paper.

Despite the dataset limiting downside of the indicator, it is still the most comprehensive measure of labour market regulations in such a large group of countries. To the best of my knowledge, it is the only standardized index measure available for this scope, covering twenty six countries and twenty three years.

*5.3 Tariff rates*

Data on tariff rates are acquired from the World Development Indicators database made available by the World Bank. Tariff rates as a proxy for protectionism are the popular measure in academic literature and can be viewed as the most direct indicator of restrictions (David, 2007). David (2007) suggests four measures of tariff rates: (1) simple tariff averages[9]; (2) trade-weighted tariff averages[10]; (3) revenue from duties as a percentage of imports; and (4) the effective rate of protection. This research employs the former two for the simple reason of data availability and interpretability. A composite index is available of the third measure in the KOF globalization index[11] (Dreher, 2006; updated by Dreher, Gaston and Martens, 2008) and yields similar results. The decision to stick to simple and weighted import tariffs in this scattered landscape of restrictive measures is best supported by an example on the construction of an index measure, provided by (David, 2007, p. 19):

> An example that illustrates the problems of constructing such a measure is the trade policy component of
> the Index of Economic Freedom. This component is based on a country's weighted average tariff rate
> (weighted by the imports from the country's trading partners). As noted, many countries do not report their

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[9] Simple mean tariff rates are defined by the World Bank as "the unweighted average of effectively applied rates for all products subject to tariffs calculated for all traded goods". Products are classified using the Harmonized System of trade at the eight- or six digit level. The data base including definition can be accessed at: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

[10] Weighted mean tariff rates are defined by the World Bank as "the average of effectively applied rates weighted by the product import shares corresponding to each partner country". Products are classified using the Harmonized System of trade at the eight- or six digit level. The data base including definition can be accessed at: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

[11] The KOF Globalisation Index is possibly the most comprehensive dataset regarding globalisation, with available data of 207 countries from 1970 – 2013. The KOF index measures the three main dimensions of globalisation: (1) economic; (2) social; and (3) political. Economic globalisation a sub-index based on two scores: (1) actual economic flows; and (2) economic restrictions. The former is a common measure of imports and exports over GDP, the latter is an index score based on tariff- and non-import barriers. The social- and cultural components are used as instrumental variables for import tariffs in the IV approach but were insufficient predictors. The data base can be accessed at: http://globalization.kof.ethz.ch/

weighted average tariff rate every year and for some of the countries in the 2005 Index the last reported weighted average tariff data was as old as 1993. In these cases the authors of the Index were forced to turn to less direct measures of tariff barriers. If the weighted average tariff rate was not available, the authors then used the country's average applied tariff rate; if the country's average applied tariff rate was not available, they used the weighted average or the simple average of most favored nation (MFN) tariff rates. In the case where neither the applied tariff rate nor MFN tariff data were available, the authors based their grading on the revenue raised from tariffs and duties as a percentage of total imports of goods. If data on duties and customs revenues are not available, they either used data on international trade taxes or they analyzed the overall tariff structure of the country and estimated an effective tariff rate. Obviously, the progression through the different methodologies implies an increasing chance of error and, as the methodologies move further from estimating weighted average tariff rates, a decreasing ability to make useful comparisons across countries.

As countries do not regularly report data on simple tariff rates and rarely on weighted tariff rates, the latter must be calculated from the former using product codes and imports data, which is thus subject to weaknesses in collecting and coding of data. In this research, the missing values that result from the data unavailability are not imputed and have thus led to elimination of observations.[12] The main objection to using import tariff as a measure of trade restrictiveness is the utilization of none-tariff barriers (NTB) in a trade regime. However, the relative incidence of NTB's is far lower for developed countries, of which the dataset is compiled. A problem with the usage of simple mean tariff rates as a measure is that it may be biased upwards (downwards) if countries set relatively high (low) import tariffs for products types corresponding to Harmonized System codes it has little demand for. Therefore, this research also employs weighted mean averages for comparison. Interestingly, weighted mean import tariffs are endogenous with FDI, as higher tariffs in a specific result in higher FDI, leading to lower imports in the sector which in turn cause lower weighted mean import tariffs. As such, weighted mean import tariffs are included in the GMM model as endogenous and thereafter compared with simple mean tariff rates in the OLS model.

*5.4 Control variables*

The strategy in this analysis controls for country fixed effects in both the empirical estimations of hypothesis 1 and hypothesis 2. Furthermore, it includes year fixed effects in the former estimation and decade fixed effects in the latter. Besides, it includes a vector of country specific control variables. For the estimation of equation 1 and 2, aiming to test hypothesis 1, are specified as followed.

A country's real GDP is obtained from the OECD database, as well as a country's population. As suggested by Blonigen, et al. (2007), trade costs are measured as the inverse of the openness measure

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[12] Estimations using multiple imputation resulted in unrealistically high coefficients which were not supported by economic theory and as such could not be interpreted.

reported by the Penn World Tables (PWT). The PWT measure openness as the sum of imports and exports divided by the total size of the economy. As such, its inverse shows a positive covariance with the tariff rate variable. Data on skill levels are extracted from the Barro and Lee educational attainment dataset and measured by average years of schooling of the population above twenty five years. As the data is only available each five years and is linear over time, missing values are generated using linear interpolation. Data on corporate income tax and wages are extracted from the OECD database. The latter uses a Unit Labour Cost index as a proxy with 2010 as base year, and will account for in-country differences in wages over time. As a measurement for investment risk, I use data on risk premium on lending, made available by the IMF in the International Financial Statistics Database. Contrarily, Olney employs a composite index from the Business Environment Risk Intelligence (BERI) database, but this is not publically accessible. The risk premium on lending is calculated as the lending rate minus Treasury bill rate, and should in well-functioning financial markets as the OECD be a reasonable proxy of investment risks. The highly unfortunate pitfall of this measure is the unavailability for numerous years and countries, substantially decreasing the estimation power of the dataset. However, to the best of my knowledge, there is no indicator publically available measuring a similar variable for the timespan of the dataset covering the same countries. Lastly, following Olney, I include membership of the EU and ratification of NAFTA as dummy variables in the equation.

For the empirical testing of the second hypothesis, tested by estimating equation 3 and 4, two more control variables are included: political ideology and unionization. For political ideology, Olney utilizes an unspecified labelling strategy of 'liberal', 'centre', or 'conservative', constructs a point system and subsequently a weighting scheme based on the legislative and executive strength of the government to calculate a final index score. This paper attempts to imitate the technique, using data acquired from the Database of Political Institutions from the World Bank. Both the executive power and the largest legislative power are indicated as either 'left', 'centre' or 'right', which I translated as -1, 0 and 1 respectively. The score for the executive power was multiplied by 1 if both houses were controlled and by 0.67 if not. The score for the legislative power was multiplied by the percentage of seats controlled by the largest party. The scores were summed and rescaled on a 1-4.5 scale with 4.5 being the most 'left' and 1 being the most 'right'. The unionization rate was acquired from the OECD database and calculated as the total number of union members divided by the total number of employed and self-employed labourers.

*5.5 Competitor employment protection*

The value of competitor (or foreign) employment protection standards is calculated as a geospatially weighted mean of employment protection standards for all other countries than domestic. Geographic coordinates of the countries are acquired from the World Map shapefile made available by Sandvik (2008). The coordinates are converted into inverted spatial distances in a 26*26 symmetric matrix row

normalized to 1. Subsequently, this matrix is multiplied with the 23*26 subject*time matrix to acquire spatially lagged competitor employment standards for each country over the timespan. This spatially lagged variable is included in the estimation of equation 3 and 4 as *cep* as a predictor for domestic employment protection standards.

The spatial lagging of dependent variables is founded on Tobler's first law of geography, which states that: "everything is related to everything else, but near things are more related than distant things" (Tobler, 1970). Here, 'near things' interpreted as geographically close things. It is easy to argue that Germany's labour standards are more closely dependent on France's labour standards than with Mexico's, because they compete for FDI in a geographically close area (with consequently low transport costs). However, various alternatives are possible, as economies may be weighted by their size, state of development or as employed by Olney, the mobility of their FDI.

## 6. DESCRIPTIVES

A first glance at the development of the key indicators is provided by figure 1. The figure summarizes the yearly averages of the indicators in the dataset and plots their developments over time. As the figure shows, steady trends for Total Affiliate Sales and Employment Protection are obvious for the span of twenty three years of the dataset comprises (1985-2007). The former shows an almost exclusively upward sloping trend, with short alterations to the trend only around 1993, 1999, and 2002. The mean trend of the latter, on the contrary, has been by approach linearly downward sloping, with an average score of 2.46 in 1985 and 2.00 in 2007. A far more mixed picture is portrayed for the annual average of tariff rates in the dataset. Despite the general trend again being downwards sloping, clear local peaks show at 1990, 1995, and 1999. A box plot of all measurements of tariff rates is depicted in figure 25, which shows that the distribution is skewed to the right. The outliers are for Korea in the late eighties, Mexico in the years around 2000, and Australia in the early nineties. As these measurements correspond to protectionist trade regimes mentioned in the literature[13], I will not remove any outliers.

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[13] For example see Conlon (1994) for Australia, Doo-Yung (2001) for Korea, and WTO (2002) for Mexico.

**Figure 1** : trend lines of the annual averages of total affiliate sales (y-axis left), tariff rates and employment protection standards (y-axis right)
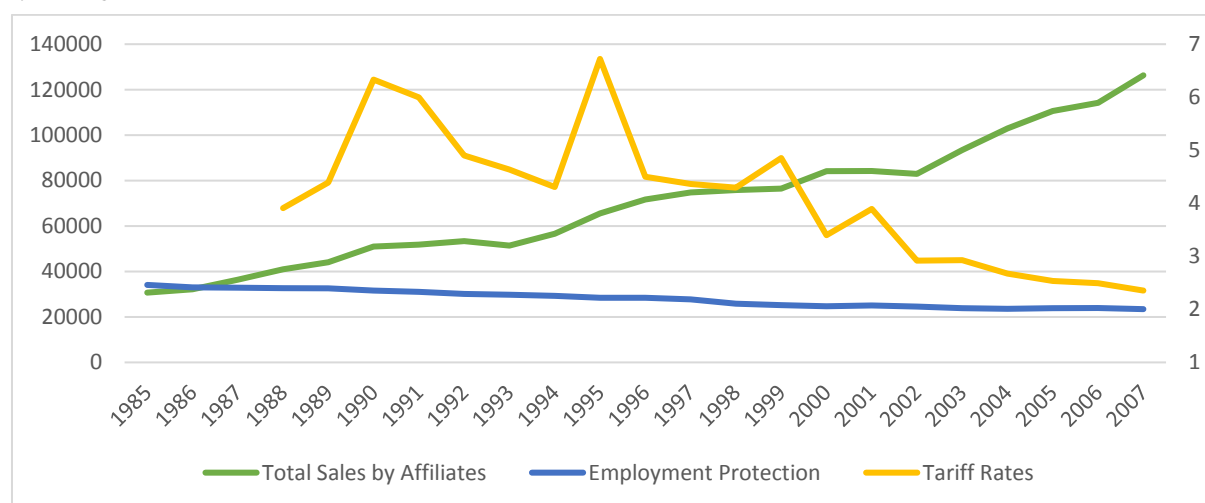


To estimate the actual effect of both explanatory variables on Total Affiliate Sales in equation 1, a strongly balanced panel data set is employed, spanning the aforementioned twenty three years and a total of twenty six countries.[14] Table 1 summarizes the data comprising the indicators. As for the dependent variables, one notes a range for Total Affiliate Sales (employed in this research as a proxy for total FDI) with a minimum of 1,164.68 million in Turkey in 1985, to a maximum of 595,323.3 million in the United Kingdom in 2007. Looking at its components, we firstly find a minimum value of 584.26 million of Local Sales (as a proxy for horizontal FDI) for Korea in 1985 and a maximum of 402,218.80 million again in the United Kingdom. Secondly, a minimum value for Sales to the United States (as a proxy for vertical FDI) is found in Turkey for 1986 with a mere 3.76 million; whereas the maximum is found in Canada in 2007 with a value of 114,926.40 million. Thirdly, for Foreign Sales other than to the host economy (as a proxy for export platform FDI) the data shows a minimum value of 23.06 million for Turkey in 1985, and a maximum of 166,564.50 million for Switzerland in 2007. For the key independent variables, we have the following extremes. For employment protection, Canada receives the lowest score of 0.59 throughout the entire span of the dataset; whereas the highest score is acquired by Portugal in the late eighties with 4.18. Note that the indicator was indexed by the OECD on a scale from zero to six, with six being the most restrictive in terms of employment protection. For the second explanatory indicator, tariff rates, we find a minimum of 0% for Switzerland from 2000 to 2007, and a maximum of 20.1% for Australia in 1991. As such, one concludes that despite the presumed homogeneity in the data resulting from a sample of merely OECD countries, the scores on the key indicators actually show a substantial variation.

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[14] [14] The set of countries consists of 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.

**Table 1**: Summary of the variables

| Variable | Observations | Mean | Std. deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Total sales (million 2005 USD) | 555 | 71461 | 97122 | 1165 | 595323 |
| Local sales (million 2005 USD) | 536 | 48514 | 70123 | 584 | 402219 |
| Sales to US (million 2005 USD) | 525 | 6959 | 16420 | 4 | 114926 |
| Foreign sales (million 2005 USD) | 547 | 17981 | 26489 | 23 | 166564 |
| Employment protection (index) | 560 | 2.2 | 1.0 | 0.6 | 4.2 |
| Tariff rates (%) | 471 | 4.0 | 2.9 | 0 | 20.1 |
| GDP (million USD) | 582 | 619942 | 731405 | 32032 | 4264208 |
| Population | 598 | 3.15e+07 | 3.21e+07 | 3298050 | 1.28e+08 |
| Trade cost | 592 | 0.021 | 0.012 | 0.006 | 0.073 |
| Skill | 598 | 9.5 | 1.9 | 4.0 | 13.1 |
| Tax rate (%) | 549 | 33.4 | 9.7 | 8.5 | 56 |
| Risk premium (%) | 357 | 2.78 | 2.20 | -1.61 | 13.44 |
| Wages (index) | 516 | 76.2 | 19.40 | 15.33 | 130.99 |
| Ideology (index) | 598 | 2.55 | 1.09 | 1.00 | 4.50 |
| Unionization (%) | 569 | 35.36 | 19.51 | 7.56 | 83.86 |

Figure 2 plots the annual average of Total Sales against the annual averages of Employment Protection and Tariff Rates after taking natural logarithms. A clear negative correlation between Total Sales and Employment Protection *and* Tariff Rates seems evident in figure 2. Despite this portrayal of the data being consistent with figure 1, where one noted that averages of Employment Protection and Tariff Rates have been decreasing over time (yet the latter somewhat more fluctuating than the former) whereas Total Sales have been predominantly increasing, this generic observation does not satisfy the general theory of this paper. Remember that the theory predicts that (horizontal and export platform) FDI can be attracted by instigating import barriers, and the initial expectation of the relationship between Tariff Rates and Total Sales would thus be upward sloping. Figure 3 eliminates time trends by plotting country averages rather than annual averages of Total Sales, Employment Protection and Tariff Rates, and gives a first picture more in line with the model. Using these means, Employment Protection still shows a negative relation with Total Sales, but the relation between Tariff Rates and Total Sales turns positive, indicating that the previously observed negative relation may be due to year fixed effects. The scatter plot also exposes a potential deficient in the dataset. A total of sixteen of twenty six countries are currently members of the European Union and thus set harmonized tariff rates, which unfortunately increases the homogeneity around an explanatory variable within our dataset and possibly negatively affects the significance of the outcomes. Despite various countries becoming members of the European Union only during the timespan of this research (e.g. Poland, Hungary, Czech Republic), data from the World Bank WITS database confirms that effective import tariffs had been harmonized since before 1985, resulting in the identical averages projected in figure 3 (and beyond).

**Figure 2**: annual averages of tariff rates and employment protection plotted (both on the x-axis) against total sales (y-axis), after taking natural logarithms of all variables
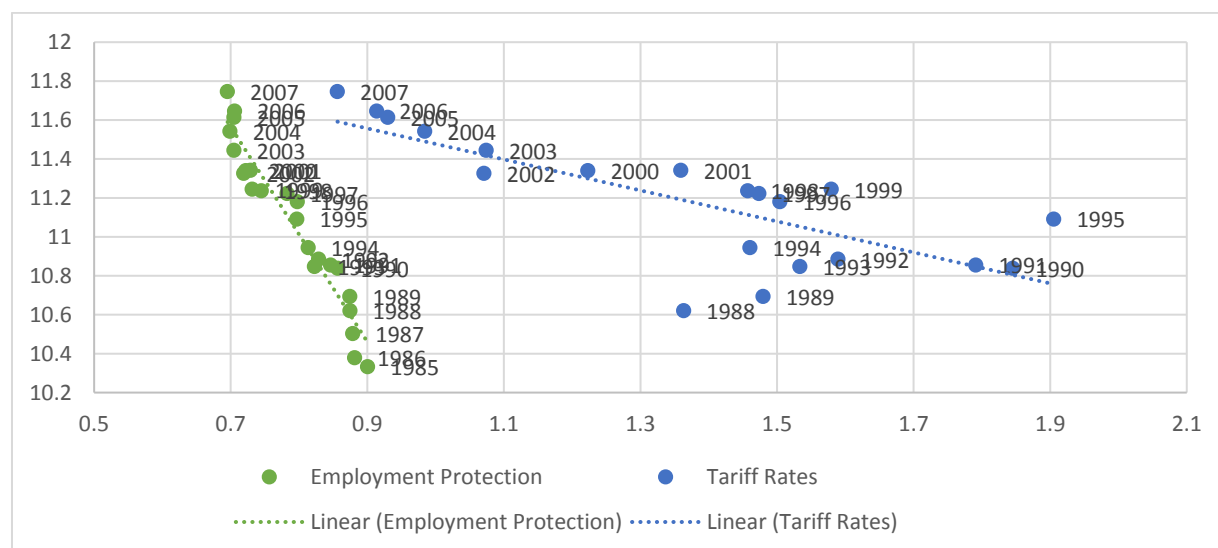


**Figure 3**: country averages of tariff rates and employment protection (both on the x-axis) plotted against total sales (y-axis), after taking natural logarithms of all variables
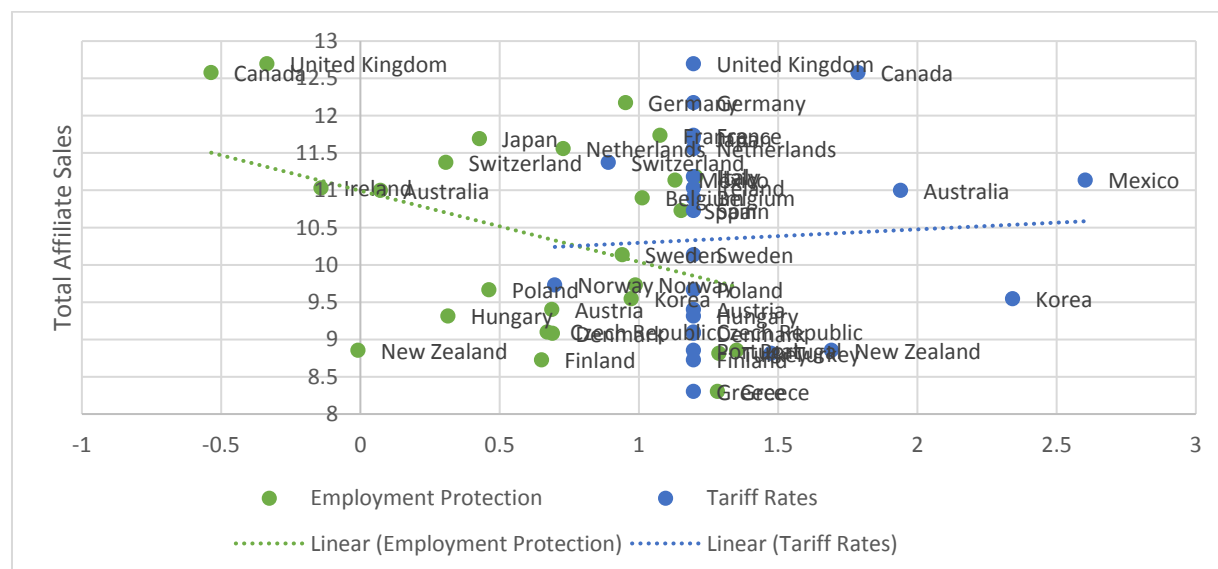


Figure 4, 5, and 6 (see appendix A) further explore the relation between the country averages of sales and employment protection and tariff rates, by decomposing sales to its components of local sales (to the host economy), foreign sales (to foreign economies other than the host economy), and sales to the United States. Interestingly, the relative positions of each country differs rather clearly in various cases. For horizontal FDI, the top positions are claimed by large and advanced economies as the United Kingdom, Japan and Germany, as well as Canada which has obvious advantages in geographic terms. Looking at export platform FDI, Canada drops down (logically, as its geographic positon is suboptimal to serve any foreign markets but the United States and possibly Greenland) and small economies with access to large markets perform relatively well. Prime examples are the Netherlands, Ireland and especially Switzerland. Here, it is interesting to note that Switzerland is in a rather unique position as it

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ensured full access to the European internal market, without the obligation to confirm to common tariff rates. Furthermore, looking at the vertical FDI component, one notes that Mexico unsurprisingly performs relatively well in comparison with the other two types. Generally speaking, the model predicts that high tariff rates are positively associated with horizontal- and export platform FDI, and negatively with vertical FDI. Figure 4 is in line with the theory, while figure 5 and 6 actually project an effect which is opposite to the prediction of the model regarding vertical- and export platform FDI.

Figure 7, 8, and 9 (see Appendix A) provide a closer look at the development of employment protection standards over time at an individual country level. The biggest decreases of employment protection in the dataset during the timespan this research covers, were experienced in Belgium, Greece, Italy, Sweden and Germany. In during this time span, there have also been countries which have experienced an absolute increase in employment protection standards, contrary to the sample trend. The largest of these were in Czech Republic, France, Hungary, Poland and New Zealand. Apart from France, all these countries were below the global mean of 2.46 in 1985, and instigate a climb towards it. As per 2007, only the Czech Republic has actually reached the level of the sample mean of these four countries. It may be interesting to note that the five largest decreases in employment protection standards all took place in EU countries, which all experienced very high initial levels. This in itself may be an indication that the internal market has had an increasing effect on the race to the bottom. However, three of the five biggest increases were also in EU countries. Yet, it may not be overlooked that these latter three only entered the European Union during the timespan of this research, and the increase may thus be the result of an effort to regulate employment protection standards at a supranational level.

In the same fashion, figure 10, 11 and 12 (see Appendix A) plot the development of tariff rates at country level over the timespan of this research. Interestingly, not a single country in our sample has higher mean tariff rates in 2007 than it had in 1988[15]. The largest decrease in tariff rates were for Australia, Korea, Mexico, New Zealand and Switzerland. All these countries had tariff rates (far) above the sample average of 3.91 in 1988. The smallest decrease in tariff rates were by Japan and the European trade bloc, which had relatively low tariff rates to begin with.

Figure 13 and 14 (see Appendix A) provide a first glimpse at the correlation between tariff rates and employment protection. Equation 2 explores if countries are engaged in a race to the bottom in labour protection standards and more specifically, if this correlation between labour protection standards increases as the tariff rates between countries decrease. A first indication in this direction would be that generally higher tariff rates would be correlated to higher employment protection standards. However, annual- and country averages again provide a mixed image. The former is projected in figure 13, where we indeed see a positive correlation. However, a closer look shows that the more recent years cluster in

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[15] Note that the earliest available data on tariff rates in the World Bank TRAINS database is from 1988.

the bottom left corner and years become less recent moving along the trend line, indicating that the correlation may be due to latent time trends. The latter is projected in figure 14 and shows a different picture. Here, we see a more scattered negative correlation, leaving the actual correlation ambiguous. Table 6 (see Appendix A) provides the covariance matrix of the two variables, which does give an indication of a negative correlation.

## 7. RESULTS

This section reports the results of the empirical analysis. For both equations, it will first present the OLS estimations and thereafter compare the results with the outcome of the GMM approach.

*7.1 Hypothesis 1: OLS*

The results from the baseline equation (1), as specified in the hypotheses section, are reported in table 2. Taking total affiliate sales as dependent variable (column 1), we note that employment protection has a significant, negative impact with a coefficient of -0.35. Keeping in mind that natural logarithms are taken of all variables, one concludes that a 1% decrease in employment protection in the host economy results in a 0.35% increase in total affiliate sales. Although the magnitude of the correlation is somewhat larger than the result obtained by Olney in his research, the sign is as expected, as well as the significance of the outcome. More interestingly, this research finds that tariff rates indeed have a positive significant correlation with total affiliate sales. Precisely, a 1% increase in mean tariff rate is estimated to result in a 0.12% increase in affiliate sales. This is consistent with our first prediction, stating that higher tariffs make it increasingly more interesting for firms to produce in a country, and thus increase its investments in the country.

Subsequently, columns 2, 3 and 4 address the different components of FDI to estimate the effects of employment protection and tariff rates on each. To start with the former, we note that employment protection is significantly and negatively correlated to all three types of FDI. Yet, the magnitude of the coefficient differs. The strongest correlation is found for vertical FDI, as we see in column 3 where a coefficient of -1.31 is estimated. This is in line with the theoretical predictions, as vertical FDI seeks cheap production sites, and increasing employment protection standards positively affects the price of labour. The weakest correlation is found between horizontal FDI and employment protection, as column 2 projects an estimation of the coefficient of a mere -0.20. This also confirms the validity of the prediction that the main goal of horizontal FDI is not cheap production sites but market access, and a modification of employment protection standards does not directly affect this. Yet the coefficient is negative, as increasing employment protection standards still affect local profits and thus the investment decision. The increasing costs may result in the MNE not entering the market completely, or deciding to serve the market from a foreign export platform. As predicted, export platform FDI shows a coefficient in between the former two, with -0.48 projected in column 4. Export platform FDI entails

aspects of both other types, as in its main purpose is to access a market similar to horizontal FDI, but within this market it seeks for the cheapest production site as vertical FDI. The effects of employment protection on the three types of FDI is similar to the outcome of Olney's research in signs, significance, and relative order.

Column 2 shows a positive, significant effect of tariff rates on horizontal FDI. Precisely, it estimates that for every 1% increase in mean tariff rates, affiliate sales to the local market increase by 0.20%. This is in line with the prediction of the model. As import tariffs increase, it becomes less attractive for a multinational to ship its products to the destination market, and relatively more profitable to produce locally. For vertical FDI, the model predicts a negative effect (if any) of tariff rates. As vertical FDI searches for the cheapest production sites, a country with lower import tariffs may have an advantage if the multinational requires imports of half-fabricates from yet another market. As import tariffs increase, the production of the final product thus becomes more expensive and the country less interesting for the multinational to invest in. The results in column 3 give an indication that the theory is correct as the sign is negative as expected, yet due to the highly insignificant p-value this research is inconclusive on the matter. Lastly, the model predicts that tariff rates have a positive effect on export platform FDI, yet the relative value of its coefficient compared to the coefficient of horizontal FDI is ambiguous. The horizontal aspect of export platform FDI predicts that higher import tariffs result in higher FDI, as the multinational will seek to invest in the site that is most expensive to export to, within a trading market. Yet, the vertical aspect predicts that the multinational will seek to invest in the site that has access to the cheapest resources to produce within the trading market, which would mean that higher tariffs would result in lower investments. The ultimate effect is thus ambiguous and would depend mainly on the relative size of the host market to the trading market. Moreover, if import tariffs become sufficiently substantial within the trading market, the multinational would be inclined to warrant multiple horizontal investments, rather than one export platform investment. The results in column 4 reflect the ambiguity of the predicted effect: an insignificant coefficient of 0.06 is estimated.

Furthermore, the signs of the control variables mirror for those that were found to be significant in either paper. A noteworthy exception are wages, which have a coefficient with a negative sign with FDI and each of its components in this research, and a significant positive coefficient for horizontal and export platform FDI in Olney's research. Besides, all signs are as expected: each type of investment tends to increase with GDP and EU membership, whereas investment risk and tax rates negatively influence FDI along each of its components.

**Table 2**: Results of the OLS estimation of hypothesis 1. Robust standard errors are in brackets. *** p<0.01, ** p<0.05, *p<0.1. All variables are in natural logs, except for the EU and NAFTA dummies. 'Total sales' are sales by US affiliates to all locations, 'Local sales' are sales by US affiliates to the local market, 'Sales to US' are sales by US affiliates back to the United States, and 'Foreign sales' are sales by US affiliates to all other foreign countries (not including the host country and the United States).

| | Total sales | Local sales | Sales to US | Foreign sales |
| --- | --- | --- | --- | --- |
| | *(1)* | *(2)* | *(3)* | *(4)* |
| L.Employment protection | -0.35*** | -0.20** | -1.32*** | -0.49*** |
| | -0.33** | [-0.20]** | [-1.11]** | [-0.56]** |
| L.Tariff rate | 0.12** | 0.20*** | -0.02 | 0.06 |
| | [0.12]** | [0.19]*** | [-0.02] | [0.01] |
| L.GDP | 1.45*** | 1.57*** | 2.84*** | 0.71* |
| | [1.45]*** | [1.59]*** | [2.61]** | [0.80] |
| L.Population | 1.08 | 0.56 | -1.07 | 2.01 |
| | [0.84] | [0.42] | [-0.47] | [0.76] |
| L.Trade cost | -0.38*** | -0.15 | 0.28 | -1.31*** |
| | [-0.41] | [-0.14] | [0.21] | [-1.28]** |
| L.Skill | -1.46*** | -1.10*** | 0.05 | -2.30*** |
| | [-1.43]** | [-1.07]** | [-0.21] | [-1.99]** |
| L.Tax rate | -1.20*** | -0.14 | -0.65** | -0.43*** |
| | [-0.20] | [-0.01] | [-0.61] | [-0.45]* |
| L.Risk premium | -0.02 | -0.02 | -0.09 | -0.03 |
| | [-0.02] | [-0.02] | [-1.05] | [-0.03] |
| L.Wages | -0.13*** | -0.02 | -0.85*** | -0.10 |
| | [-0.13] | [-0.02] | [-0.90] | [-0.06] |
| L.NAFTA | -0.53 | 0.03 | -0.04 | -0.07 |
| | [-0.04] | [0.04] | [-0.11] | [0.03] |
| L.EU | 0.37*** | 0.28*** | 0.86*** | 0.44*** |
| | [0.37***] | [0.29]*** | [0.85]** | [0.46]*** |
| Country FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Observations | 238 | 236 | 233 | 235 |
| R-squared | 0.89 | 0.89 | 0.54 | 0.79 |

This first estimation of hypothesis 1 leads to two conclusions: (1) it confirms the model by Olney and reaffirms that vertical FDI is more prone to changes in employment protection standards than horizontal FDI, which is more prone to changes in employment protection standards than horizontal FDI. The relevant conclusion for the race to the bottom hypothesis is that countries could use decreasing employment protection standards as a tool in the competition for FDI; and (2) it confirms the theory that import tariffs are positively correlated to FDI. When splitting the FDI in components, the results regarding vertical and export platform FDI are insignificant, yet the signs are in line with the model.

The relevant conclusion in the race to the bottom hypothesis is that countries may use import tariffs as a tool to make the country more attractive to invest in (as is shown by the positive and significant effect on total FDI) and use it as a deflator of the international interdependency of labour protection standards. Before we turn to the second equation of the race to the bottom hypothesis, which estimates if interdependency of countries' employment protection standards are mitigated by import tariffs, we will first employ two alternative estimation techniques to confirm the results of equation 1.

*7.2 Robustness check 1: GMM*

The results of the Arellano Bond estimation are reported in table 3. Column 1 firstly addresses the estimation for total sales. Here, we note that total sales are significantly correlated to its lagged counterpart, with a coefficient of 0.92. In line with the OLS result, column 1 reports a positive correlation between tariff rates and total sales, yet the coefficient is somewhat smaller with 0.04 and significant at a 0.1 level. Splitting sales in its components, column 2 first reports the GMM estimation of local sales, which are positively related to the local sales a year earlier with a coefficient of 0.90. The effect of tariff rates on local sales is significant at a 0.05 level and the positive sign is in line with the result of the OLS estimation. For foreign sales in countries other than the host economy, the results reported in column 4 of both the lagged sales and employment protection show to be significant at a 0.01 and 0.05 level respectively. The sign of the lagged sales explanatory variable is positive as expected, and the coefficient of employment protection is negative similar to the results of the OLS estimation. The ambiguity of the effect of tariff rates on export platform FDI is in line with the theory, and with a p-value of 0.88 the effect is again far from conclusive. For Sales back to the United States, again the effect of tariff rates is insignificant, reported in column. The coefficient of tariff rates is negative as expected, again indicating that tariff rates negatively affect vertical FDI, yet again the p-value of 0.11 demands restraint to draw any conclusions. It is interesting to note that the GMM estimated coefficients for total, horizontal, and export platform FDI are lower than their counterparts from the OLS estimation. This is in line with the theory that countries instigate relatively high import tariffs for industries they intend to attract to their country, and when FDI in those sectors increases and trade as a result decreases, so do the mean tariff rates.

The sufficient scores on the Arellano-Bond tests for zero autocorrelation as reported in table 3 for total sales and its respective components mean that the null-hypothesis of no autocorrelation of the first and second level lagged values is not rejected, and the high p-values on the Hansen tests lead to the conclusion that the model may not be rejected for over identification.

**Table 3**: Results of the Arellano-Bond GMM estimation. Robust standard errors are in brackets. *** p<0.01, ** p<0.05, *p<0.1. All variables are in natural logs, except for the EU and NAFTA dummies. 'Total sales' are sales by US affiliates to all locations, 'Local sales' are sales by US affiliates to the local market, 'Sales to US' are sales by US affiliates back to the United States, and 'Foreign sales' are sales by US affiliates to all other foreign countries (not including the host country and the United States).

| | Total sales | Local sales | Sales to US | Foreign sales |
| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| L.Employment protection | -0.10*** | -0.10*** | -0.23* | -0.07 |
| | [-0.10]*** | [-0.10]*** | [-0.23]* | [-0.07]* |
| Tariff rates | 0.04* | 0.04** | -0.02 | 0.04 |
| | [0.04] | [0.04] | [-0.02] | [0.04] |
| Lagged sales | 0.92*** | 0.90*** | 0.93*** | 0.93*** |
| | [0.92]*** | [0.90]*** | [0.93]*** | [0.93]*** |
| Controls | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Observations | 259 | 251 | 247 | 254 |
| Hansen p-value | 1 | 1 | 1 | 1 |
| AR(2) p-value | 0.39 | 0.07 | 0.80 | 0.16 |

The results related to employment protection of the OLS estimation mirror Olney's showing that the correlation is negative: most negative for vertical FDI, less so for export platform FDI and least negative for horizontal. The replication of the relative effects indicates that the OLS model is well-calibrated. Regarding the relation between tariff rates and FDI and its components, the OLS estimation and the GMM estimation provide a consistent, yet partly inconclusive picture despite the difference in estimation techniques employed. Both estimation techniques significantly confirm the positive correlation between total sales and tariff rates. Yet, when attempted to decompose FDI into its three components to address the differentiated effects, results are predominantly insignificant, yet coefficients seem to support the general theory: horizontal FDI is positively correlated with tariff rates and vertical FDI negatively. Estimation of coefficients of tariff rates on export platform FDI is most ambiguous, which is in line with the presumption that this component is subject to the combination of effects.

*7.3 Hypothesis 2: OLS*

The most important results thus far indicate that decreasing labour protection standards may be used as a tool to attract FDI, and adversely, that increasing tariff rates may be employed for the same objective. As the literature provided, national governments have valid reasons to aim to attract FDI, and as such to undercut each other in labour protection standards. According to the theory, this interdependency of labour standards, leading to the aforementioned race to the bottom, increases as markets become more integrated, and is thus mitigated by the tariff rates. To test this second hypothesis of this paper, I estimate the impact of foreign employment protection standards on domestic foreign protection standards, the impact of tariff rates on the latter, and crucially the interaction term of the predicting variables. As the

section on the econometric specification expounds the theory predicts that domestic labour standards positively correlates with tariff rates and foreign labour protection standards, and negatively with their interaction term.

Table 4 reports left the results of the OLS regression of equation 3 as laid out in the section on the econometric specification. In the table, competitor employment of competing countries are captured by the Competitor EP term, which is spatially lagged and row normalized, again following the technique elaborated on in the aforementioned section. We note that this space-time lagged variable is positively correlated with the dependent variable, with a coefficient of 2.21. As we again estimate a model of natural logarithms of the variable values, it is concluded that if the weighted average of foreign employment standards falls by 1%, the employment protection standards in the domestic economy fall by 2.21%. Continuing with the second explanatory variable, we note that the simple mean of tariff rates, here denoted by Tariff rates, are estimated to have a positive effect on employment protection standards. Following the same logic, the coefficient of 0.45 is interpreted as a 0.45% increase in labour protection standards for every 1% increase in tariff rates.[16] The third variable of our interest, the interaction term, is negative and significant at a 0.1 level. Again referring to the specification section, one is reminded that a significant negative interaction term is interpreted as that the combined effect of tariff rates and foreign employment protection standers are less than the sum of their parts, and thereby confirms the theory that tariff rates may be used as an intermediary measure to protect the labour protection standards in the home economy from the race to the bottom effect of competition.

The control variables are mostly significant and of the expected sign. Labour protection standards in the home economy are positively correlated with GDP, trade cost, wages, political ideology and unionization. Negative correlations are found with population, corporate tax rates, and skill level. The latter effect is controversial, but may be explained by a lesser degree of dependency of skilled employees on government labour protection legislation.

*7.4 Robustness check 2: GMM*

To control for persistency of labour standards over time, we turn to the GMM estimation as described in the model specification section as equation 4. Here, the correlation between labour standards between the lagged domestic value and the space-time lagged foreign values is tested, as well and again tariff rates and the interaction term. We note in table 4 at the right side that employment protections standards are indeed correlated to its lagged value with a coefficient of 0.42. This is logically explained by the political, social and corporate forces opposing change. For the other three coefficients of interests, we see that signs mimic the results of the OLS estimation, yet significant levels are inconclusive. For the

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[16] Note that the 1% change of tariff rate is based on the mean tariff rate, which in itself is measured by percentage points. The 1% referred to here is the change in percentage points.

strength of the coefficient with foreign labour standards, we note that coefficient is a lot smaller than for the OLS, indicating that the lagged domestic variable partly absorbs the correlation. Correlation coefficients of tariff rates and the interaction term are similar to the OLS result. The insignificant values for the p-score on the AR(2) and Sargan test do not require the null hypotheses to be rejected, meaning that that the second degree lags are not autocorrelated and the model is well specified. In contrast with the OLS results, the results from the GMM estimation are significant on none of the three significance levels indicated. This may lead to two conclusions: (1) the effects found in the OLS estimation are in fact due to autocorrelation of the dependent variable and there is no spatial autoregressive relation of employment protection standards or an intermediating effect of tariff rates; or (2) due to the efficiency limiting properties of GMM relative to OLS the small sample size yields different significance levels over the two techniques. As mentioned in section 4.2, this paper leans on the OLS due to the likeliness of option 2, but to be conclusive analysis of a more comprehensive dataset is required.

Generally, the results seem to confirm the three main predictions of the model regarding hypothesis 2: (1) domestic employment protection is positively correlated to the labour protection standards in other countries. This means that a country follows the actions of foreign countries if they lower their labour protection standards, confirming a race to the bottom effect; (2) further, we not that tariff rates are positively correlation with employment protection standards, confirming the prediction that countries with high tariff rates are less inclined to reduce labour standards from competitive intentions; and (3) the interaction term between tariff rates and foreign labour protection standards is negative, indicating that the combined effect is less than the sum of the parts. Logically, we follow the model that at one side, an increase in tariff rates has less of a positive on FDI if other countries have relatively high labour standards, because the competition is simply less fierce. On the other hand, the model would predict that an in increase in foreign labour standards would less affect relatively well protected economy because the labour standards are already above the market equivalent, ceteris paribus. Concluding, the model seems to indicate that protectionism seems to be, indeed, a tool to protect domestic labour standards from the persistent race to the bottom in the competition for FDI.

**Table 4**: Results of the estimation of equation 3 (left) and equation 4 (right) of Hypothesis 2. Robust standard errors in brackets. Robust standard errors are in brackets. \*\*\* p<0.01, \*\* p<0.05, \*p<0.1. All variables are in natural logs, except for the EU dummy. The dependent variable is employment protection country in the host economy. Competitor EP is a weighted average of employment protection standards in foreign countries, based on distance from the host economy. CEP\*Tariff rates denotes the interaction term between Tariff rates and competitor employment protection standards.

| *OLS* | | | *GMM* | |
|---|---|---|---|---|
| L.Competitor EP | 2.21\*\*\* [1.85]\* | | L.Competitor EP | 0.46 [0.49] |
| L.Tariff rates | 0.45\*\* [0.36]\* | | L.tariff rates | 0.20 [0.20] |
| L.CEP\*Tariff rates | -0.57\* [-0.44]\* | | L.CEP\*Tariff rates | -0.24 [-0.24] |
| L.GDP | 0.63\*\*\* [0.62]\*\*\* | | Lagged EP | 0.43\*\*\* [0.43]\*\* |
| L.Population | -2.21\*\*\* [-2.08] | | Controls | Yes |
| L.Tradecost | 0.16 [0.14] | | Decade FE | Yes |
| L.Skill | -1.11\*\*\* [-1.13]\*\* | | Observations | 175 |
| L.Tax rate | -0.09\* [-0.08] | | Sargan p-value | 0.47 |
| L.Wages | 0.15\*\*\* [0.15] | | AR(2) p-value | 0.39 |
| L.Risk premium | -0.01 [-0.01] | | | |
| L.Ideology | 0.04\* [0.04] | | | |
| L.Unionization | 0.00\*\* 0.00 | | | |
| L.EU | -0.02 [-0.02] | | | |
| Country FE | Yes | | | |
| Decade FE | Yes | | | |
| Observations | 203 | | | |
| R-squared | 0.40 | | | |

# 8. CONCLUDING REMARKS

*8.1 Summary*

Analysing a panel data set consisting of twenty six countries over twenty three years, this research has yielded the following results. Firstly, it showed that for the dataset, tariff rates and employment protection sorted opposite effects on the inflow of FDI. The former showed a positive correlation with FDI, whereas the latter a negative one. Breaking it down to components, tariff rates were positively correlated with horizontal FDI, confirming the tariff-jumping theory. The effects on vertical and export platform FDI were insignificant, yet indicated that at least vertical FDI benefits from low import tariffs, like theory predicts. The effect of employment protection was strongest for vertical FDI, weakest for horizontal FDI and intermediate for export platform FDI, confirming their respective mobility. Using a GMM predictor, the paper shows that the positive effect of import tariffs on FDI also holds at a $0.05 < p < 0.1$ level for the intrinsically endogenous weighted average of import tariffs, and controlled for persistence of FDI over time.

The paper showed that labour standards are positively space time autoregressive, confirming the race to the bottom hypothesis. Moreover, it showed that tariff rates have a positive effect on labour standards, and lastly, that the interaction term between tariff rates and the space time lagged employment protection variable was negative. As such, we conclude that the impact of foreign labour standards on the domestic labour standards, the race-to-the-bottom, increases in pressure as mean tariff rates decrease. In order to control for persistence of labour standards over time, I thereafter estimated the GMM model, which did not yield significant results.

*8.2 Discussion*

This paper is not conclusive on several aspects of its hypothesis due to insignificant results. Testing the first hypothesis, the effect of tariff rates on the three separate components was insignificant for vertical and export platform FDI. This is unfortunate because, even though the hypothesis for FDI in general holds, it doesn't allow us to distinguish its actual mechanisms. Had the data been clear on the relative effects on the separate components, it could be used as a weighting scheme to predict results outside of the sample. Moreover, the GMM estimators yielded insignificant results testing for the second hypothesis. Therefore, this paper is not conclusive if the acquired results in the OLS model are not a result of the persistence of labour standards over time. Presumably, the insignificant results are an effect of gaps in the data for tariff rates and investment costs. To the best of my knowledge, the data included in this research is the most complete that is freely available. To further solidify the results of this research, one could test the models using data from BERI for investment risk. Regarding import tariffs, I am not aware of a more complete dataset than the one I employed.

There are several reasons to question the external validity of the findings, mostly due to the scope of the dataset. The literature review revealed that FDI is more beneficial for developing countries than for developed countries, possibly eroding the motivation for developing countries to compete in employment protection standards. Moreover, the developed OECD countries host a relatively large share of horizontal FDI compared to vertical. As tariff rates have a proven positive effect on the former, and an assumed negative effect on the latter, one could argue that for less developed countries, tariff rates cannot be utilized as a buffer against competition forces. Lastly, the FDI tested for in this research was all from US companies. The literature review uncovered that MNEs from developed countries are more likely to respond to import tariffs by investment. Therefore, the overall effect of tariff rates on investment may be lower than found in this research.

*8.3 Policy implications*

If one is to accept the political premise that employment protection standards have social value and are preferred to be maintained, sorts three possible reactions: (1) a government protects is employment protection standards by cultivating its import tariffs. As such, it maintains investments and protection at the cost of global integration; (2) a government allows the erosion of employment protection standards by increasing economic globalization and pursuing economic growth, ultimately having to accept or ignore public uproar; or (3) it can decrease the competitive pressure on labour standards by allowing supranational agreements on such issues to be paired with tariff restricting agreements. As such, this paper returns to the globalization trilemma which is ultimately a political choice for globalization, sovereignty *or* democracy.

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*Appendix A: Tables and figures*

**Figure 4**: Country averages of local sales (y-axis) against country averages of tariff rates and employment protection (x-axis). All values are in natural logarithms.
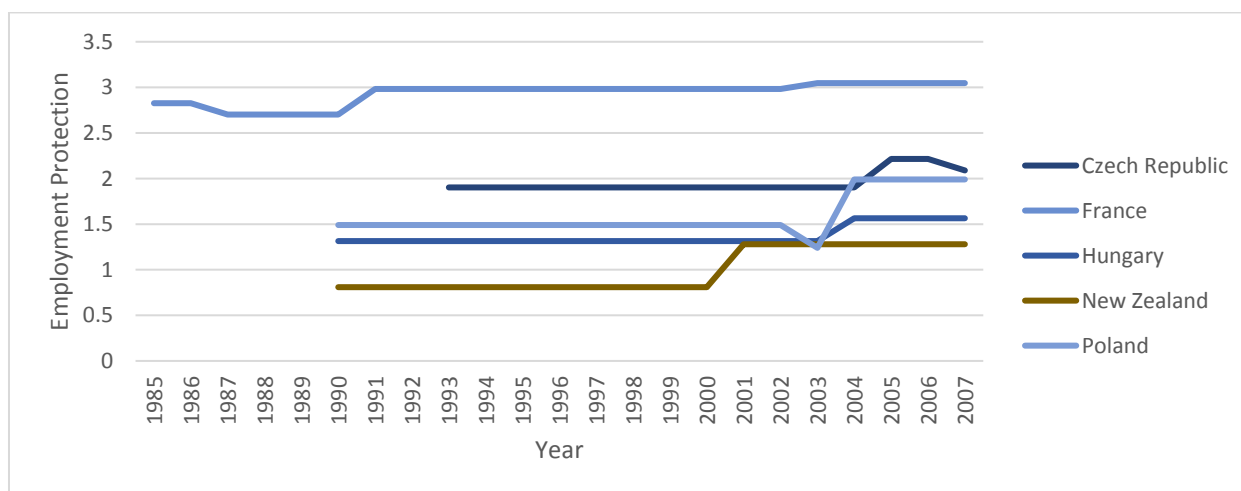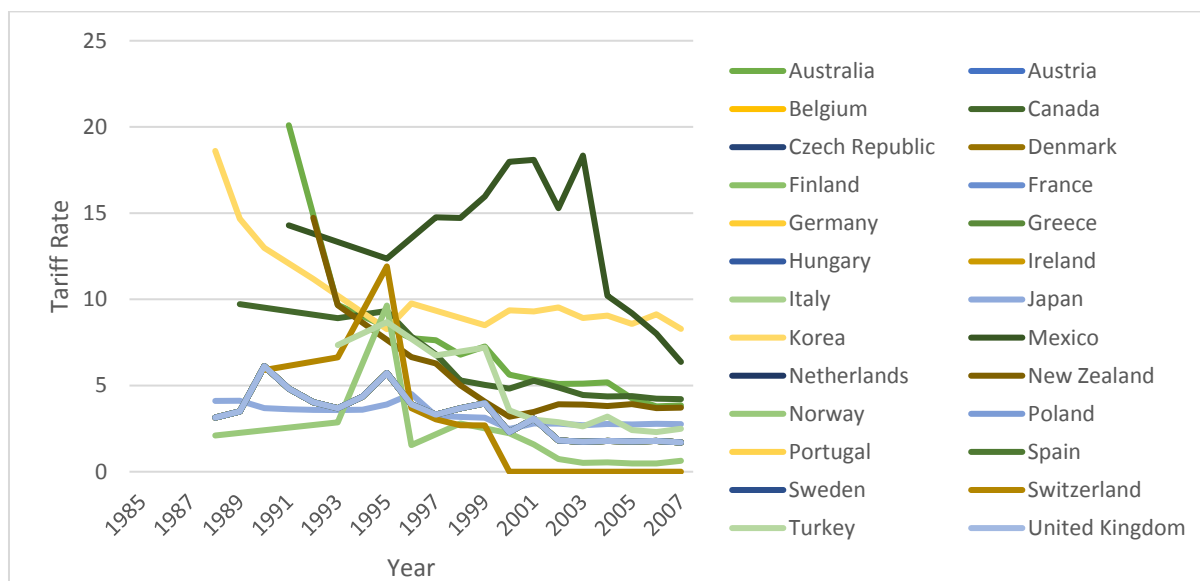


**Figure 5**: Country averages of sales to other foreign countries (y-axis) against country averages of tariff rates and employment protection (x-axis). All values are in natural logarithms.



**Figure 6**: Country averages of sales to other foreign countries (y-axis) against country averages of tariff rates and employment protection (x-axis). All values are in natural logarithms.



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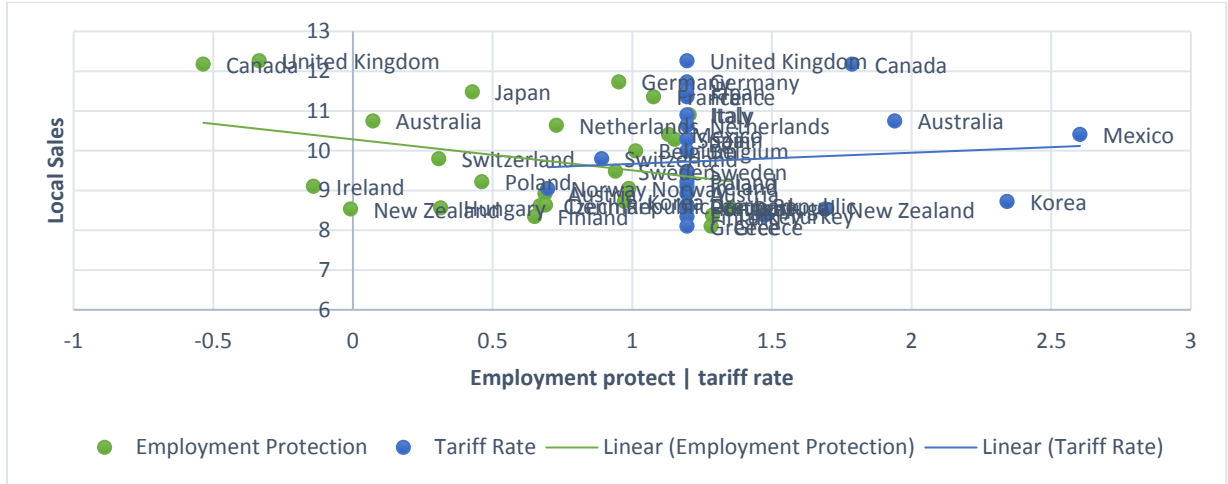
**Figure 7**: country trends of employment protection standards.
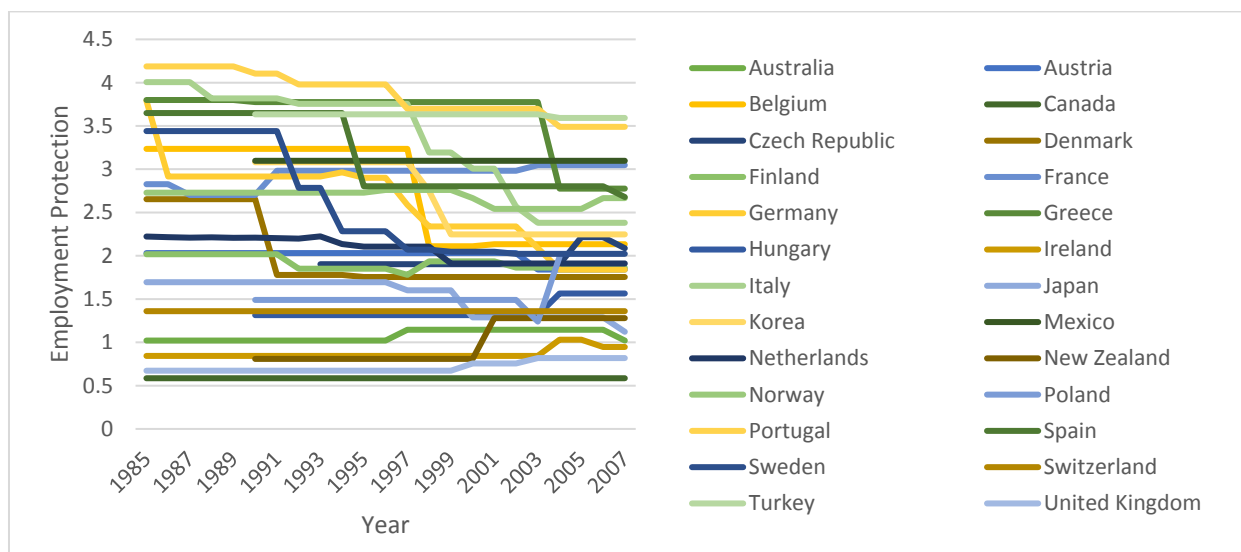


**Figure 8**: country trends of the five largest decreases in employment protection standards.
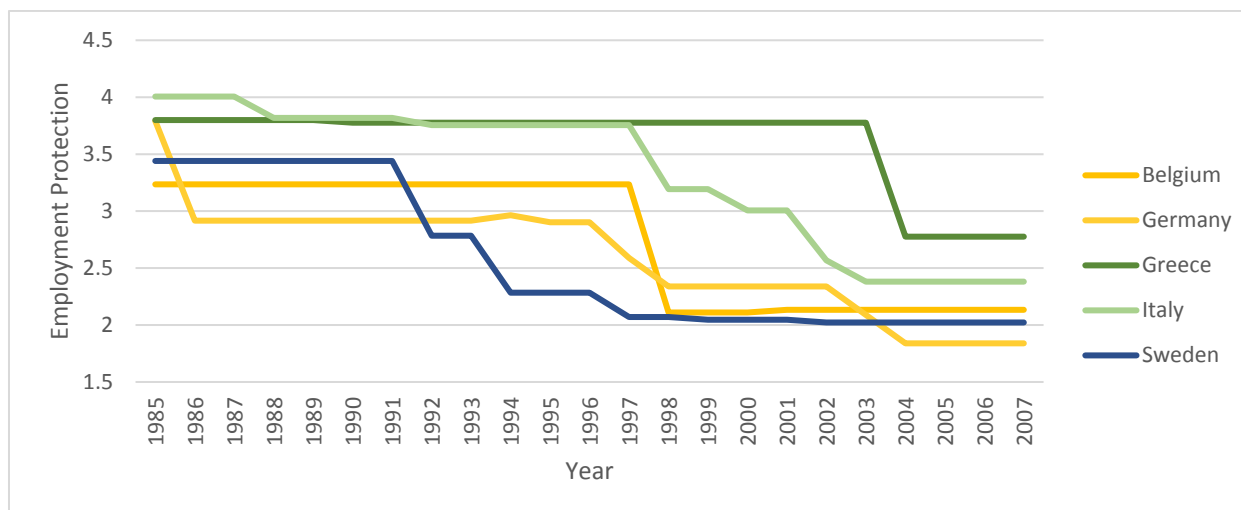


**Figure 9**: country trends of the five largest increases in employment protection standards.

**Figure 10**: country trends of import tariffs.



**Figure 11**: country trends of the five largest decreases in import tariffs.
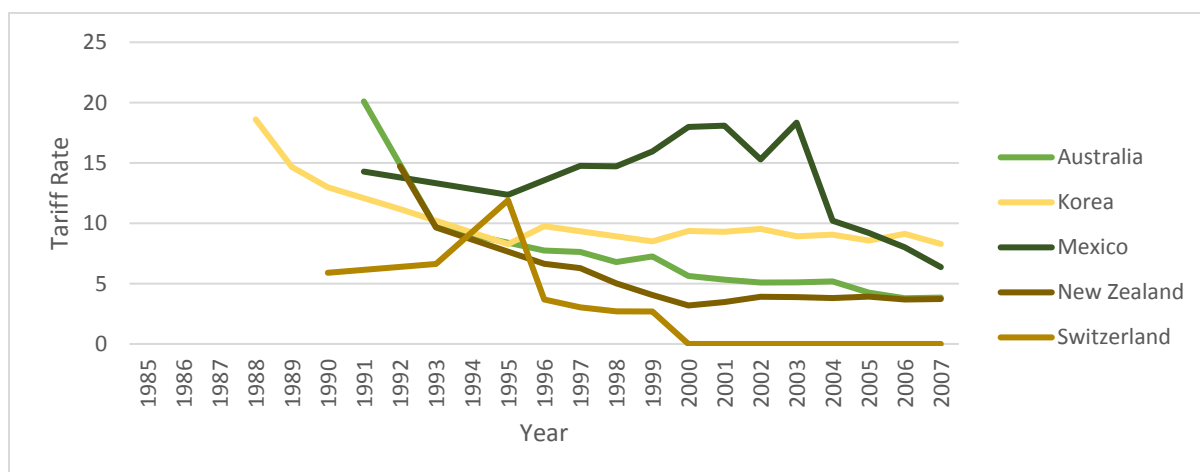


**Figure 12**: country trends of the five largest increases in import tariffs.
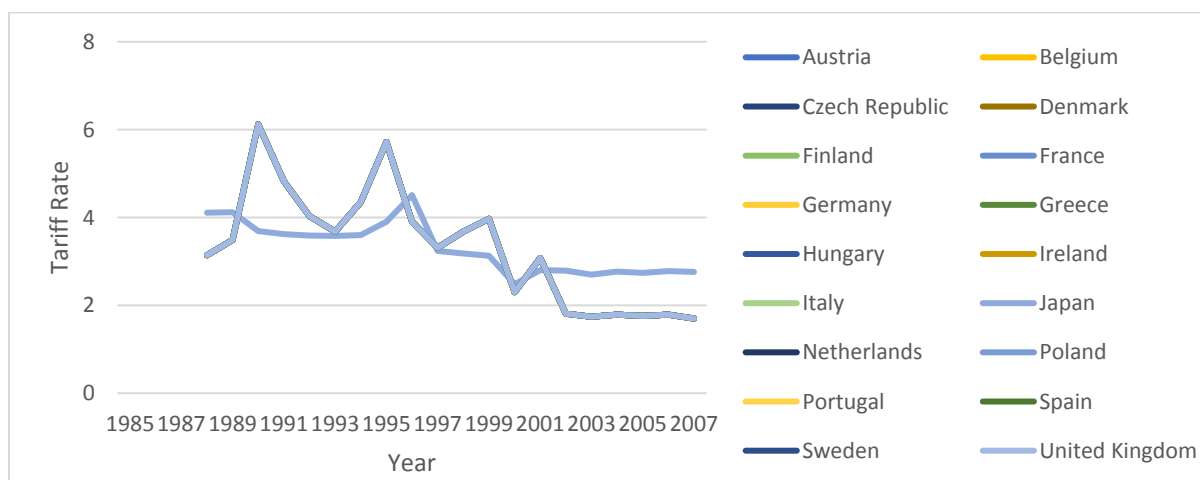
**Figure 13**: annual averages of employment protection standards against annual averages of tariff rates. Both values are in natural logarithms.
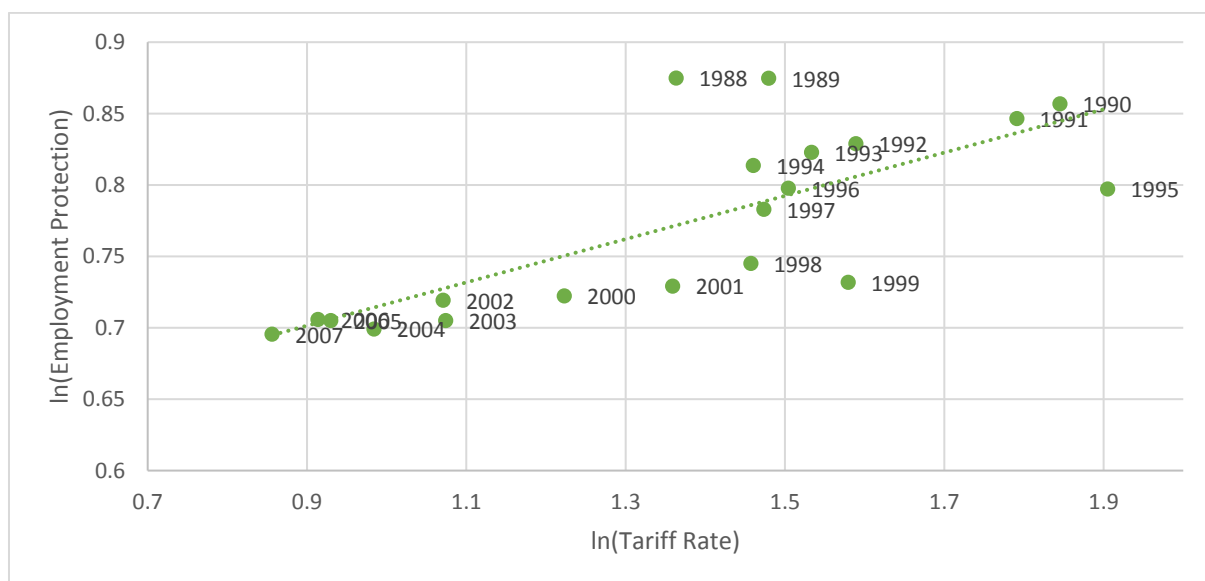


**Figure 14**: country averages of employment protection standards against country averages of tariff rates. Both values are in natural logarithms.
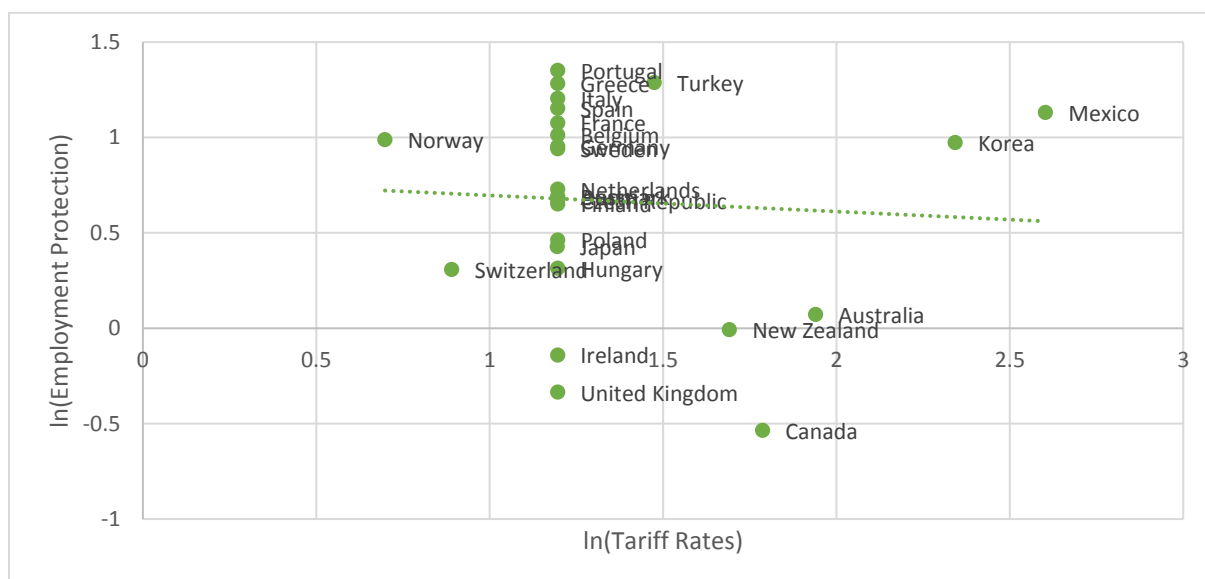


**Table 4**: correlation matrix between employment protection standards and simple mean tariff rates.

|  | *Employment protection standards* | *Simple mean tariff rates* |
|---|---|---|
| Employment protection standards | 0.262939 |  |
| Simple mean tariff rates | -0.014011 | 0.322039 |

*Appendix B: A comparison with Olney's data*

**Table 5**: summary statistics of my data. The sample includes 26 OECD countries and 23 years (1985-2007).

| *Variable* | *Observations* | *Mean* | *Standard Deviation* | *Minimum* | *Maximum* |
|---|---|---|---|---|---|
| Total Affiliate Sales (million dollars) | 555 | 71460.76 | 97122.05 | 1164.683 | 595323.3 |
| Employment Protection | 560 | 2.189456 | 0.995218 | 1 | 4.1875 |
| GDP (million dollars) | 582 | 619,942 | 731405.4 | 32031.59 | 4,264,208 |
| Population (thousands) | 598 | 31500 | 32100 | 3298.05 | 128000 |
| Trade Costs | 592 | 0.021311 | 0.011606 | 0.0058843 | 0.072654 |
| Skill | 598 | 9.502605 | 1.893466 | 3.97 | 13.112 |
| Tax Rate (%) | 549 | 33 | 10 | 8.5 | 56 |
| Risk Premium on Lending (%) | 357 | 2.77745 | 2.196947 | -1.606667 | 13 |
| Wages (Index) | 516 | 76 | 19 | 15 | 131 |
| Ideology (index) | 598 | 2.55 | 1.09 | 1.00 | 4.50 |
| Unionization (%) | 569 | 35.36 | 19.51 | 7.56 | 83.86 |

**Table 6**: summary statistics of Olney's (2013) data. The sample includes 26 OECD countries and 23 years (1985-2007).

| *Variable* | *Observations* | *Mean* | *Standard Deviation* | *Minimum* | *Maximum* |
|---|---|---|---|---|---|
| Total Affiliate Sales (million dollars) | 556 | 71,364 | 96,918 | 1,165 | 586,295 |
| Employment Protection | 560 | 2.2 | 1.0 | 0,6 | 4.2 |
| GDP (million dollars) | 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 (index) | 590 | 0.018 | 0.003 | 0.012 | 0.027 |
| Wages (Index) | 570 | 80.5 | 24.0 | 0.0 | 121.8 |
| Ideology (index) | 590 | 2.1 | 0.5 | 1.2 | 3.0 |
| Unionization (%) | 558 | 35.2 | 20.0 | 6.6 | 83.9 |

Note: in my data, Canada receives the lowest score for employment protection with a score of 1 throughout the entire span of the dataset; whereas the highest score is acquired by Portugal in the late eighties. In Olney's dataset, the lowest score was acquired by the United Kingdom in 2007, which could be due to a different weighting scheme employed to average scores on individual contracts, collective dismissals, and temporary contracts. However, looking at the development graphs of employment

protection standards I note, for example, a local peak for Spain in 2002, whereas none of the three indicators at the OECD shows that increase in the OECD data. Therefore, the OECD has probably revised the data since Olney's research. Despite there being some discrepancies in the relative order of the final scores, the effects are expected to be marginal as all three components of employment protection are correlated to the latent political and social ideology.
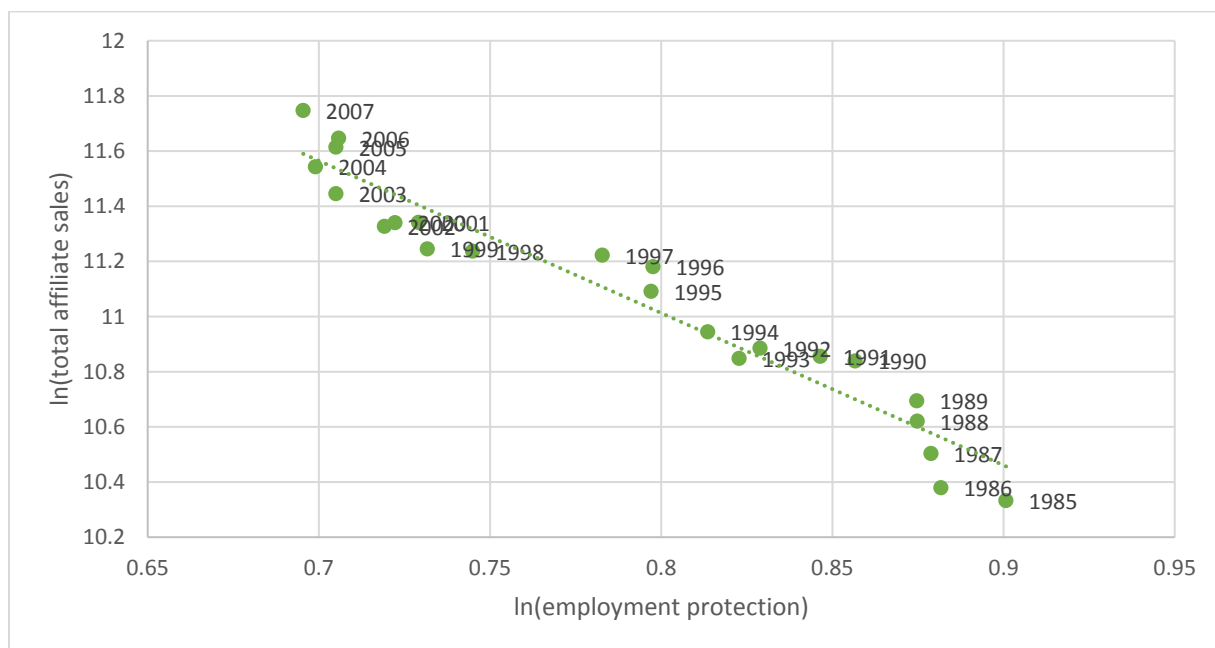
**Figure 15**: trends of annual average total affiliate sales and annual average of employment protection in my data.
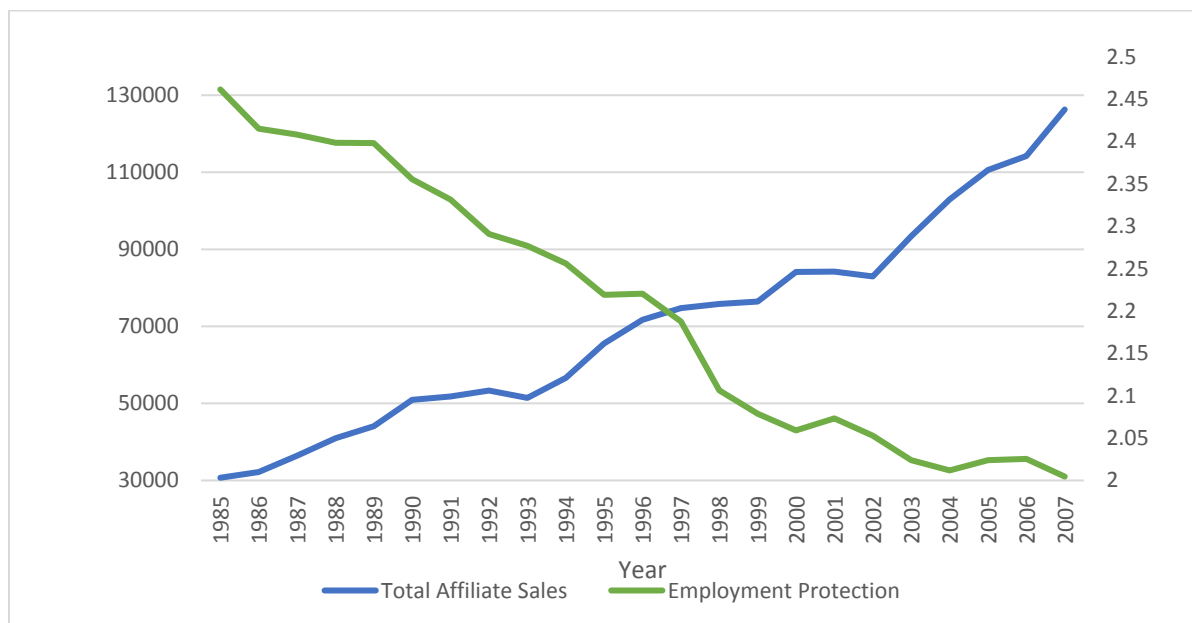


**Figure 16**: trends of annual average total affiliate sales and annual average of employment protection in my data.



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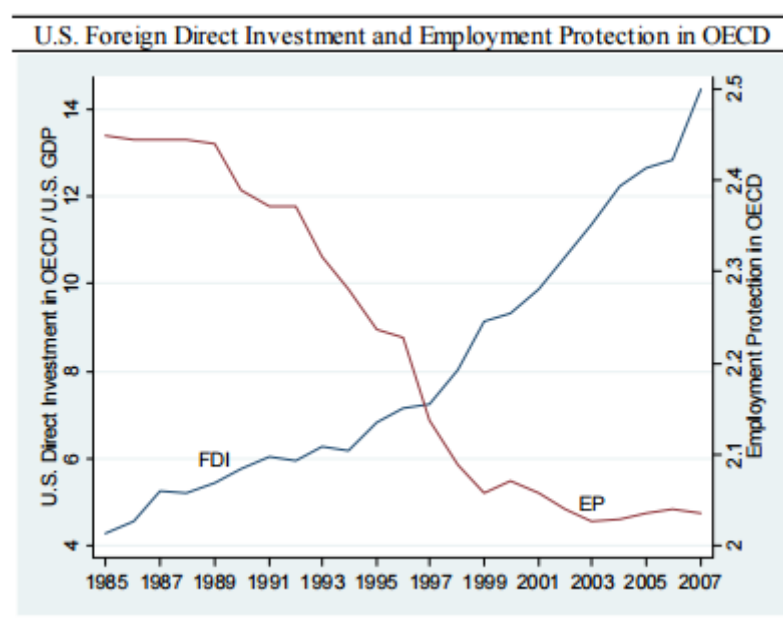
**Figure 17**: employment protection and total affiliate sales (annual average), based on my data.
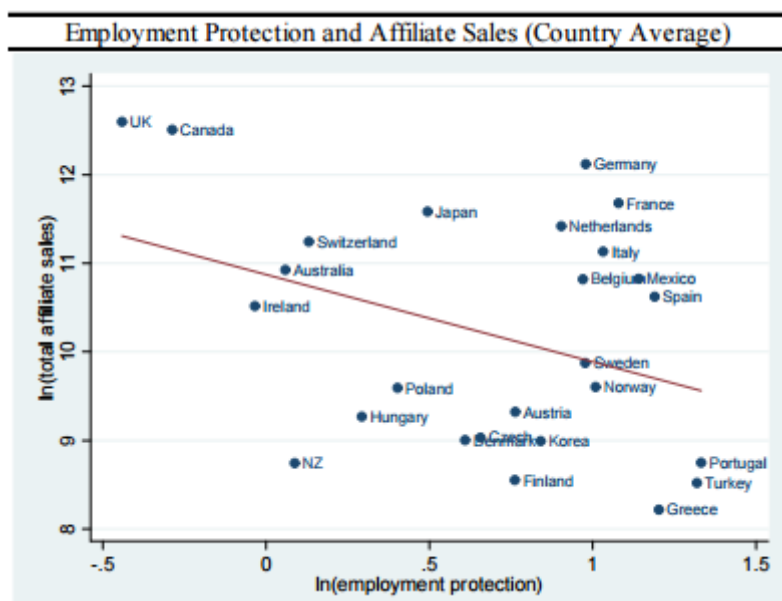


**Figure 18**: employment protection and total affiliate sales (annual average), based on Olney's data.
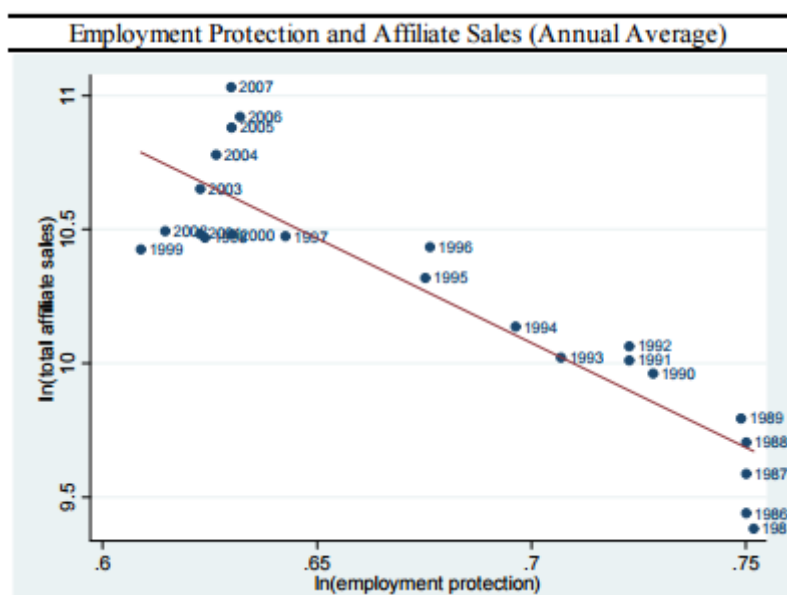
**Figure 19**: employment protection and total affiliate sales (country average), based on my data.
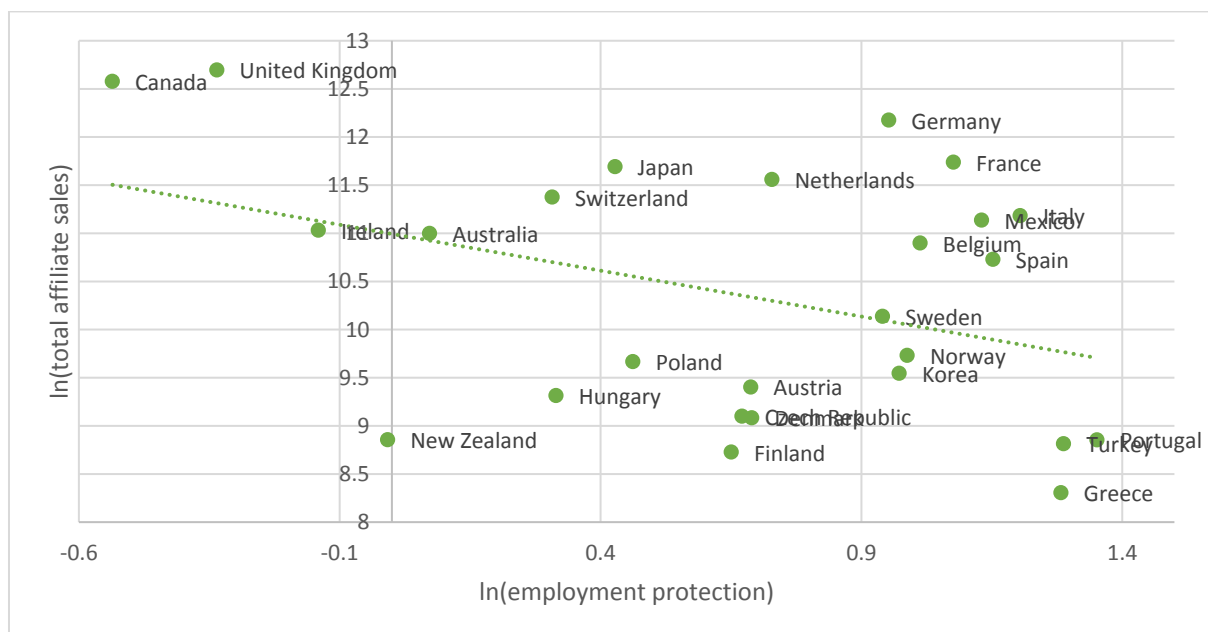


**Figure 20**: employment protection and total affiliate sales (country average), based on Olney's data

**Figure 21**: horizontal (top)- vertical (middle)- and export platform (bottom) FDI, plotted against employment protection, based on my data. All values are in natural logarithms.
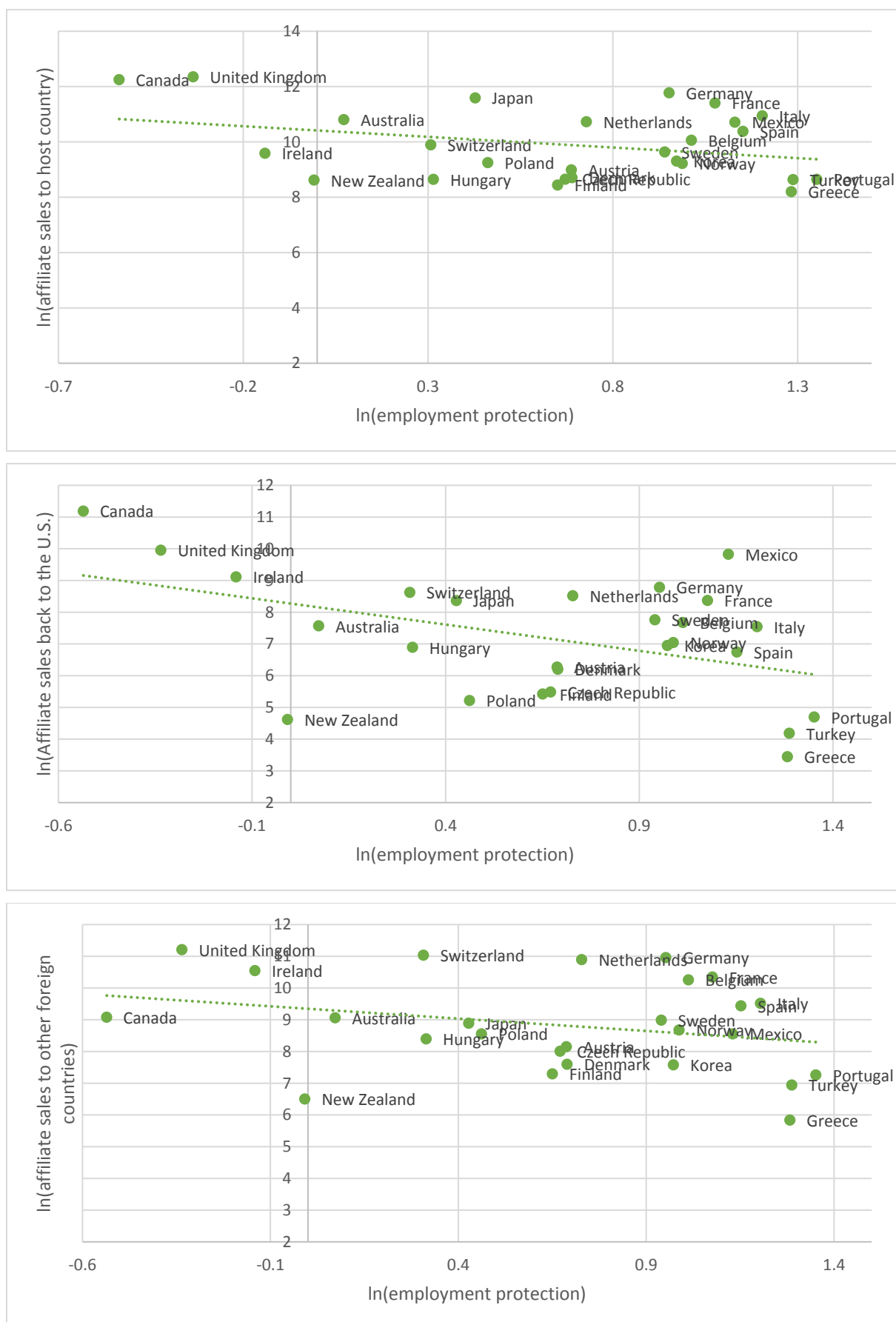
**Figure 22**: horizontal (top)- vertical (middle)- and export platform (bottom) FDI, plotted against employment protection, based on Olney's data. All values are in natural logarithms.
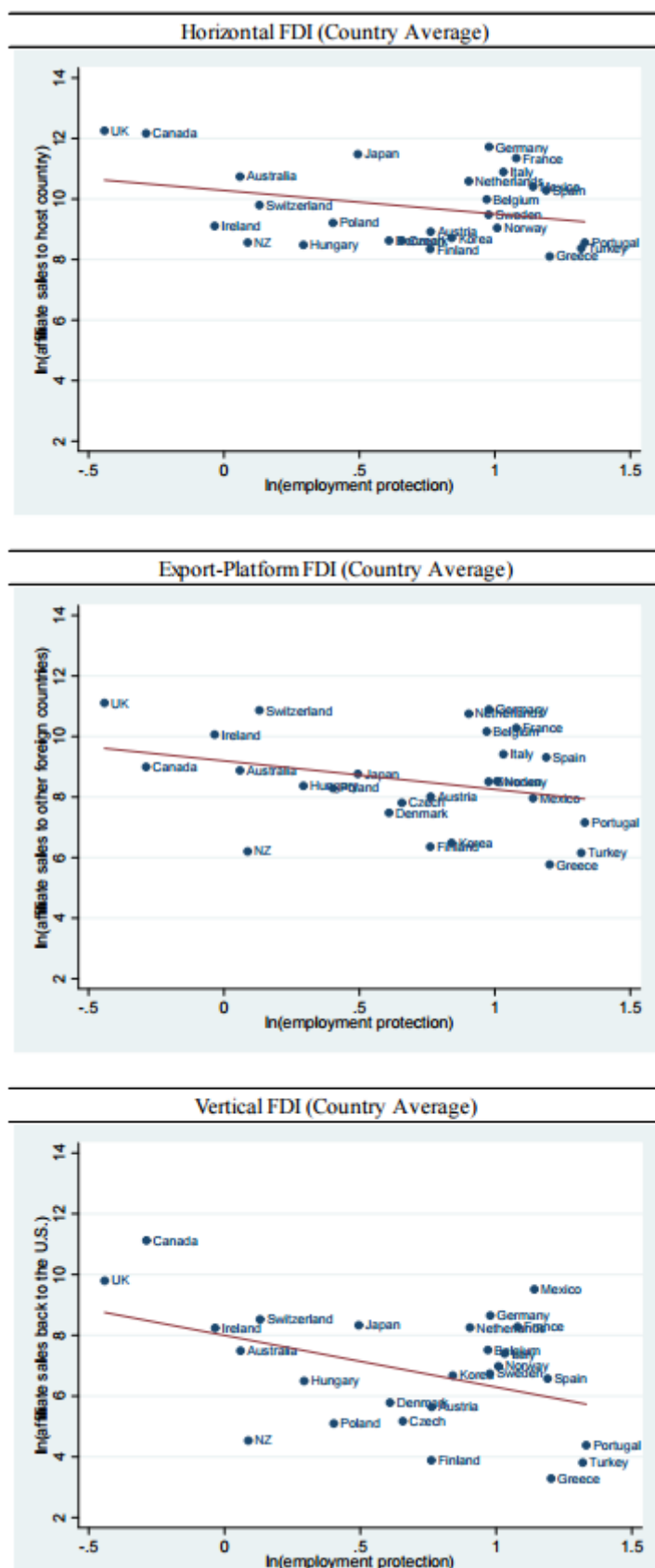
**Figure 23**: trend lines of employment protection standards over time of all countries (top), largest decreases (middle) and largest increases, based on my data.
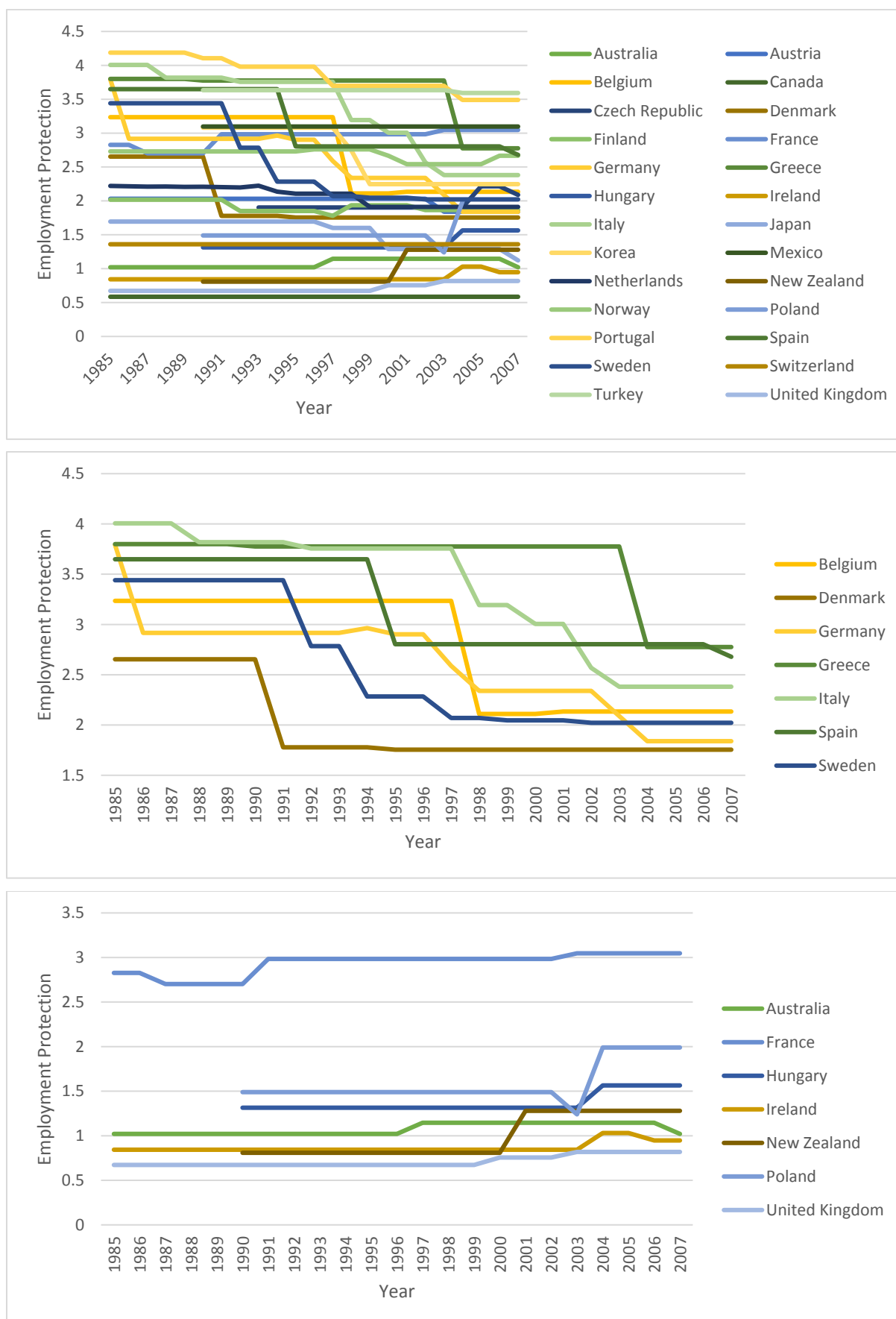
**Figure 24**: trend lines of employment protection standards over time of all countries (top), largest decreases (middle) and largest increases, based on Olney's data.
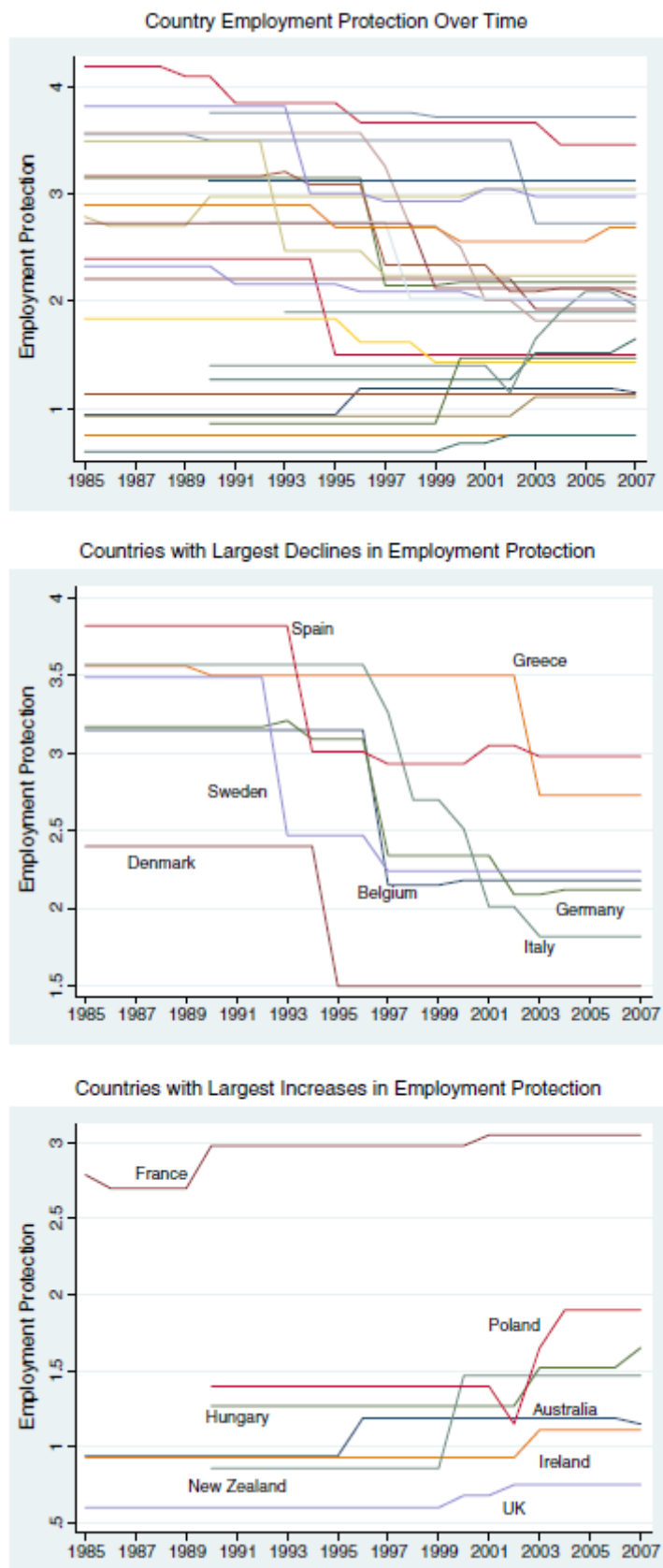
**Figure 25**: box-plot of tariff rates for each individual year and country



Tariff rate, applied, simple mean, all products (%) [TM.TAX.MRCH.SM.AR.ZS]