serve the needs of child passengers, thus possibly reducing welfare in the long run.

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TRADE, FACTOR PROPORTIONS, AND POLITICAL RIGHTS

José Tavares*

Abstract—This paper uses aggregate data to test the implication that capital-poor individuals favor trade liberalization in poor (capital-scarce) countries and are against it in rich (labor-scarce) countries. Income per capita is used as a proxy for the country capital-labor ratio while political rights is used as a proxy for the capital-labor ratio of the median voter. We analyze the determinants of average tariff rates in a cross section of countries to find that they are negatively associated with both income per capita and political rights, while they are positively, significantly, and robustly associated with their interaction, corroborating our initial hypothesis.

I. Introduction

In the past few decades, the world has experienced a dramatic increase in the volume of international trade, similar to the experience of trade integration in the late nineteenth century. However, unlike the nineteenth century, today the exchange of goods across borders takes place between established democracies or countries that progressively award more political rights to their citizens. The Freedom House Index of Political Rights increased on average from 0.42 to 0.59 between 1972 and 1999, higher figures denoting more political rights.[1] The rise in trade is accompanied in rich countries by fears that inexpensive imports from low-wage developing countries will drive out jobs or drive down wages. In the United States there has been an absolute decline in the wage rate of the unskilled since the mid 1970s, partly attributable to increased international integration,[2] while Europe has experienced an increase in the unemployment rate.[3] There is

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*Faculdade de Economia, Universidade Nova de Lisboa.

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[1] The Freedom House Index, structured for convenience on a scale from 0 to 10, is available from Freedom House (2005).

[2] The tendency for real wages to rise in the United States conspicuously halted in the early 1970s, while imports as a share of gross domestic product started a sharp increase.

[3] Other forces, such as technology, have been advanced as possible causes of the reversal in the wages of the unskilled. This paper exploits and emphasizes the trade link, but not necessarily because it is stronger. While policymakers can do little about technology, they can do something about trade openness.

a risk of a rise in protectionism, which would cut short the potential benefits of economic integration and specialization.[4]

The literature on the political economy of protection has so far focused almost exclusively on studies of the demand for protection at the industry or individual levels, ignoring aggregate data.[5] The main benefit of using aggregate data is the possibility of inferring results from a broad cross section of countries over time, in contrast with the important microstudies that tend to concentrate on one country and one year. The response of trade policy to individual preferences should be discernible in aggregate data, and several reasons make it worthwhile to investigate how the interaction of factor endowments and political rights affects trade openness.

First, the factor proportions theory of trade has clear distributional predictions: the Stolper-Samuelson theorem postulates that, as countries integrate with world markets, the return to the domestically scarce factor decreases while the return to the abundant factor increases. In other words, world market integration has a starkly asymmetric impact in capital-abundant and labor-abundant countries: it harms workers where capital is relatively abundant and benefits workers where capital is relatively scarce. In a classical paper, Mayer (1984) uses the Stolper-Samuelson effect to derive a formal relationship between the capital-labor ratio of the median voter and her preferred level of trade openness. We argue that the level of political rights proxies for the influence of capital-poor individuals in the design of trade policy. Since most of the electorate—and, notably, the median voter—are relatively capital poor in any given country, more democracy may lead to less openness in capital-abundant countries and more openness in labor-abundant countries. By using the interaction of political rights and an indicator of a country capital-labor endowment, we formally test the link between factor proportions and trade policy.

A second reason to examine aggregate data is that the debate over trade policy is almost always framed, in politically relevant terms, as the result of a clash between the high-wage/capital-abundant industrialized world and the low-wage/capital-scarce developing world. The argument that integration may lead to a protectionist backlash involves a political mechanism working at the national level, suggesting an examination of aggregate entities, "invisible" to sectorial studies.

Our paper adds to the literature on the political economy of protection in different ways. First, we argue that political rights is a good proxy for the relative endowment of the median voter, as political rights tend to be "granted" by relatively high-income elites to relatively lower-income citizens.[6] The predictions on political rights and trade are clear-cut: political rights are associated with yielding power to the low capital-per-worker median voter. In relatively capital-abundant countries this median voter has an incentive to block imports, while in labor-abundant countries the median voter has an interest in doing the opposite. This paper uses a broad sample of countries over time, new data on tariff rates, and an indicator of exogenous import intensity[7] and finds that political rights are an important driving force of tariff rates and import intensity.[8]

In addition, political rights are a better proxy than income inequality, as used in Dutt and Mitra (2002), for different reasons. First, inequality may actually have the opposite effect of increasing the capital-labor endowment of the decisive "voter" by redistributing power to lobbies, which tend to be formed mostly by producers, high capital-per-worker individuals, as demonstrated in Rodriguez (2004).[9] Second, redistributive schemes that compensate those who lose from trade policy changes are rarely, if ever, put in place: as argued in Spector (2001), in some cases it is altogether infeasible to redistribute the gains from trade.[10] Given this restriction on redistribution, factor owners will display trade policy preferences that diverge from the optimal policy recommendation of free trade. Whoever actually makes trade policy choices becomes a relevant issue. Plausibly, in democratic regimes political representatives reflect, however imperfectly, the trade preferences of individuals.[11]

II. Trade, Factor Returns, and Political Rights

Economists tend to look for differences in factor endowments where they observe trade. The most basic tool to think about trade, the Hecksher-Ohlin model, proposes a simple mechanism: domestic factor supplies and exogenous international product prices determine domestic production and consumption. Trade is the difference between domestic production and domestic consumption. If all countries have similar consumption patterns, a given country will tend to export the goods that use intensively the factor that is relatively abundant at home, and import the goods using the domestically scarce factor. An important result deriving from the factor proportions theory of trade is the Stolper-Samuelson theorem, stating that when a country opens up to trade it experiences a decrease in the return to the domestically scarce factor and an increase in the return to the abundant factor.[12]

[4] The relationship between trade openness and economic growth has been widely documented, as in Frankel and Romer (1999), Wei (2000), and Quah and Rauch (1990). Rodriguez and Rodrik (2000) present a skeptical view.

[5] Two important exceptions, which we review below and of which we became aware when finalizing this paper, are Milner with Kubota (2005) and O'Rourke and Taylor (2006). See Rodrik (1995) for an early survey of the empirical literature on the political economy of trade. Tavares and Wacziarg (2001), in a study of the effects of democratization on economic growth, found an increase in political rights to be associated with a decrease in trade intensity.

[6] See, for instance, Acemoglu and Robinson (2001).

[7] This measure of exogenous openness, from which an indicator of policy-induced openness will be derived, is in the spirit of Frankel and Romer (1999) and Wei (2000). These authors use exogenous determinants of openness—namely, the geographical characteristics of the country—to estimate "exogenous openness," correct for endogeneity, and make inferences on the impact of openness and growth. See footnote 19 below.

[8] Baack and Ray (1983) had presented some evidence that the extension of the franchise in the United States was accompanied by declining tariffs on capital-intensive imports and rising tariffs on labor-intensive imports.

[9] This is also a factor in Mitra (2002), who analyzes the relationship between the fixed costs of lobbying and the choice of free trade.

[10] More generally, there is little evidence that redistribution responds to inequality. Benabou (1996) surveys cross-country evidence testing the link between inequality and redistribution and finds that nine out of ten studies do not find a relationship of any sign between the variables, while Perotti (1996) regresses six indicators of redistribution on an indicator of inequality and finds very little evidence of a pattern, whether the sample is restricted to democracies or not. We acknowledge that increases in political rights have two effects: a decrease in the capital-labor ratio of the median voter, which unambiguously should lead to more openness in capital-poor countries—as suggested in Milner with Kubota (2005)—and a possible increase in the capital-labor ratio if more democracy leads to redistribution. The little evidence in favor of an empirical link between inequality and redistribution suggests that the first effect dominates. That is also an issue that can be decided by the data.

[11] In a previous version of this paper we have shown that, when the interaction of political rights and income per capita is entered as a determinant of trade, the interaction of income inequality with income becomes nonsignificant. This holds for import intensity and for two indicators of trade policy openness. These results are available upon request.

[12] See Samuelson (1949).

TABLE 1.—TRADE OPENNESS, INCOME, AND POLITICAL RIGHTS SUMMARY STATISTICS

	Observations	Mean	Standard Deviation	Correlation with Income Per Capita	Correlation with Political Rights
Import intensity	441	37.85	22.01	0.11	0.09
Import policy indicator	441	−2.37	19.74	0.17	0.04
Import tariffs	472	19.41	13.93	−0.41	−0.25
Political rights	465	0.53	0.33	0.48	1
Income per capita	456	8.18	1.06	1	

In each case the sample considered is the largest for which tariff data are available.

Opening an economy raises the real return to the factor that is relatively abundant at home through a rise in the price of the good that uses that factor intensively.[13] The existence of winners and losers to trade liberalization is a conspicuous feature of trade models.

There are several studies suggesting an empirical connection between individual factor endowments and preferences for trade openness, including Brock and Magee (1978), Irwin (1996), Rogowski (1989), Scheve and Slaughter (2001), Balistreri (1997), and Beaulieu (2002). More recently, Mayda and Rodrik (2005) have crossed individual and country characteristics to assess what determines trade preferences. They find that attitudes toward trade are influenced by economic and noneconomic considerations. Specifically, individuals who have a relatively high level of education and skills tend to be pro-trade in countries that are well endowed with human capital, and against trade in countries poorly endowed with human capital.[14] Papers such as Milanovic (2005) and Rama (2003) suggest that openness to trade actually benefits the poor in developing countries.

As to the connection between political rights and trade, Baldwin (1982) first argued that in capital-abundant countries a majority of workers who own only labor prefer to decrease international trade. Mayer (1984) extended the framework in Baldwin (1982) and examined the case where individuals own more than one factor of production and are ordered along a continuum in terms of their relative capital-labor endowment to find that the preferred tariff rate is positive for individuals relatively well endowed with the factor used intensively in the production of the imported good and zero for individuals whose personal capital-labor ratio equals the national capital-labor ratio. Either because of rules, personal incentives, or the influence of money in policymaking, the political process may be biased against individuals with lower capital-labor ratios. In this paper we assume that political liberalization—the increase in the level of political rights—increases the ability of poor individuals, who own almost exclusively labor, to influence the political process.[15] In sum, we expect that more mature democracies are more inclusive toward lower-income (low capital-labor ratio) individuals.

Two recent papers, Milner with Kubota (2005) and O'Rourke and Taylor (2006), have addressed the relationship between political rights, factor proportions, and trade using aggregate data. Milner with Kubota (2005) present evidence for developing countries suggesting that democratization of the political system leads political leaders in labor-rich countries to lower trade barriers. O'Rourke and Taylor (2006) assume that deepening democracy (for example, by broadening the franchise), together with the Hecksher-Ohlin-Stolper-Samuelson predictions, should lead to trade liberalization in countries where workers stand to gain from it and the reverse where workers stand to lose. The authors test and confirm this hypothesis using data on democracy, factor endowments, and protection in the nineteenth century.

III. Openness, Factor Proportions, and Political Rights: The Evidence

In this section we test whether the average tariff rate depends on the interaction of country factor endowments and the level of political rights.[16] Our data set covers the period from 1980 to 2003 and a broad cross section of developed and developing countries.[17] The data are available from Gatti (2004) for tariffs; World Bank (2005) for import intensity, per capita GDP, and government expenditures; LaPorta et al. (1999) for fractionalization and legal origin; Larrain and Tavares (2003) for distance to major economies and the determinants of import intensity; Freedom House (2005) for political rights; and finally, Barro and Lee (1994) for the dummy variables. Table 1 above presents summary statistics for the variables of interest.

Our aim is to check whether tariff rates are determined by the interaction of country factor endowments and political rights. Our estimation equation is the following:

$$\begin{aligned}\text{Tariff Rates} = {} & \alpha + \beta 1 \times \log \text{GDP}_{pc} + \beta 2 \\ & \times \text{Political Rights} + \beta 3 \times (\log \text{GDP}_{pc} \\ & \times \text{Political Rights}) + \theta \times Z + \varepsilon,\end{aligned} \tag{1}$$

where the βs are the parameters of interest, associated with country income per capita, political rights, and their interaction. Income per capita proxies for relative capital endowment of the country under study and allows us to exploit a larger sample than would be possible using variables such as the ratio of physical capital to labor force. Z stands for other controls, entered to test for the robustness of the results. All specifications include regional and time dummies. Table 2 presents our results, adding in succession a series of different controls, including indicators of government expenditure, the structure of the economy, its geographic and cultural characteristics. In all specifications we find that higher income per capita and more political rights are associated with lower tariff levels, while the interaction of the two variables is significantly associated with higher tariff levels. In other

[13] The main assumptions necessary for this result to hold are that the two countries share similar technologies and product mixes, and display no factor-intensity reversals.

[14] Mayda (2006) finds evidence of a similar effect when studying the relationship between individual and country relative endowments in human capital and the response to immigration flows.

[15] The "one man, one vote" principle suggests how political participation through the vote tends to be independent of individual characteristics, including income.

[16] In a previous version of this paper we tested the symmetrical relationship between the above-mentioned interaction, import intensity and an indicator of policy-dependent openness. In this shorter version we have decided to concentrate on tariffs as the explicit trade policy indicator.

[17] Additional information on the data is available from the author upon request.

TABLE 2.—TRADE AND POLITICAL RIGHTS—ROBUSTNESS DEPENDENT VARIABLE: IMPORT TARIFFS AND IMPORT POLICY INDICATOR—ORDINARY LEAST SQUARES

	Import Tariffs					Import Policy Indicator	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Income per capita	−9.53**	−10.46**	−9.47**	−6.46**	−5.90**	8.18**	0.05
	(−6.10)	(−6.53)	(−4.26)	(−4.13)	(−3.40)	(4.24)	(0.02)
Political rights	−36.19**	−57.49**	−68.54**	−49.26**	−40.89**	48.01**	49.78**
	(−2.01)	(−3.34)	(−3.00)	(−2.69)	(−2.14)	(2.34)	(2.69)
Income per capita × political rights	4.79**	7.37**	8.96**	6.26**	5.29**	−5.12**	−6.28**
	(2.30)	(3.58)	(3.20)	(2.85)	(2.30)	(−2.01)	(−2.62)
Government expenditures					yes		yes
Fractionalization, ever colony, postwar independence, and oil exporter				yes	yes		yes
Island, landlocked country, population, area, and distance to major economies			yes	yes	yes		yes
Legal origin and religious affiliation		yes	yes	yes	yes		yes
Regional dummies	yes	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes	yes
Income pc threshold	7.56	7.80	7.65	7.87	7.73	9.38	7.93
Political rights threshold	1.99	1.42	1.06	1.03	1.12	1.60	1.01
R^2	0.37	0.42	0.52	0.54	0.55	0.14	0.52
Nr. observations	450	450	330	325	311	608	409

The import policy indicator is computed using the deviations of import intensity relative to the predicted value of a regression of import intensity on exogenous determinants, as explained in the text. The import policy indicator intensity is constructed using import intensity from World Bank (2005) and the methodology above: income per capita is GDP per capita in constant U.S. dollars, also from World Bank (2005); and political rights ranges between 0 and 1, increasing in political rights, and is from the Freedom House (2005). Index of Political Rights. Government expenditures is also from World Bank (2005). The dummy ever colony notes countries that were colonies after 1825; postwar independence, countries that became independent after World War II; island, whether the country was an island; and landlocked country, whether it had no access to the sea. Oil exporter denotes whether it was considered a major oil exporter. All are from Barro and Lee (1994). Also from this source come the variables area, population, and the dummy for major religious affiliation. The distance to major economies is the average country distance to the twenty largest economies by GDP in 1980, from Larrain and Tavares (2003). Legal origin is a dummy for origin of the legal system—English, French, German, or Scandinavian—and is from LaPorta et al. (1999). *t*-statistics are presented in parentheses below coefficients and are computed using heteroskedastic-consistent standard errors. We note ** when $p < 0.05$ and with * when $p < 0.10$.

words, more political rights lower tariff rates in poor countries but tend to increase them at higher levels of income per capita.[18] In the last two columns we use as a dependent variable an indicator of policy openness and find that, consistent with the results on tariffs, the interaction of income per capita and political rights decreases openness.[19]

We are able to define threshold levels above which more political rights (or higher income per capita) lead to higher tariffs through the positive joint effect of income per capita and political rights. The income per capita threshold level reported in table 2 gives us the level of income above which an increase in political rights leads to higher rather than lower tariffs. In our specifications, the threshold levels at which more political rights are reflected in a higher predicted tariff level are between 7.56 and 7.87, whereas the average level of income per capita in the sample is 8.33 (8.40 for the last five-year period). This suggests the plausibility of our estimates.[20] Interestingly, the political rights threshold level, above which higher income per capita is associated with higher tariffs, is outside the relevant [0,1] range, indicating that more income always leads to lower tariffs in the sample. This is evident in figure 1, where we represent, in a three-dimensional diagram, how the tariff level—on the vertical axis—depends on income per capita and political rights—on the two axes that define the horizontal plane. We use the coefficients estimated in column 1 of table 2 to draw the predicted tariff rates as a function of political rights and income per capita. As can be easily verified, for

[18] Results for the specification in column 5 and subsample of non-OECD and non-oil-exporting countries deliver significant coefficients of the same sign for the three variables of interest.

[19] To arrive at the indicator of policy openness we computed the value of total exports for twenty large economies, according to absolute gross domestic product in 1990. The economies were Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Iran, Italy, Japan, South Korea, Mexico, the Netherlands, Poland, Spain, Turkey, the United Kingdom, and the United States. We then multiplied exports of these large economies by bilateral indicators of proximity, computed for each economy–large economy pair in the sample, taking into account the inverse of the bilateral distance in miles and dummies that take the value 1 when the country pair has a common land border, the same dominant religious denomination, or the same official language. For each country in the sample we end up with four exogenous determinants for actual import intensity, defined as the following:

$$\text{Import-DI}_{\text{country } i} = \sum_{\text{country } j=1 \text{ to } 20 \text{ of largest economies}} \{(1/\text{Bilateral Distance}_{i,j}) \times \text{Absolute Exports}_{j \text{ of } 20 \text{ largest economies}}\}$$

$$\text{Import-CO}_{\text{country } i} = \sum_{\text{country } j=1 \text{ to } 20 \text{ of largest economies}} 0\{\text{Contiguous}_{i,j} \times \text{Absolute Exports}_{j \text{ of } 20 \text{ largest economies}}\}$$

$$\text{Import-RE}_{\text{country } i} = \sum_{\text{country } j=1 \text{ to } 20 \text{ of largest economies}} \{\text{Religion}_{i,j} \times \text{Absolute Exports}_{j \text{ of } 20 \text{ largest economies}}\}$$

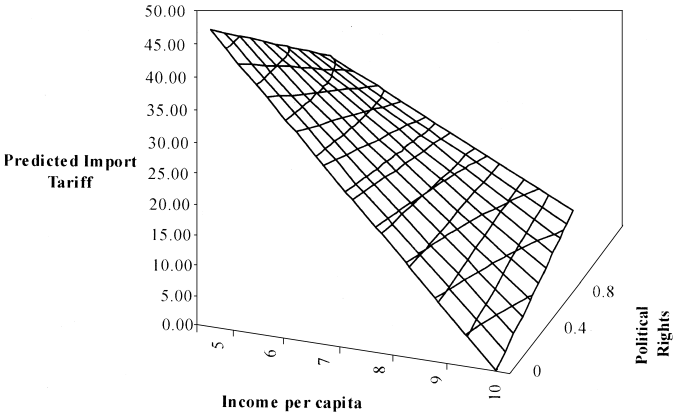
$$\text{Import-LA}_{\text{country } i} = \sum_{\text{country } j=1 \text{ to } 20 \text{ of largest economies}} \{\text{Language}_{i,j} \times \text{Absolute Exports}_{j \text{ of } 20 \text{ largest economies}}\}$$

Finally, we regress actual import intensity on the four exogenous determinants above. The predicted value of the dependent variable in that regression is the exogenous level of import intensity, and its difference to actual imports gives us the import policy indicator.

In a previous version of this paper we used this same measure of policy openness (as well as actual import intensity) as the dependent variables and found very robust evidence that, while income per capita and political rights are positively associated with openness, the coefficient on their interaction is robustly negative. Following the suggestion of the editor, in this version we concentrate on tariff rates as the dependent variable.

[20] In the previous version of the paper, we computed the value of this threshold for different specifications and estimation methods when the dependent variable was the indicator of policy openness as described above and, interestingly, the threshold values were located in the same [7.5, 8] interval.

FIGURE 1.—INCOME PER CAPITA, POLITICAL RIGHTS, AND PREDICTED TARIFF RATE



The figure plots, in the vertical axis, the value of the predicted import tariff against income per capita and political rights. The value of the predicted import tariff is computed from estimates of the coefficients on income per capita, political rights, and the product of the two variables, as reported in equation (1) in table 2, as well as an estimate of the constant, not reported.

poor countries—with, say, a logarithm of per capita GDP close to 5—an increase in political rights from 0 to 1 lowers the tariff rate by 9% while, for rich countries (with, say, logarithm of per capita income of 9), the same increase in political rights leads to an increase in tariff rates of 7 percentage points. This is the key result in our paper, adding to the evidence in Milner with Kubota (2005) that democratization leads to trade openness in developing countries.

IV. Conclusions

This paper uses the insight in Mayer (1984) of the relationship between country endowments, individual endowments, and trade policy. Using the Stolper-Samuelson theorem on the relation between relative goods prices and domestic factor returns, Mayer (1984) suggests that capital-poor individuals prefer lower tariff rates in poor/labor-abundant countries and higher tariff rates in rich/labor-scarce countries. If political rights are a proxy for the relative capital-labor endowment of the median voter, an increase in political rights should lead to more openness (lower tariffs) in capital-poor countries and less openness (higher tariffs) in capital-rich countries. We test this implication in a broad cross section of countries using data on average tariff rates. Indeed, while, per se, income per capita and political rights decrease tariff levels, their interaction is positively and robustly associated with tariff levels. In sum, an increase in political rights may lead to higher tariff levels after some income per capita threshold has been surpassed. Growth and development is likely to be associated with demands for increased trade openness everywhere but, at very high levels of income, more political rights may lead to increased pressure for higher tariff rates.

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GRANT SUPPORT AND EXPORTING ACTIVITY

Holger Görg, Michael Henry, and Eric Strobl*

Abstract—This paper investigates whether government support can act to increase exporting activity. We use a uniquely rich data set on Irish manufacturing plants and employ an empirical strategy that combines a nonparametric matching procedure with a difference-in-differences estimator in order to deal with the potential selection problem inherent in the analysis. Our results suggest that if grants are large enough, they can encourage already exporting firms to compete more effectively on the international market. However, there is little evidence that grants encourage nonexporters to start exporting.

I. Introduction

MOST governments seem to take a positive view on exporting, so that the more firms in the economy that export, the better. In this regard it is not surprising that many governments have taken some initiative in encouraging firms to export. Despite the potential importance of using explicit policies to promote exporting activity, there are, however, few empirical studies that have investigated this issue. One exception is the recent study by Bernard and Jensen (2004) on the determinants of exporting activity in the United States which, among other things, investigates whether export promotion expenditures at the state level influence the decision of U.S. plants to export. Their findings suggest little evidence that such policies encourage participation in the global market by U.S. manufacturers.

Arguably, export promotion expenditures on their own may not have a significant effect on exporting. Firstly, expenditure on export promotion measured at the state level may be masking firm-specific differences in their ability to access information on foreign markets and, hence, heterogeneity in the ability to export. Secondly, information on foreign markets per se may not be sufficient to ensure that firms can successfully compete on the international markets. Even more important may be that firms are productive enough to do so. As the recent theoretical and empirical literature on firm-level export activity argues, selling abroad involves sunk costs, and it is only the "better" firms, that is, those that are more efficient or productive, that are able to overcome these entry barriers and export successfully (Clerides, Lach, & Tybout, 1998; Bernard & Jensen, 1999; Melitz, 2003). These findings perhaps highlight the fact that other types of government support specifically targeted at improving productivity-related aspects of the firms' operations, to assist them in overcoming barriers to exporting, could prove more effective. Examples of such relevant support programs arguably include subsidies, such as for R&D and training, among others.[1] However, to date there has been, as far as we are aware, no study that has explicitly investigated this indirect channel of government subsidies.

In this paper we explicitly investigate whether firm-specific subsidies of all types can play a role in encouraging export activity. More specifically, we take advantage of the case of manufacturing industries in the Republic of Ireland where an extensive and diverse grant support system has been used in an attempt to make indigenous industry more internationally competitive. In this regard we have access to plant-level data including, among many other things, the total amount of output exported and an exhaustive database containing information on all grants provided by Irish authorities. It is important to note that these grants are not specifically designed to promote exporting but are related to encouraging investment in technology, training, or physical capital.

A crucial issue in estimating how government support may affect firm exporting activity is how to deal with the problem of what it would have been without government support. Ideally, the researcher would want to observe what would have happened to exporting activity in the firm if it had not received a subsidy. Clearly, however, this is unobservable; one can only witness a funded firm's actual exports and not what it would have sold abroad without a subsidy. This leaves as a control group only those firms that were not subsidized. The use of nonrecipients as a comparison group, however, would only be justified if the provision of grants were a completely random process, otherwise the analysis would suffer from selection bias. In reality, of course, this is unlikely to be the case as authorities

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* Institut für Weltwirtschaft and Christian-Albrechts-Universität, Keiland GEP Nottingham; Aston Business School, Aston University; and École Polytechnique Paris, respectively.

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[1] Well-known examples include the Small Business Innovation Program in the United States (Wallsten, 2000) or R&D support available from the Office of the Chief Scientist (OCS) in Israel (Lach, 2002).