

# Impact study

# Returns to Export Promotion

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## Executive Summary

We update the estimates of exports and GDP per capita returns to export promotion provided in Olarreaga, Sperlich and Trachsel (2020) using two new surveys of Trade Promotion Organizations conducted in 2021 and 2024. The two main research questions addressed in Olarreaga, Sperlich and Trachsel (2020) and in this new study are (i) What are the average export and GDP per capita returns to export promotion? and ii) Do they vary across countries?

Results suggest that export and GDP per capita returns to increases in TPOs' budgets are large. Among Trade Promotion Europe (TPE) members, a 1 percent increase in TPO's budget leads to a 0.069 percent increase in export growth and a 0.090 percent increase in GDP per capita growth. In monetary terms, this implies that a 1 Euro increase in the average TPO budget among TPE members translates into a 172 Euros increase in exports and a 396 Euros increase in GDP in the average TPE member country.<sup>1</sup>

The large returns in export revenue can be explained by relatively inexpensive TPO activities resulting in multimillion-dollar export deals, which can then be imitated by other firms that did not directly benefit from TPO activities. These positive externalities result in very large returns in terms of exports. The fact that returns in terms of GDP are even higher results from the fact that productivity gains associated with exporting through competition and innovation effects associated with exports will affect both exports and domestic sales.

One may be tempted to compare these returns with those reported in ITC (2016), which also used the methodology developed by Olarreaga, Sperlich, and Trachsel (2020).<sup>2</sup> However, these numbers are not comparable because of differences in methodologies and data.

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<sup>1</sup> In the full sample of 89 countries the comparable numbers are that a 1 Euro increase in the average TPO budget translates into a 106 Euros increase in exports and a 378 Euros increase in GDP at the mean of the sample.

<sup>2</sup> The ITC (2016) reported that a 1 USD increase in exports resulted in an 87 USD increase in exports and a 384 USD increase in GDP.

Using the same methodology and data, Olarreaga (2024) tested whether exports and GDP per capita returns before and after the year 2014 (corresponding to the year of the last survey used in ITC (2016)) were different. Results indicate no statistical differences in returns to increases in TPO budgets between the two periods. Therefore, the average returns over the period 2005-2024 are those discussed above and reported in Table A below.

**Table A: Returns by TPO**

TPO	Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)	TPO	Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)
Acciò	0.055	0.023	0.086	0.020	Ireland	0.070	0.024	0.089	0.021
Basque T&I	0.067	0.025	0.084	0.020	Italy	0.070	0.023	0.092	0.021
Belgium	0.063	0.023	0.092	0.021	Lithuania	0.074	0.023	0.094	0.021
Bulgaria	0.068	0.023	0.092	0.022	Malta	0.077	0.023	0.091	0.021
Cyprus	0.067	0.023	0.093	0.022	Murcia	0.065	0.025	0.076	0.020
Estonia	0.077	0.023	0.090	0.021	Netherlands	0.066	0.023	0.088	0.022
Finland	0.065	0.025	0.088	0.022	Portugal	0.073	0.023	0.092	0.022
Flanders I&T	0.067	0.024	0.093	0.019	Slovenia	0.073	0.024	0.086	0.021
France	0.073	0.025	0.085	0.022	Spain	0.069	0.023	0.091	0.022
Germany	0.062	0.024	0.091	0.021	Switzerland	0.067	0.026	0.108	0.023
Greece	0.083	0.025	0.090	0.022	Wallonia	0.082	0.024	0.091	0.020
hub.brussels	0.062	0.025	0.092	0.020	<b>Average</b>	<b>0.069</b>	<b>0.024</b>	<b>0.090</b>	<b>0.021</b>

**Note:** The first and fifth columns report export returns and the third and seventh columns report GDP per capita returns. The second, fourth, sixth, and eighth columns report wild bootstrapped standard errors with 500 repetitions associated with each of those point estimates.

As shown in Table A, all TPE members have positive export and GDP per capita returns, and all estimates are statistically different from zero, as the standard error associated with each TPO estimate is at least 1.96 times smaller than the point estimate.<sup>3</sup>

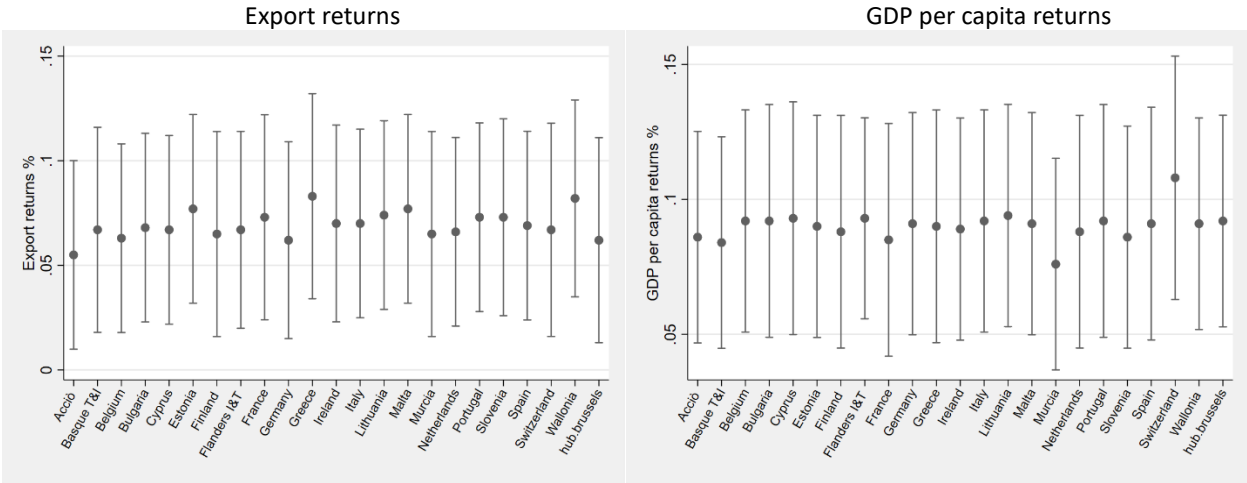
The variation in exports and GDP per capita returns across TPO is a function of TPO characteristics and country characteristics. Export returns are higher in countries with lower tariffs on imported inputs, a high share of private sector representatives on the executive board of the TPO, have a high share of their expenditure on small and medium-size firms, have a high share of their expenditure on marketing activities, have a strategy that tends to target specific

<sup>3</sup>Note that regional agencies were not considered when econometrically estimating the parameters of our model for employment returns, which is built to use data for national agencies. Using the estimated parameters we then compute the returns for each regional agency. In the case of Belgium, which does not have a national agency, we constructed a hypothetical one by putting together the characteristics of Flanders Investment and Trade and Wallonia Export and Investment Agency.

sectors or destinations. GDP per capita returns are higher in countries with lower tariffs on imported inputs, a high share of their expenditure on small firms, a high share of their expenditure on export support services, and a small share of their expenditure on matching grants. Note that the fact that the TPO characteristics that determine higher export returns are not the same as those determining higher GDP per capita returns explains why, in some countries, there may be very high GDP per capita returns but relatively lower export returns.

The point estimates of export returns vary from 0.055 to 0.83, implying that a 1 percent increase in the TPO’s budget can lead to a 0.055 increase in exports at the bottom to a 0.083 percent increase in exports at the top of estimated returns. The estimated GDP per capita returns range is 0.076 to 0.108. However, the differences in point estimates of exports and GDP per capita returns are not statistically different, as seen in Figure A. Indeed, all of the 95 percent confidence intervals overlap, suggesting that despite the difference in point estimates, there are no statistical differences in exports and GDP per capita returns.

**Figure A: TPE members’ Export and GDP per capita returns**



**Note:** The left panel show export returns to export promotion, and the right panel GDP per capita returns to export promotion. The round symbol (●) shows each TPO’s point estimate of export returns. The lines through the symbols represent the 95 percent confidence intervals calculated using robust standard errors obtained using wild bootstrap.

Results also suggest that exports and GDP per capita returns do not vary with budget size. In other words, there are no increasing or decreasing returns to increases in TPO budgets, as the estimated returns are constant across all TPO budget levels.

We also found important positive externalities in TPO activities. An increase in the TPO budget of an agency of another country within the same region and income group leads to an increase in exports and GDP per capita at home. This suggests that joint TPO activities among countries within the same region and income levels should help increase the returns to export promotion.

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# Returns to Export Promotion

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## Abstract

We estimate the export and GDP per capita returns to export promotion following the methodology developed by Olarreaga, Sperlich, and Trachsel (2020) and using an updated database that contains two new Trade Promotion Organization (TPO) surveys undertaken in 2021 and 2024. The results suggest that, on average, across the 89 countries in the sample, a 1 percent increase in TPO's budget leads to 0.067 percent in export growth and 0.101 percent in GDP per capita growth. Results also show strong positive complementarities in TPO expenditures across countries sharing the same region and level of income per capita, highlighting the importance of coordinating TPO's activities.

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## 1. Introduction

We estimate the export and GDP per capita returns to export promotion in an unbalanced sample of 89 countries spanning from 2005 to 2024. Following Olarreaga, Sperlich, and Trachsel (2020) we identify the export and GDP per capita returns to increases in TPOs' budgets using a control function approach where characteristics that are likely to be uncorrelated with the error term in the exports and GDP per capita equations are used as instruments to TPO budgets, as well as through the interaction of TPO's budget with TPO's characteristics. The latter also allows us to estimate export and GDP per capita returns for each country, as the TPO characteristics vary by country (and time).

Results suggest that, on average, across the 89 countries in the sample and over the period 2005-2024, a 1 percent increase in TPOs' budget led to a 0.067 percent increase in export growth. The highest export return is found in Nicaragua, with a 0.085 percent increase in export growth following a 1 percent increase in the TPO budget. The lowest export return is found in Morocco, with a 0.046 percent increase in export growth. Thus, while there is heterogeneity in export returns, they are all positive, and all individual country export returns are not statistically different from the average return at the 5 percent level. Returns in terms of GDP per capita show more heterogeneity. The country with the highest return in terms of GDP per capita is Morocco, with a 0.153 percent increase in GDP per capita growth, and the country with the lowest GDP per capita return is Mauritius, with a 0.055 percent in GDP per capita growth. But again, none of these returns are statistically different from the average return at the 5 percent level.

It may seem surprising that Morocco has the highest GDP per capita return while having the lowest in the sample. This is explained by the fact that the TPO characteristics that capture the heterogeneity of returns are different in the export and GDP per capita equations. As discussed in Olarreaga, Sperlich, and Trachsel (2020), the characteristics that matter for obtaining the highest export returns are different from those that matter to obtain high returns in terms of GDP per capita. For example, having a higher share of the budget coming from public sources

increases export returns but decreases GDP per capita returns. Similarly, a higher share spent on export support services increases export returns but reduces GDP per capita returns.<sup>4</sup>

We also explore whether there are non-linearities associated with the TPO's budgets or complementarities in export returns among TPOs in the same region and income group. We found no evidence of non-linearities in TPO's budgets, meaning that the exports and GDP per capita returns do not vary with budget size: there are no increasing or decreasing returns to increases in TPO budgets. Regarding complementarities with other TPO agencies in the same region and income group, we found strong positive complementarities, meaning that an increase in the budget of other TPOs in the region leads to increased exports at home. While, in theory, there could be positive or negative complementarities as the efforts by other agencies can either help or hinder home exports, the data suggests the presence of strong positive complementarities.

These results are important for at least three reasons. First, most countries promote exports, so understanding their impact not only in terms of exports but also in terms of GDP per capita, which arguably is what should ultimately matter, is important. Moreover, TPO budgets are not negligible. The average TPO budget in our sample is USD 42 million, but it can be higher than USD 500 million, and smaller than USD 50 thousand. Second, while there are differences in returns based on TPO characteristics that can be quite large (Morocco has a GDP per capita return three times as large as the GDP per capita return of Mauritius), all export and GDP per capita returns are positive, suggesting that trade promotion positively contributes to economic activity. Finally, and perhaps most importantly, evidence of positive complementarities is crucial when considering trade promotion at the global level. In the presence of negative complementarities, if one country promotes exports, it can boost its exports and GDP per capita, but it would hurt other countries' exports and GDP per capita. In such a world, if there is no cooperation among TPOs, there will be too much export promotion from a global perspective, as each TPO does not consider its negative impact on other countries. However, in

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<sup>4</sup> See Figures 2 and 3 in Olarreaga, Sperlich and Trachsel (2020).

the presence of positive complementarities, there is not enough promotion as each TPO does not consider its impact on other countries. Coordination among TPOs that help internalize these positive externalities should lead to more export promotion.

The main challenge we faced was merging five different surveys of TPO activities and funding covering different countries and time spans undertaken by the World Bank, the International Trade Center (ITC), and Trade Promotion Europe (TPE) at different points in time. Given the differences in country and time coverages in each survey, we explore the potential heterogeneity of estimated returns across time and regions. We found no statistically significant differences in average returns for the period 2005-2014 and 2015-2024 or for a subsample of countries that are Trade Promotion Europe members.<sup>5</sup> This led us to consider the entire sample across all countries and periods rather than sub-samples when estimating the export and GDP per capita returns. The advantage of the entire sample is statistical power.

We are not the first to examine the returns to export promotion. As mentioned earlier, our methodology is borrowed from Olarreaga, Sperlich, and Trachsel (2020), who estimated export and GDP per capita returns for 64 countries during the period 2005-2014. Our estimates differ from those in their paper because our sample covers more countries and years. Still, for the countries found in both papers, the estimates are not statistically different from each other.

There is also a large literature estimating returns to export promotion in terms of the extensive and intensive margin of exports. Lederman, Olarreaga, and Payton (2010) found in a cross-section of countries for the year 2005 that a 1 percent increase in TPOs' budgets leads to a 0.05 percent increase in export growth. While the methodology and data differ significantly, these average returns are similar to the ones we obtain here in this paper. Volpe and Carballo (2010) found that smaller firms are more likely to benefit from export promotion than large firms in Chile. While this is not something we can explore with our dataset that contains no firm

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<sup>5</sup> TPE members include Belgium, Bulgaria, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Malta, Netherlands, Poland, Portugal, Slovenia, Spain, Switzerland and Ukraine.

information, our results, like those of Olarreaga, Sperlich, and Trachsel (2020), confirm that agencies that spend a larger share of their budget on small firms have a higher export return. Cruz (2014), Brooks and van Biesebroeck (2017), and Lederman, Olarreaga and Zavala (2016) show that export promotion helps non-exporting firms enter export markets in Brazil, Belgium, and Latin America, respectively. Munch and Schaur (2018) show that this effect is larger for smaller firms in Denmark, echoing the results of Volpe and Carballo (2010). van Biesebroeck, Konings, and Volpe (2016) show that Belgian and Peruvian firms that used export promotion services during the Great Recession were more likely to continue to export after the Great Recession. Similarly, Choi et al. (2024) show that during the COVID pandemic, TPOs were particularly helpful during negative shocks to world trade.

While our paper cannot address many of the questions in the existing literature because we do not have firm level information, it is the only paper with Olarreaga, Sperlich, and Trachsel (2020) that provides estimates of returns to trade promotion in terms of GDP per capita growth. Its contribution to this earlier paper is the larger number of countries and time span covered in the analysis.

Section 2 discusses the data used in the empirical analysis methodology and section 3 presents the empirical methodology. Section 4 presents the estimates returns to trade promotion in terms of export and GDP per capita and section 5 concludes.

## **2. Data**

We merge five different data sources. The first survey of TPO we used was undertaken in 2005 by the World Bank in collaboration with the ITC and covered 103 developing and developed countries, but only for the year 2005. It is documented in Lederman, Olarreaga and Payton (2010). The second survey was undertaken in 2010 also by the World Bank in collaboration with the ITC and covered 95 countries for the period 2006-2010. It is documented in Cruz, Lederman and Zoratto (2018). The third survey was undertaken by the ITC in 2014 and covered the period

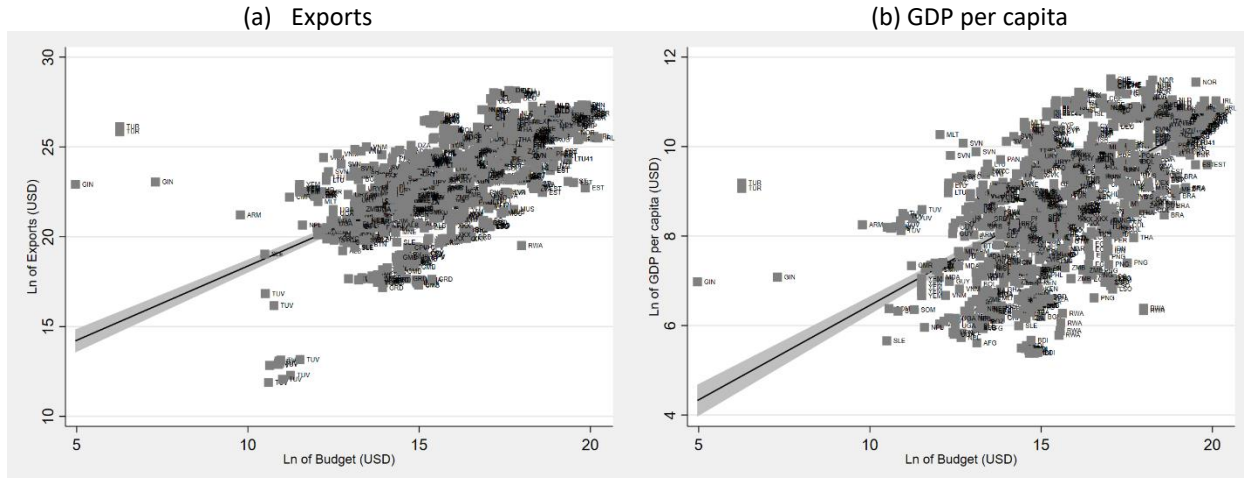
2010-2014 but only for fourteen European TPOs. It is documented in the International Trade Center (2016). The fourth survey was undertaken by the World Bank in 2021 and covered the period 2011-2021 for 57 developing and developed countries. The final survey was undertaken by Trade Promotion Europe and covered the period 2019-2024 for 15 European countries. To estimate the returns in terms of exports and GDP per capita, we merge these five datasets with data on exports and tariffs from the World Trade Organization and GDP per capita and working age population from the World Bank's World Development Indicators.

The merging of the five surveys is straightforward when questions are identical across surveys. However, not all questions are found in all surveys, as some are dropped and others added depending on the needs of each survey and the important constraint of not having too long surveys, leading to a low response rate. The merging was done so that if a question is dropped in a given survey, the answer is assumed to remain unchanged in the next survey. Similarly, when a question is added, it is assumed that the answer to that question was identical in the previous survey. These assumptions allow us to have a less unbalanced panel. Finally, in the last TPE survey, it was decided that to overcome confidentiality issues, we should not ask for the exact value of the TPO budget but rather provide brackets. Because we had the exact values in all four surveys, we decided to convert the brackets with their mid-point value instead of converting the exact values in the four previous surveys into brackets.

After merging these seven datasets, we start exploring the simple correlation across countries and time between TPOs' budgets on the one hand and exports and GDP per capita on the other. On the left-hand side panel of Figure 1 we can see the correlation between TPOs' budgets and exports and on the right-hand side panel the correlation between TPOs' budgets and GDP per capita. Both panels exhibit a strong and positive correlation, suggesting that countries with larger TPOs' budgets tend to have higher exports and a higher GDP per capita. However, nothing causal should be interpreted from these graphs as these correlations can be due to omitted variables (for example, larger countries tend to have both larger exports and institutional budgets) or reverse causality (countries with a large export sector may be induced to have

larger TPO budgets). The methodology described in the next section allows us to address these potential and estimate export returns that do not suffer from omitted variable bias or reverse causality.

**Figure 1: Correlation between TPO budgets and exports and GDP per capita**



**Note:** These are unconditional correlations between the natural log of TPOs’ budget in the horizontal axis and the natural log of exports in panel (a) and the natural log of GDP per capita in panel (b) in the panel dataset spanning from 2005 to 2024.

Nevertheless, one can draw two important messages from Figure 1. First, there are strong positive correlations between TPOs’ budgets on the one hand and exports and GDP per capita on the other. While correlations are not causal, they suggest that higher TPO budgets are associated with higher exports and GDP per capita. Second, there is some important heterogeneity in country performance (again, keeping in mind the caveat that these correlations are not causal). Countries such as Germany and Turkey tend to do particularly well in terms of exports (panel (a)), as their observations tend to be well above the regression line. This implies that their exports are higher than the simple correlation would imply corresponds to the size of their TPO budget. Switzerland and Slovenia also do relatively well in terms of GDP per capita (panel (b)), with their observations well above the regression line. On the other hand, Tuvalu and Gambia underperform in exports, and Rwanda and Burundi underperform in terms of GDP per capita, as their observations are well below the regression line. The methodology developed by Olarreaga, Sperlich, and Trachsel (2020) and discussed below will allow us to estimate these differences in exports and GDP per capita returns associated with increases in TPOs’ budgets.

Table 1 provides summary statistics for all the variables used to estimate the results presented in section 4. The summary statistics are calculated over the 129 TPOs for which we have (some) data in at least one survey. The 89 countries used in the estimation are those for which we have data for all the necessary variables in the statistical analysis. The average TPO budget is USD 43 million, with a standard deviation of USD 82 million. The average exports are USD 117 billion, with a standard deviation of 243 billion. So, there is a lot of variation in the sample in terms of TPO budgets, exports, and GDP per capita. The average share of TPOs' budget on total exports is relatively low at 0.5 percent but again has a high standard deviation at 1.7 percent (and gets above 10 percent in some Sub-Saharan African countries).

**Table 1: Summary Statistics**

	Mean	Std. dev.	Min	Max	Obs
TPO budget (millions USD)	43	82	0.04	700	1,042
Exports (millions USD)	117000	243000	18	1690000	997
GDP per capita (USD)	16818	19526	217	99995	1,022
Share of TPO budget in total exports (%)	0.5%	1.7%	0.0%	28%	995
Population 15-64 (million)	22	92	0.07	950	1,027
Tariff on intermediate goods	6.15%	3.15	0%	22.66%	846
Share of Public funding	50-75%	20%	<10%	75-100%	1,035
Share of Private funding	<10%	15%	<10%	75-100%	1,035
Share of funding from fees	<10%	10%	<10%	75-100%	1,035
Share of expenditure on non-matching grants	<10%	10%	<10%	75-100%	893
Share of expenditure on matching grants	<10%	10%	<10%	75-100%	893
Share of expend. on export support services	10-25%	10%	<10%	75-100%	1,041
Share of expend. on marketing/promotion	25-50%	15%	<10%	75-100%	1,041
Share of expenditure on small firms	25-50%	15%	<10%	75-100%	1,022
Share of expenditure on medium-sized firms	25-50%	15%	<10%	75-100%	1,022
Share of expenditure on large firms	10-25%	10%	<10%	75-100%	1,022
Share of expenditure on non-exporting firms	<10%	10%	0%	75-100%	1,005
Share of expend. on new/occasional exporter	10-25%	10%	<10%	75-100%	1,021
Share of expenditure on established exporters	25-50%	15%	<10%	75-100%	1,021
Rank of KPI number of exporters	Med	NA	Low	Top	909
Rank of KPI value of exports	High	NA	Low	Top	909
Rank of KPI number of clients	Me	NA	Low	Top	909
Rank of KPI client satisfaction	Med	NA	Low	Top	909
Rank of other KPI	Low	NA	Low	Top	909
Rank of strategy: promote all exports	High	NA	None	Top	917

**Note:** Author's calculation using data from 5 TPO surveys covering 120 countries during the period 2005-2024, as well as data from the World Trade Organization and the World Bank.

There is also a lot of variation in the sample in terms of country size (working-age population) and income levels. The average country has a working-age population of 22 million, but this varies between 70,000 and 950 million individuals. The average GDP per capita is USD 16818 and it varies between USD 217 and USD 99,995. The variance is less pronounced regarding TPOs' characteristics. Interestingly, on average, TPOs tend to be mostly funded by the public sector, and a large share of their expenditure is on small and medium-sized firms rather than large firms, and on established exporters.

In Table 2, we provide summary statistics for TPE members. The statistics are computed over the 5 TPO surveys, i.e., from 2005 to 2024.

**Table 2: Summary Statistics for TPE members**

	Mean	Std. dev.	Min	Max	Obs
TPO budget (millions USD)	72.1	100	0.2	700	266
Exports (millions USD)	287000	384000	1260	1690000	257
GDP per capita (USD)	33044	18741	3899	99994	257
Share of TPO budget in total exports (%)	0.1%	0.4	0.0%	0.5%	257
Population 15-64 (million)	12.8	16.0	0.3	54.9	262
Tariff on intermediate goods	5.2%	0.1%	4.0%	9.0%	223
Share of Public funding	75-100%	<10%	2	75-100%	266
Share of Private funding	<10%	<10%	1	50-75%	266
Share of funding from fees	<10%	<10%	1	50-75%	266
Share of expenditure on non-matching grants	<10%	<10%	1	75-100%	255
Share of expenditure on matching grants	<10%	<10%	1	75-100%	255
Share of expend. on export support services	10-25%	<10%	1	75-100%	266
Share of expend. on marketing/promotion	25-50%	<10%	2	75-100%	266
Share of expenditure on small firms	25-50%	<10%	2	75-100%	266
Share of expenditure on medium-sized firms	25-50%	<10%	2	75-100%	266
Share of expenditure on large firms	<10%	<10%	1	25-50%	266
Share of expenditure on non-exporting firms	10-25%	<10%	1	75-100%	266
Share of expend. on new/occasional exporter	50-75%	<10%	1	75-100%	266
Share of expenditure on established exporters	<10%	<10%	0	75-100%	265
Rank of KPI number of exporters	Med	NA	Low	Top	252
Rank of KPI value of exports	Med	NA	Low	Top	252
Rank of KPI number of clients	Med	NA	Low	Top	252
Rank of KPI client satisfaction	Med	NA	Low	Top	252
Rank of other KPI	Low	NA	Low	Top	252
Rank of strategy: promote all exports	Med	NA	No	Top	255

**Note:** Author's calculation using data from 5 TPO surveys covering the 18 countries which are part of TPE and for which we have data during the period 2005-2024. We also use data from the World Trade Organization and the World Bank. The 18 TPE members for which we have data in at least one survey are Belgium, Bulgaria, Cyprus, Estonia, Finland, Germany, France, Hungary, Ireland, Lithuania, Malta, Netherlands, Poland, Portugal, Slovenia, Spain, and Switzerland.

As in the full sample, there is some significant variance in TPO budgets, exports, and GDP per capita that will help us identify the impact of increases in TPO budgets on exports and GDP per capita. Perhaps the more interesting difference is that TPE members seem to spend, on average, a larger share of their budget on new and occasional exporters and less on established exporters than what is observed on average in the full sample.

### 3. Methodology

Before estimating heterogeneous returns for each country, we estimate the average returns for the entire sample using the following models:

$$\ln(exports_{ct}) = \alpha_c + \alpha_t + \beta \ln(budget_{ct}) + \sigma \ln(tariff_{ct}) + \varepsilon_{ct} \quad (1)$$

$$\ln(GDPpc_{ct}) = \theta_c + \theta_t + \rho \ln(budget_{ct}) + \omega \ln(tariff_{ct}) + \mu_{ct} \quad (2)$$

where  $exports_{ct}$  and  $GDPpc_{ct}$  are exports and GDP per capita of country  $c$  at time  $t$ , respectively;  $budget_{ct}$  is the TPO budget in country  $c$  at time  $t$ , and  $tariff_{ct}$  is the average tariff on intermediate goods in country  $c$  at time  $t$ . The coefficients of interest are  $\beta$  and  $\gamma$  that capture the returns to increases in TPOs' budget in terms of export and GDP per capita growth.  $\alpha_c$  and  $\theta_c$  are country fixed effects and  $\alpha_t$  and  $\theta_t$  are time fixed effects;  $\sigma$  and  $\omega$  are the coefficients on the natural log of tariffs, and  $\varepsilon_{ct}$  and  $\mu_{ct}$  are the error terms.

Because TPOs' budgets may be endogenous even after controlling for country and year fixed effects (and other control variables), we use not only an ordinary least square estimator but also a control function estimator where TPO characteristics that are unlikely to be correlated with the error term and were identified in Olarreaga, Sperlich, and Trachsel (2020) are used as instruments. To those instruments, we add variables that capture the ranking that each TPO gives to different Key Performance Indicators (KPI), such as the number of clients, number of exporters, export value, client satisfaction, or other indicators. Arguably, the type of KPI used by the TPO is unlikely to be correlated with the error terms in equations (1) and (2). We use a

control function estimator rather than an instrumental variable estimator because when estimating heterogeneous returns, we will be using a nonlinear estimator, and as shown by Terza, Basu, and Rathouz (2009), a control function estimator is consistent in nonlinear models, whereas this is not the case for the instrumental variable estimator. So, for symmetry between the linear and non-linear models, we use a control function estimator in both. Because the control function is the predicted error of a regression of the endogenous variable (ln of TPOs' budgets) on all instruments and other exogenous variables, to obtain robust standard errors we use bootstrap sampling with 500 repetitions.

To determine whether average returns changed between the 2005-2014 period and the 2015-2024 period, we estimate both models using a control function estimator in these two sub-samples. If there is a statistically significant difference, we need to estimate the heterogeneous effects in two sub-samples. Also, because this study is particularly interested in countries that are members of TPE, we check whether the average returns are different in a sub-sample that only contains TPE members.

To estimate the heterogeneous returns per country, we follow the methodology developed by Olarreaga, Sperlich, and Trachsel (2020). There are only two differences between the methodology in this paper and the one in Olarreaga, Sperlich and Trachsel (2020). The first one is obvious, and it is the larger sample as two additional surveys were conducted since their study published in 2020. The second one is the use of Key Performance Indicators as instrumental variables for TPO's budgets.

In both papers, we allow the impact of export-promotion budgets on exports to vary across EPA characteristics by using a varying coefficient model where the characteristics that matter for heterogeneous returns (share of public funding, share of funding from fees, share of expenditure on marketing activities, export support services, established exporters, non-exporters, small and medium size firms, matching grants, non-matching grants, the degree to which the TPO strategy relies on promoting exports of all products to all destinations, and the

share of the executive board seats in the hands of the private sector) were identified in Olarreaga, Sperlich and Trachsel (2020).<sup>6</sup>

We address the potential endogeneity and measurement error of TPOs' budgets with the help of a control function estimator where we use as instruments some of the TPO characteristics that are less likely to be correlated with the error terms in the export and GDP per equation: the share of the budget coming from fees paid for services, the share of the budget coming from public funds, the share of TPOs' budgets spent on nonmatching grants, the extent to which the agencies' responsibility is mainly export promotion, and the rank of different Key Performance Indicators (number of exporters, number of clients, value of exports, etc. Thus, the identification of the export and GDP per capita returns to increases in TPO budgets relies not only on the varying coefficient modeling but also on the standard assumptions associated with instruments when using a control function estimator. The standard errors are estimated using wild bootstrap as in Mammen (1992) with 500 repetitions. The advantage is that the procedure controls for unknown heteroscedasticity.

#### **4. Results**

We start by estimating the average returns in terms of export and GDP per capita growth without allowing for heterogeneity in returns across countries. Table 3 reports the estimation results of equations (1) and (2) using an ordinary least square estimator. The first four columns report for the export equation, and the last four columns report for the GDP per capita equation. The odd-numbered columns report results for the full sample, and the even-numbered columns report results for the subsample of TPE members. Columns (1), (2), (5), and (6) report results of the estimation controlling only for country-fixed effects, whereas columns (3), (4), (7), and (8) report results also controlling for year fixed effects and average tariff on

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<sup>6</sup> As in their paper we also control for the natural log of population with a polynomial of degree 3 in both the export and GDP per capita equations.

intermediate goods. As we add controls to the export and GDP per capita equations, the returns associated with a 1 percent increase in TPOs' budgets decrease.

Importantly, all exports and GDP per capita returns are positive and statistically significant, at least at the 5 percent level. When using all controls, the average export return in the full sample is 0.03, and the average GDP per capita return is 0.04. This implies that a 1 percent increase in TPOs' budget leads, on average, to a 0.03 percent increase in conditional exports and a 0.04 percent increase in conditional GDP per capita. In the TPE sample, export returns are slightly higher at 0.05, and GDP per capita returns are very close to the returns estimated in the full sample.

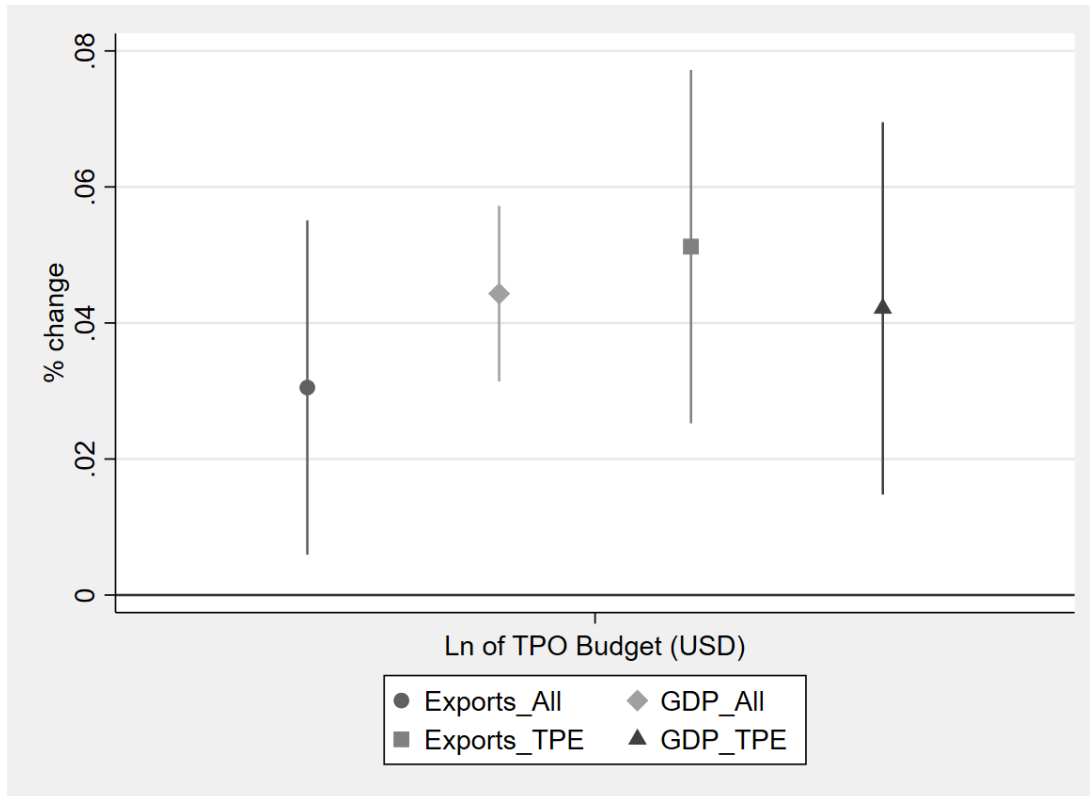
**Table 3: Average returns in the full and TPE sample (OLS)**

	ln of exports				ln of GDP per capita			
	All (1)	TPE (2)	All (3)	TPE (4)	All (5)	TPE (6)	All (7)	TPE (8)
ln of TPO budget	0.08* (0.03)	0.12* (0.03)	0.03§ (0.01)	0.05* (0.01)	0.08* (0.02)	0.05* (0.02)	0.04* (0.01)	0.04* (0.01)
ln of Tariffs			0.17* (0.06)	-0.46§ (0.20)			-0.03 (0.04)	-0.65* (0.22)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
Adjusted R <sup>2</sup>	0.99	0.98	0.99	0.99	0.98	0.92	0.99	0.98
# observations	995	257	832	216	1022	257	834	216

**Note:** All columns use an ordinary least square (OLS) estimator. The first four columns report the results for ln of Exports, and the last four columns for ln of GDP per capita. The odd-numbered columns report results for the full sample, and the even-numbered columns report results for the subsample of TPE countries. Robust standard errors are reported in parenthesis. \* stands for statistical significance at the 1 percent level, and § stands for statistical significance at the 5 percent level.

An important question is whether the average returns are statistically different in the full and TPE sample. If they are, we would need to estimate the returns for TPE members separately, implying a loss of statistical power in the estimates. Fortunately, they are not statistically different, as can be seen from Figure 3, which plots the estimated returns and their 95 percent confidence interval for the full sample and the TPE sub-sample.

**Figure 2: Average export and GDP per capita returns (OLS)**



**Note:** Each symbol shows the point estimate of average returns in terms of exports or GDP per capita reported in Table 3. The round symbol (●) shows the point estimate of average export returns in the full sample (column 3 in Table 3). The diamond symbol (◆) shows the point estimate average return in terms of GDP per capita in the full sample (column 7 in Table 3). The square symbol (■) shows the point estimate of average export returns in the TPE sample (column 4 in Table 3), and the triangle symbol (▲) shows the average returns in terms of GDP per capita in the TPE sample (column 8 in Table 3). The lines through the symbols represent the 95 percent confidence intervals corresponding to the robust standard errors of the estimated returns reported in each corresponding column in Table 3.

The 95 percent confidence interval for export returns in the full sample oscillates between 0.006 percent and 0.055 percent, whereas the 95 percent confidence for export returns in the TPE sample oscillates between 0.03 and 0.08. Thus, while the average estimated export returns in the TPE sample are higher, the 95 percent confidence intervals of the TPE and full sample largely overlap, suggesting that the estimated returns are not statistically different. The same is valid for the GDP per capita returns that oscillate between 0.031 and 0.057 in the full sample and between 0.015 and 0.069 in the TPE sample.

The estimates in Table 3 and Figure 2 may suffer from endogeneity bias even after controlling for country and year-fixed effects. We address this using a control function estimator, and the results are reported in Table 4. The first two columns report results for the export equation in the full and TPE sample with all controls, and the third and fourth columns report results for the GDP per capita equation again in the full and TPE sample, respectively.

**Table 4: Average returns in the full and TPE sample (control function)**

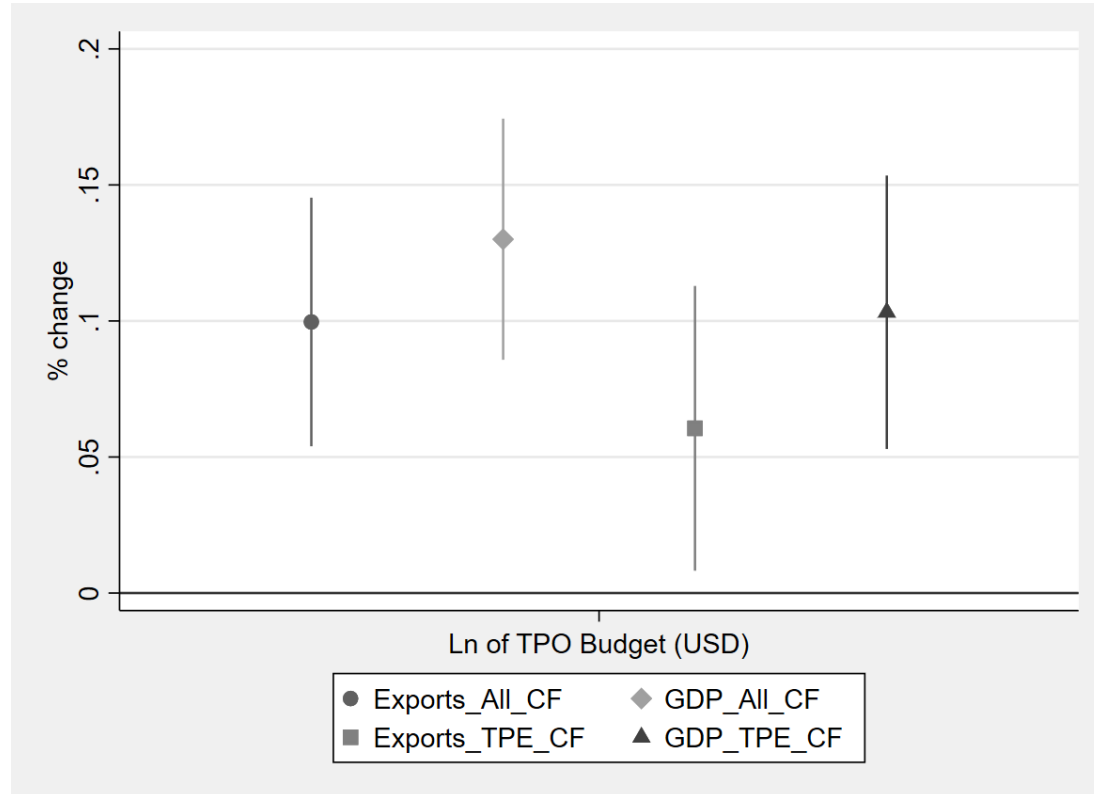
	ln of Exports		ln of GDP per capita	
	All (1)	TPE (2)	All (3)	TPE (4)
ln of TPO budget	0.10* (0.02)	0.06§ (0.03)	0.13* (0.02)	0.10* (0.03)
ln of Tariffs	0.16* (0.06)	-0.46° (0.27)	-0.02 (0.04)	-0.60* (0.23)
Control function	-0.07* (0.02)	-0.02 (0.03)	-0.09* (0.02)	-0.08* (0.03)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.99	0.98	0.99	0.98
# observations	832	214	834	204

**Note:** All columns use a control function estimator where the importance given by each TPO to different Key Performance indicators is used as instruments for the ln of the TPO budget. The first four columns report the results for the ln of Exports, and the last four columns for the ln of GDP per capita. The odd-numbered columns report results for the full sample, and the even-numbered columns report results for the subsample of TPE countries. Robust standard errors are obtained through bootstrap with 500 repetitions and using as strata the country identifier. They are reported in parentheses. \* stands for statistical significance at the 1 percent level, § stands for statistical significance at the 5 percent level, and ° for statistical significance at the 10 percent level.

Again, all export and GDP per capita returns are positive and statistically significant in both the full and TPE samples. The control function has a negative sign and is statistically significant, except for the export equation in the TPE sample. This suggests that the endogeneity of TPOs' budgets was downward biasing the estimates of exports and GDP per capita returns. Indeed, the return estimates reported in Table 4 tend to be higher than the export returns reported in Table 3. The results reported in Table 4 show that when using the control function estimator, a 1 percent increase in TPO budgets leads to a 0.10 percent increase in conditional exports and a 0.13 percent increase in conditional GDP per capita.

As before, and as can be seen in Figure 3, the export and GDP per capita returns in the full sample are not statistically different from the returns in the TPE sample.

**Figure 3: Average Export and GDP per capita returns (control function)**



**Note:** Each symbol shows the point estimate of average returns in terms of exports or GDP per capita using the estimates in Table 4. The round symbol (●) shows the average export returns point estimate in the full sample (column 1 in Table 4). The diamond symbol (◆) shows the point estimate average return in terms of GDP per capita in the full sample (column 3 in Table 4). The square symbol (■) shows the point estimate average export return in the TPE sample (column 2 in Table 4), and the triangle symbol (▲) shows the average returns in terms of GDP per capita in the sample of TPE members (column 4 in Table 4). The lines through the symbols represent the 95 percent confidence intervals corresponding to those average returns computed using robust standard errors. The returns are estimated using a control function estimator where variables capturing the importance of different Key Performance Indicators used in TPOs are used to address the potential endogeneity of TPOs' budgets.

The 95 percent confidence interval for export returns in the full sample varies between 0.052 and 0.145. In the TPE sample, it varies between 0.008 and 0.112. The 95 percent confidence interval for GDP per capita returns in the full sample spans from 0.085 to 0.174 and in the TPE sample from 0.053 to 0.153. The overlapping of confidence intervals implies there is no need to

estimate the returns for the TPE sub-sample separately from the other countries in the full sample.

Before exploring the heterogeneity across countries of exports and GDP per capita returns, we examine how changes in TPO budgets of other agencies within the same region and income level affect home exports and GDP per capita. To do so, we introduce a new variable called the Regional TPO budget (third row in Table 5), which each year sums the budget of TPOs in other countries within the same region and year. Table 5 reports results for the full sample.

**Table 5: Regional complementarities in the full and TPE samples (control function)**

	Ln of Exports All (1)	Ln of GDP per capita All (2)
In of TPO budget	0.13* (0.02)	0.14* (0.02)
In of Tariffs	0.08 (0.06)	-0.05 (0.04)
In Regional TPO budget	0.08* (0.02)	0.04* (0.01)
Control function	-0.09* (0.02)	-0.10* (0.03)
Country FE	Yes	Yes
Year FE	Yes	Yes
Adjusted R <sup>2</sup>	0.99	0.99
# observations	723	724

**Note:** All columns use a control function estimator where the importance given by each TPO to different Key Performance indicators is used as instruments for the Ln of TPO budget. The first two columns report the results for Ln of Exports, and the last two columns for Ln of GDP per capita. The odd-numbered columns report results for the full sample, and the even-numbered columns report results for the subsample of TPE countries. The Regional TPO budget is obtained by summing the TPO budgets by region, year, level of income, and whether or not it is a TPE member. Robust standard errors are obtained through bootstrap with 500 repetitions and using as strata the country identifier. They are reported in parentheses. \* stands for statistical significance at the 1 percent level, § stands for statistical significance at the 5 percent level, and ° for statistical significance at the 10 percent level.

We do not report results for the TPE sample because all TPE members share the same region and income levels, and therefore, there is not enough variation in the data to identify the complementarities in the TPE sample. The results in the full sample confirm large exports and GDP per capita returns for the home country's TPO budget. More importantly, the budgets of

other TPOs within the same region and income levels have a positive and statistically significant effect on exports and GDP per capita.

The presence of these positive externalities suggests that without coordination efforts to internalize the externalities, export promotion efforts are likely to remain inefficiently small, as countries do not take into account the positive impact they have on other members when deciding their export promotion efforts.

### **Exploring the heterogeneity of returns**

Before reporting the estimates of the heterogeneous returns per country using the varying coefficient model, we explore the heterogeneity of export and GDP per capita returns across three dimensions: country size, time, and the size of TPO budgets.

We start with country size measured by its GDP. To assess whether returns and GDP per capita returns are higher in larger countries, we divide the sample of countries into 4 quartiles and identify the largest countries as those in the first quartile and the smallest countries as those in the fourth quartile. We then interact the ln of TPO budgets with two dummies: one indicating that the country is in the top quartile in terms of size and another indicating that the country is in the bottom quartile in terms of size. If these interactions are positive, it signals that countries in that quartile have higher returns than countries in the different size quartiles.

The results are presented in Table 6 where the two interactions are added to our specification with country and year-fixed effects and tariffs as control variables, and where we use a control function estimator. The average estimated export returns are all positive and statistically significant and similar to the ones reported in Table 4 and Figure 3. More interestingly the interaction of TPOs' budgets with a dummy indicating that the country is in the first quartile in terms of economic size is negative and statistically significant in all equations and samples, whereas it tends to be positive (but not always statistically significant) when interacting TPOs'

budgets with a dummy indicating that the country is in the fourth quartile in terms of economic size.

**Table 6: Heterogeneity of returns by country size in the full and TPE samples (control function)**

	ln of Exports		ln of GDP per capita	
	All (1)	TPE (2)	All (3)	TPE (4)
ln of TPO budget	0.10* (0.03)	0.07§ (0.03)	0.13* (0.03)	0.11* (0.03)
ln of Tariffs	0.14§ (0.06)	-0.19 (0.25)	-0.01 (0.04)	-0.43§ (0.20)
1st quartile*budget	-0.02* (0.01)	-0.01* (0.002)	-0.01* (0.002)	-0.01* (0.002)
4 <sup>th</sup> quartile*budget	0.003 (0.003)	0.000 (0.003)	0.006* (0.002)	-0.01 (0.01)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.99	0.99	0.99	0.98
# observations	751	205	752	205

**Note:** All columns use a control function estimator where the importance given by each TPO to different Key Performance indicators is used as instruments for the ln of TPO budget (the three control function residuals are not reported). The first two columns report the results for ln of Exports, and the last two columns for ln of GDP per capita. The odd-numbered columns report results for the full sample, and the even-numbered columns report results for the subsample of TPE countries. The first and fourth quartile dummies are identified in terms of GDP (economic size), and the interaction is with the ln of TPO budget. Robust standard errors are obtained through bootstrap with 500 repetitions and using as strata the country identifier. They are reported in parentheses. \* stands for statistical significance at the 1 percent level, and § stands for statistical significance at the 5 percent level.

These results imply that larger countries in terms of GDP tend to have lower export and GDP per capita returns than smaller countries. The differences are not large, but they are statistically significant. In the full sample, a 1 percent increase in TPOs' budget leads to 0.08 percent increase in conditional exports for countries in the first quartile, 0.10 percent for countries in the second and third quartile, and 0.103 percent for the smallest countries in the fourth quartile. Similarly, a 1 percent increase in TPOs' budget leads to a 0.12 percent increase in conditional GDP per capita for countries in the first quartile, 0.13 percent for countries in the second and third quartile, and 0.136 percent for the smallest countries in the fourth quartile. In other words, export promotion leads to higher export and GDP per capita returns in smaller countries.

To explore the extent of heterogeneity across time, Table 7 reports the results of the estimation of equations (1) and (2) for two sub-samples: 2005-2014 and 2015-2024. While these two sub-samples contain the same number of years, the number of observations is larger in the first sub-sample. This is partly because the first sub-sample contains data from three surveys, whereas the second sub-sample only contains data for two sub-samples. An implication of this is that the precision of the estimates in the second sub-sample is lower than in the first sub-sample, with exports and GDP per capita returns being statistically significant at the 1 percent level in the first sub-sample but only at the 10 percent level in the second sub-sample. Partly for this reasons, we do not report results for the TPE sub-sample before and after 2014, because there will be too few observations in those two sub-samples to identify exports and GDP per capital returns credibly.

**Table 7: Returns before and after 2014 in the full sample (control function)**

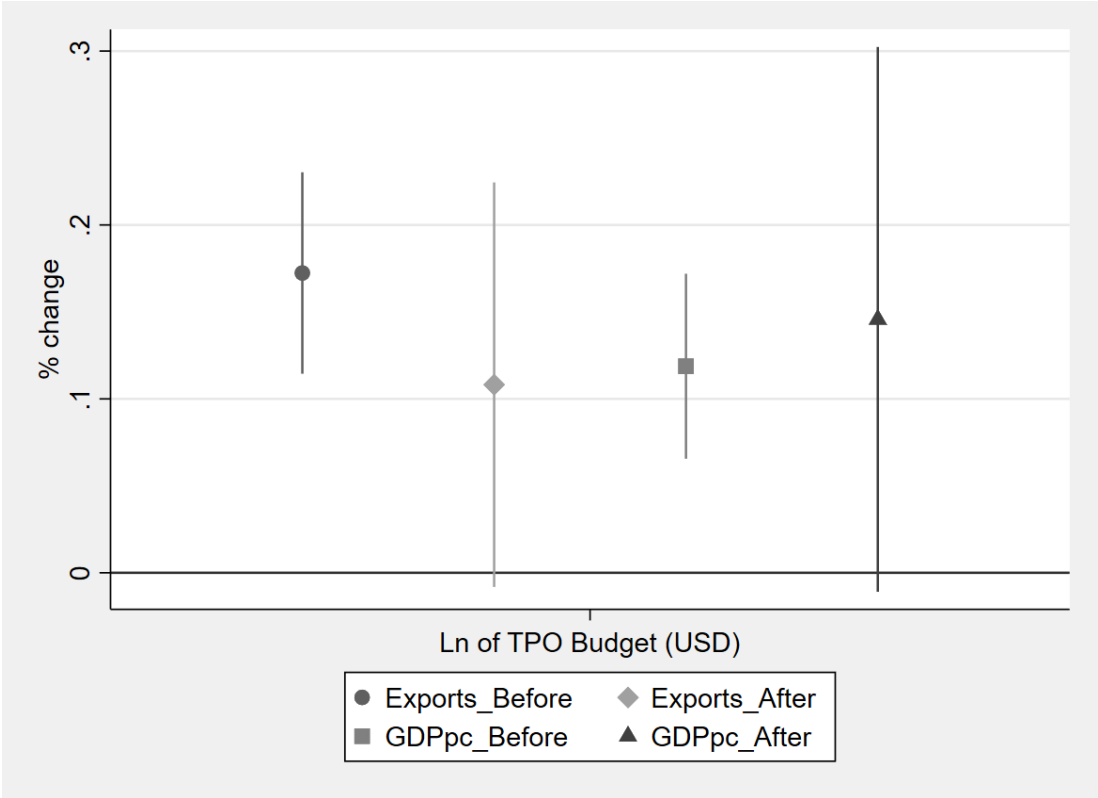
	Exports		GDP per capita	
	Before (1)	After (2)	Before (3)	After (4)
In of TPO budget	0.17* (0.03)	0.11° (0.06)	0.12* (0.03)	0.15° (0.08)
In of Tariffs	-0.25* (0.08)	0.11 (0.10)	-0.21* (0.04)	0.06 (0.08)
Control function	-0.12* (0.03)	-0.02 (0.06)	-0.09* (0.03)	-0.08 (0.07)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.99	0.99	0.99	0.99
# observations	543	208	544	208

**Note:** All columns use a control function estimator where the importance given by each TPO to different Key Performance indicators is used as instruments for the In of TPO budget. The first two columns report the results for the sample before 2014, and the last two columns for the sample after 2014. The odd-numbered columns report export returns and the even-numbered columns report GDP per capita returns. Robust standard errors are obtained through bootstrap with 500 repetitions and using as strata the country identifier. They are reported in parentheses. \*stands for statistical significance at the 1 percent level, § stands for statistical significance at the 5 percent level, and ° for statistical significance at the 10 percent level.

Figure 4 shows the estimated export and GDP per capita returns and their 95 percent confidence intervals before and after 2014, reported in Table 7. The confidence intervals overlap, indicating that the export and GDP per capita returns before 2014 are not statistically

different from the exports and GDP per capita returns after 2014. This is important because it suggests there is no need to split the sample into two to capture heterogeneous returns across time, providing more statistical power to the heterogeneous returns per country.

**Figure 4: Average export and GDP per capita returns before and after 2014 (control function)**

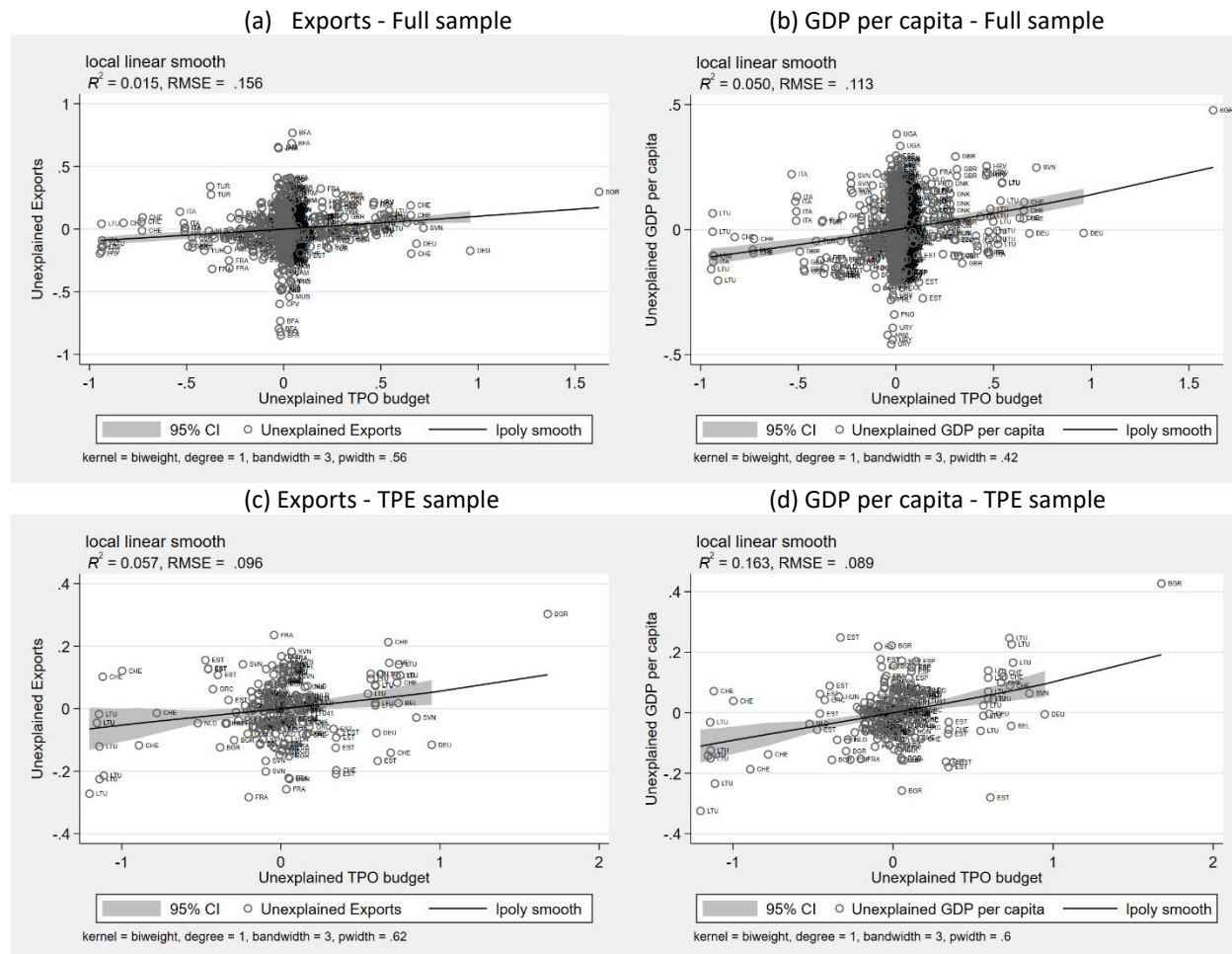


**Note:** Each symbol shows the point estimate of average returns in terms of exports or GDP per capita using the estimates in Table 7. The round symbol (●) shows the average export returns point estimate in the sample before 2014 (column 1 in Table 7). The diamond symbol (◆) shows the point estimate average return in terms of exports in the sample after 2014 (column 2 in Table 7). The square symbol (■) shows the point estimate average export return in terms of GDP per capita before 2014 (column 3 in Table 7), and the triangle symbol (▲) shows the average returns in terms of GDP per After 2014 (column 4 in Table 7). The lines through the symbols represent the 95 percent confidence intervals corresponding to those average returns. The returns are estimated using a control function estimator where variables capturing the importance of different Key Performance Indicators used in TPOs are used to address the potential endogeneity of TPOs’ budgets.

Finally, we explore whether there is any heterogeneity in exports and GDP per capita returns across TPO budget size. To do so, we use a semiparametric version of equations (1) and (2), where a fully flexible function captures the impact of TPOs’ budgets on exports and GDP per capita. In contrast, all other variables (fixed effects and the natural log of the average tariff on

intermediate goods) appear linearly, as in equations (1) and (2). In other words, we try to disentangle whether there are increasing or decreasing returns to increases in TPOs budgets: does a 1 percent increase in the budget of a TPO has a stronger impact on exports and GDP per capita when the TPO budget is small (decreasing returns) or large (increasing returns)

**Figure 5: Semiparametric estimates of the relationship between TPO budgets and exports and GDP per capita in the full and TPE samples (control function)**



**Note:** These are semiparametric estimates of the relationship between TPO budgets and exports or GDP per capita. In panels (a) and (b), we report the results for the full sample, and in panels (c) and (d) the results for the sample of TPE members. All other control variables, including the control function to address the endogeneity of TPOs' budgets, are introduced parametrically. The shaded areas provide the 95 percent confidence intervals.

Figure 5 clearly shows constant returns to increases in TPO budgets. The four panels show a clear linear relationship between TPO budgets and exports or GDP per capita. The constant slope implies that a 1 percent increase in TPO budgets leads to the same percentage increase in

exports or GDP per capita regardless of how big the TPO budget is. The top two panels provide the estimates for the full sample, and the bottom two panels provide the estimates for the TPE sub-sample.

As for the linear specifications reported in Table 4, GDP per capita returns are higher than export returns, as the slope on panels (b) and (d) is steeper than in panels (a) and (c). An explanation for these higher returns in terms of GDP per capita is that export promotion not only directly affects exports but also encourages a more innovative eco-system and new and more productive techniques that lead to broader productivity and employment gains.<sup>7</sup>

A second important observation from Figure 5 is that there is some important heterogeneity in exports and GDP per capita returns across countries. In the full sample of panel (a), we see that countries such as Uganda, Slovenia, and Italy have export returns that are much higher than what the linear relationship predicts for their corresponding level of export promotion budgets. Other countries, such as Uruguay, Armenia, and Papa New Guinea, have much lower export returns than predicted by the model.

To fully explore this heterogeneity, we estimate the varying coefficient model in Olarreaga, Sperlich, and Trachsel (2020). This allows us to estimate export and GDP per capita returns to increases in export promotion budgets for each country in the full sample. Results are reported in Table 8. All export and GDP<sup>8</sup> per capita returns are positive and statistically different from zero, at least at the 10 percent level (except for Morocco and Tunisia export returns), as the estimated returns are all more than 1.65 times larger than the estimated standard errors. All GDP per capita returns are statistically significant at the 1 percent level (except for Mauritius which is statistically significant at the 5 percent level).

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<sup>7</sup> In a companion piece, we explore the employment gains associated with export promotion.

<sup>8</sup> The only difference with the methodology in their paper is that we allow the returns to export promotion to also vary with the average tariff on intermediate goods.

**Table 8: Returns per country over the entire sample**

Country	Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)	Country	Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)
Afghanistan	0.069	0.023	0.092	0.021	Jamaica	0.063	0.025	0.104	0.022
Albania	0.068	0.024	0.076	0.021	Jordan	0.078	0.026	0.109	0.023
Armenia	0.073	0.022	0.075	0.021	Kenya	0.074	0.028	0.121	0.025
Australia	0.072	0.025	0.080	0.023	Korean	0.063	0.028	0.114	0.025
Austria	0.063	0.023	0.085	0.021	Latvia	0.057	0.024	0.088	0.022
Bangladesh	0.055	0.031	0.123	0.027	Lebanon	0.066	0.024	0.091	0.021
Barbados	0.063	0.029	0.118	0.025	<i>Lithuania</i>	0.074	0.023	0.094	0.021
<i>Belgium</i>	0.063	0.023	0.092	0.021	Macedonia	0.079	0.023	0.094	0.022
Belize	0.065	0.028	0.110	0.024	Madagascar	0.063	0.023	0.088	0.023
Bosnia	0.071	0.022	0.090	0.021	Malawi	0.055	0.029	0.119	0.025
Botswana	0.059	0.025	0.104	0.022	Malaysia	0.073	0.025	0.095	0.022
Brazil	0.082	0.029	0.121	0.025	<i>Malta</i>	0.077	0.023	0.091	0.021
<i>Bulgaria</i>	0.068	0.023	0.092	0.022	Mauritius	0.062	0.030	0.055	0.025
Burkina-Faso	0.066	0.028	0.118	0.025	Mexico	0.080	0.027	0.114	0.024
Cabo Verde	0.061	0.028	0.106	0.022	Morocco	0.046	0.041	0.156	0.033
Chile	0.059	0.023	0.086	0.022	Nepal	0.068	0.028	0.126	0.026
Colombia	0.058	0.025	0.100	0.022	<i>Netherlands</i>	0.066	0.023	0.088	0.022
Costa Rica	0.063	0.023	0.092	0.022	Nicaragua	0.085	0.027	0.067	0.022
Côte d'Ivoire	0.059	0.029	0.112	0.024	Oman	0.058	0.023	0.086	0.022
Croatia	0.065	0.024	0.084	0.021	Panama	0.068	0.024	0.093	0.021
<i>Cyprus</i>	0.067	0.023	0.093	0.022	Paraguay	0.067	0.027	0.107	0.023
Czech Rep.	0.060	0.024	0.094	0.022	Peru	0.076	0.024	0.104	0.022
Denmark	0.063	0.024	0.091	0.021	Philippines	0.066	0.023	0.098	0.022
Dominica	0.056	0.026	0.104	0.022	<i>Portugal</i>	0.073	0.023	0.092	0.022
Dominican R.	0.065	0.024	0.093	0.023	Rwanda	0.057	0.032	0.125	0.027
Ecuador	0.071	0.028	0.108	0.023	Senegal	0.056	0.028	0.125	0.024
Egypt	0.067	0.034	0.131	0.028	Serbia	0.066	0.024	0.095	0.022
El Salvador	0.064	0.024	0.097	0.022	Seychelles	0.081	0.026	0.103	0.023
<i>Estonia</i>	0.077	0.023	0.090	0.021	Sierra L.	0.064	0.028	0.114	0.024
Fiji	0.053	0.029	0.119	0.025	<i>Slovenia</i>	0.073	0.024	0.086	0.021
<i>Finland</i>	0.065	0.025	0.088	0.022	<i>Spain</i>	0.069	0.023	0.091	0.022
<i>France</i>	0.073	0.025	0.085	0.022	Sweden	0.055	0.026	0.083	0.022
<i>Germany</i>	0.062	0.024	0.091	0.021	<i>Switzerland</i>	0.067	0.026	0.108	0.023
Ghana	0.075	0.029	0.125	0.025	Syria	0.059	0.030	0.129	0.026
Great Britain	0.062	0.023	0.089	0.022	Tanzania	0.065	0.028	0.117	0.024
<i>Greece</i>	0.083	0.025	0.090	0.022	Thailand	0.056	0.025	0.118	0.024
Guatemala	0.077	0.023	0.090	0.021	Trinidad&T.	0.078	0.024	0.095	0.022
Guyana	0.074	0.028	0.113	0.024	Tunisia	0.051	0.038	0.136	0.031
Honduras	0.068	0.025	0.081	0.021	Turkey	0.076	0.025	0.109	0.023
Hungary	0.061	0.023	0.087	0.022	Uganda	0.073	0.030	0.118	0.025
Iceland	0.064	0.023	0.089	0.022	Uruguay	0.072	0.026	0.111	0.024
Indonesia	0.069	0.023	0.101	0.022	Vietnam	0.055	0.028	0.119	0.025
<i>Ireland</i>	<i>0.070</i>	<i>0.024</i>	<i>0.089</i>	<i>0.021</i>	Yemen	0.073	0.024	0.101	0.022
Israel	0.052	0.025	0.083	0.023	Zambia	0.067	0.029	0.118	0.026
<i>Italy</i>	<i>0.070</i>	<i>0.023</i>	<i>0.092</i>	<i>0.021</i>	<b>Average</b>	<b>0.067</b>	<b>0.026</b>	<b>0.101</b>	<b>0.023</b>

**Note:** The first and fifth columns report export returns and the third and seventh columns report GDP per capita returns. The second, fourth, sixth, and eighth columns report wild bootstrapped standard errors with 500 repetitions associated with each of those point estimates. Country names in *italics* signal TPE members.

The average export return in the full sample is 0.067, and the average GDP per capita return is 0.101. This implies that a 1 percent increase in TPOs' budgets leads, on average, to a 0.067 percent increase in conditional exports and a 0.101 percent increase in conditional GDP per capita. While there is heterogeneity in returns all exports and GDP per capita returns are within one standard deviation from the corresponding average returns, suggesting that while TPO characteristics matter, the differences observed in TPOs worldwide do not critically determine returns to export promotion.

We collected data in 2014 and 2024 for most TPE members, and we can explore whether changes in TPO characteristics led to changes in exports and GDP per capita returns. Estimated returns and their standard errors for the period 2011-2014 are reported in the first four columns of Table 9 and for the period 2021-2024 in the last four columns of Table 9.

**Table 9: Returns for TPE members in 2011-2014 and 2021-2024**

Estimates for TPE members in 2011-2014					Estimates for TPE members in 2021-2024				
Country	Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)	Country	Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)
Belgium	0.063	0.026	0.092	0.021	Belgium	0.066	0.024	0.092	0.020
Bulgaria	0.070	0.027	0.094	0.021	Bulgaria	0.078	0.022	0.096	0.020
Cyprus	0.063	0.025	0.095	0.022	Cyprus	0.076	0.024	0.090	0.020
Estonia	0.086	0.028	0.091	0.021	Estonia	0.076	0.023	0.097	0.020
France	NA	NA	NA	NA	France	0.063	0.026	0.085	0.021
Germany	0.062	0.027	0.092	0.020	Germany	0.065	0.024	0.092	0.020
Hungary	NA	NA	NA	NA	Hungary	0.067	0.024	0.091	0.020
Iceland	0.064	0.027	0.094	0.021	Iceland	0.066	0.024	0.085	0.020
Italy	0.072	0.027	0.096	0.021	Italy	0.077	0.023	0.094	0.020
Lithuania	0.082	0.026	0.089	0.020	Lithuania	0.070	0.023	0.100	0.020
Malta	NA	NA	NA	NA	Malta	0.077	0.023	0.092	0.020
Netherlands	0.071	0.026	0.084	0.021	Netherlands	0.063	0.023	0.090	0.023
Portugal	NA	NA	NA	NA	Portugal	0.074	0.024	0.003	0.020
Slovenia	0.069	0.027	0.082	0.020	Slovenia	0.076	0.025	0.083	0.020
Spain	0.068	0.026	0.090	0.021	Spain	0.065	0.024	0.088	0.020
Switzerland	0.067	0.030	0.111	0.022	Switzerland	0.070	0.027	0.105	0.022
<b>Average</b>	<b>0.070</b>	<b>0.027</b>	<b>0.093</b>	<b>0.021</b>	<b>Average</b>	<b>0.071</b>	<b>0.024</b>	<b>0.086</b>	<b>0.020</b>

**Note:** The first and third columns report exports and GDP per capita returns associated with a 1 percent increase in TPO budgets in 2014. The fifth and seventh columns report exports and GDP per capita returns associated with a 1 percent increase in TPO budgets. The second, fourth, sixth, and eighth columns report the wild bootstrapped standard errors with 500 repetitions associated with each of those point estimates. Greece, Finland, and Ireland are TPE members, but we do not have data for the periods 2011-2014 and 2021-2024, so we cannot compute returns for those periods.

Differences in returns for the two periods are small and not statistically significant. The average export return observed for TPE members in the 2011-2014 period is 0.070 and 0.071 in the 2021-2024 period. Similarly, the average GDP per capita returns are 0.093 in 2011-2014 and 0.086 in 2021-2024. Two factors drive this lack of differences in estimated returns. First, there have not been very big differences in TPO characteristics during these two periods, and second, the impact of these differences in exports and GDP per capita returns tends to be small or compensate for each other.

The returns computed in the previous analysis were undertaken using data for national TPOs. In many countries such as Belgium and Spain there are important regional players that were not fully taken into account when estimating previous returns. For Spain, we ignored regional agencies and focused on the data for the national agency (ICEX). For Belgium, which does not have a national agency, we constructed a hypothetical one by putting together the characteristics of Flanders Investment and Trade and Wallonia Export and Investment Agency. In Table 10, we compute the exports and GDP per capita returns for the period 2021-2024 for the six regional TPOs that are members of TPE. The mandate of these regional agencies is to target certain regions and cannot be considered national agencies. Therefore, the estimated returns to increases in their budgets are in terms of *regional* exports and GDP per capita.

**Table 10: Returns for TPE regional members in 2024**

Institution	Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)
Flanders Investment & Trade	0.067	0.024	0.093	0.019
hub.brussels invest & export	0.062	0.025	0.092	0.020
Wallonia Export & Invest	0.082	0.024	0.091	0.020
Acciò	0.055	0.023	0.086	0.020
Basque Trade & Investment	0.067	0.025	0.084	0.020
Instituto de Fomento de Murcia	0.065	0.025	0.076	0.020
<b>Average</b>	<b>0.066</b>	<b>0.024</b>	<b>0.087</b>	<b>0.020</b>

Note: The first and third columns report exports and GDP per capita returns associated with a 1 percent increase in TPO budgets in 2024. The second and fourth columns report wild bootstrapped standard errors with 500 repetitions associated with the point estimates in the first and third columns.

Again, all returns are positive and statistically different from zero at the 5 percent significance level. Also, as in the full sample of national TPOs, no regional TPO has a return that is more than one standard deviation from the average return in the full sample or the sub-sample of regional TPOs. As for national TPO, this indicates only some moderate heterogeneity in exports and GDP per capita returns.

## **5. Concluding remarks**

TPOs are present in most countries. While most are relatively small, with an average budget of USD 43 million, representing an average of 0.5 percent of the country's exports, understanding their impact on export growth and, ultimately, GDP per capita growth is important.

In this paper, we estimate the exports and GDP per capita return to increases in TPO budgets using a varying coefficient model developed by Olarreaga, Sperlich, and Trachsel (2020). The varying coefficient model uses the variation in TPO institutional setups, funding sources, expenditure priorities, and strategies to estimate heterogeneous returns per country. Indeed, TPOs' setup can vary from being fully funded by the public sector to being fully funded by the private sector, and their strategy, mandates, and operations go from prioritizing large established exporters to small non-exporting firms. These differences allow us to identify differences in both exports and GDP per capita returns.

Results show that exports and GDP per capita returns to export promotion are positive and statistically different from zero in all countries. A 1 percent increase in TPOs budgets leads, on average, to a 0.067 percent increase in conditional exports and a 0.101 percent increase in conditional GDP per capita. The fact that returns in GDP per capita are higher than export returns suggests that export promotion has a growth-promoting effect that goes beyond the impact on export growth, perhaps by promoting a more competitive and innovative ecosystem that leads to productivity and employment gains.

Interestingly, differences in TPO characteristics can translate into large differences in export and GDP per capita returns. Estimated export returns are twice as large in Nicaragua (the country in the sample with the largest export returns) than in Morocco (the country with the lowest export returns). Estimated GDP per capita returns are three times higher in Morocco than in Mauritius. So, TPOs' characteristics matter for export and GDP per capita returns. However, they are all positive, and no country has an estimated return that is statistically different from the average return in the sample.

Among TPE members, there is less heterogeneity in average returns over the period 2005-2024. Export returns vary from 0.063 in Belgium to 0.083 in Greece, and GDP per capita returns vary from 0.085 in France to 0.101 in Switzerland. Again, none of the returns are statistically different from the ones in the full sample or the sub-sample of TPE members.

We also explore the heterogeneity of exports and GDP per capita returns across three dimensions: country size, time, and the size of TPOs' budgets. We found that countries with a smaller GDP tend to have higher returns, but we found no heterogeneity across time or size of TPOs' budgets. Exports and GDP per capita returns are not statistically different when estimated over two subsamples before and after 2014. The returns to increases in TPOs' budgets do not vary with the size of the budget, i.e., there is a linear relationship between TPOs' budgets and exports and GDP per capita.

Finally, we examine whether increases in TPOs' budgets in other countries impact exports and GDP per capita at home. We did this by examining how changes in TPO budgets in countries within the same region and income level positively or negatively impacted exports and GDP per capita. We found that increases in other countries' TPOs' budgets positively impact exports and GDP per capita. This positive externality suggests that coordinating the efforts of TPOs within the same region can lead to higher exports and GDP per capita returns.

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# Impact study

# Employment Returns to Export Promotion

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## Executive Summary

We estimate employment returns to export promotion directly and indirectly through export promotion's impact on GDP per capita, first and then on employment for the period 2005-2024. Results suggest that, on average, among Trade Promotion Europe (TPE) members, a 1 percent increase in Trade Promotion Organizations' budget leads to a 0.012 percent increase in employment once we include the indirect effect through GDP per capita estimated in Olarreaga (2024a).

The total employment effect is positive in all TPE member countries, but it is statistically different from zero only in Bulgaria. If we exclude the indirect effect that increases in TPOs' budgets have first on GDP per capita and then on employment, the average impact on employment is ten times smaller (see Table A).

**Table A: Employment returns with and without indirect GDP per capita effects**

Country	Without GDPpc		With GDPpc		Country	Without GDPpc		With GDPpc	
	Empl. Returns (%) (1)	Empl. Returns (s.e.) (2)	Empl. Returns (%) (3)	Empl. Returns (s.e.) (4)		Export Returns (%) (5)	Export Returns (s.e.) (6)	GDPpc Returns (%) (7)	GDPpc Returns (s.e.) (8)
Acciò	0,004	0,009	0,015	0,008	Ireland	-0,005	0,009	0,006	0,008
Basque T&I	0,003	0,009	0,014	0,009	Italy	0	0,009	0,011	0,008
Belgium	0,002	0,009	0,013	0,008	Lithuania	0,002	0,009	0,014	0,008
Bulgaria	0,007	0,009	0,019	0,009	Malta	-0,003	0,009	0,008	0,008
Cyprus	0,004	0,009	0,015	0,008	Murcia	0,003	0,009	0,014	0,008
Estonia	0,006	0,009	0,017	0,009	Netherlands	0,001	0,009	0,011	0,008
Finland	-0,001	0,009	0,01	0,008	Portugal	0,004	0,009	0,015	0,008
Flanders I&T	0,002	0,009	0,013	0,008	Slovenia	0,001	0,009	0,011	0,008
France	0	0,009	0,01	0,008	Spain	0,003	0,009	0,014	0,008
Germany	-0,002	0,009	0,009	0,008	Switzerland	-0,006	0,01	0,007	0,008
Greece	0,002	0,009	0,013	0,008	Wallonia E&I	0	0,009	0,012	0,008
hub.brussels	0,002	0,009	0,014	0,008	<b>Average</b>	<b>0,001</b>	<b>0,009</b>	<b>0,012</b>	<b>0,008</b>

**Note:** The first and fifth columns report employment returns without considering the indirect effects of export promotion on GDP per capita. The third and seventh columns report employment returns including indirect effects through GDP per capita. The second, fourth, sixth, and eighth columns report wild bootstrapped standard errors with 500 repetitions associated with each of those point estimates.

These results imply that an increase of 1000 Euro in the average TPO's budget of TPE members leads, on average, to 2.7 additional jobs.<sup>1</sup>

These estimates, however, need to be interpreted with care as the point estimate is only significant in the case of Bulgaria, as can be seen from the right panel in Figure A. Bulgaria is indeed the only case where the 95 percent confidence interval does not intersect the 0 lines. While all other national or regional TPOs have a positive total effect, these are not statistically different from zero. Importantly, none of the individual TPO returns are statistically different from each other as the 95 percent confidence intervals all overlap, regardless of whether we look at the total effects or the direct effects that exclude the impact that trade promotion has on GDP per capita.<sup>2</sup>

We also examine whether country characteristics matter for employment returns. An important country characteristic is the within-country correlation across sectors between comparative advantage and labor market frictions. Carrère et al. (2020) show that the correlation between comparative advantage and labor market frictions is an important determinant of aggregate unemployment. Countries with a higher correlation tend to suffer from higher levels of aggregate unemployment, as a larger share of the labor force is in sectors with strong labor market frictions. In Olarreaga (2024b), we interact the correlation between comparative advantage and labor market frictions with TPO's budget to estimate how the impact of TPO's budget on employment varies with the correlation. We found that the higher the correlation, the higher the employment returns to increases in TPO budgets. This implies that export

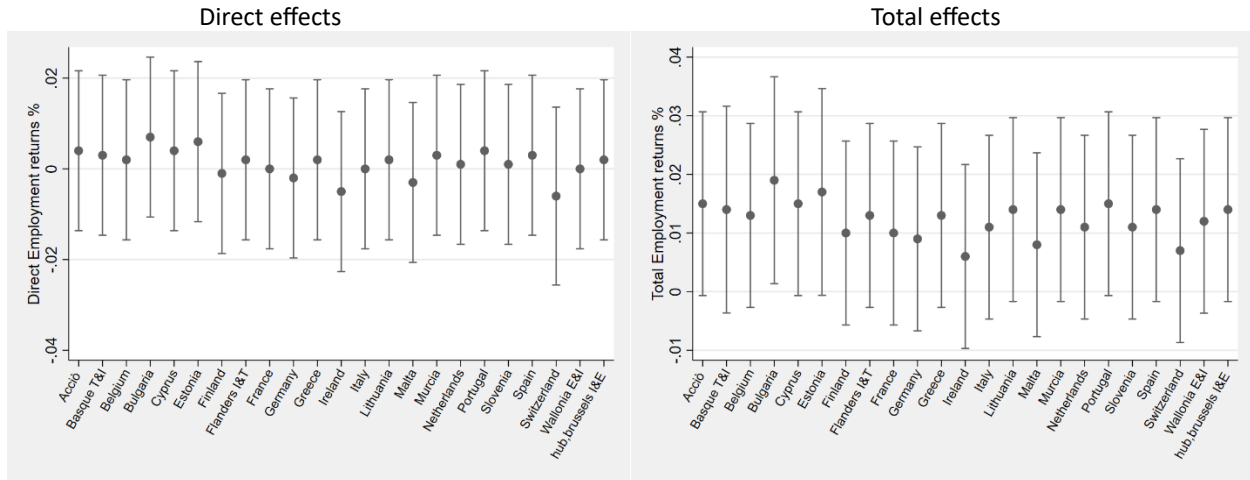
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<sup>1</sup> In Olarreaga (2024b), we estimate employment returns to export promotion for 76 countries and found that, on average, a 1 percent increase in TPOs' budgets leads to a 0.015 percent increase in employment once we include the indirect effect through GDP per capita. Note also that employment returns are statistically different from zero in only half of the larger sample. Importantly, the average employment return is 80 percent smaller when we do not include the indirect effect through GDP per capita.

<sup>2</sup> Note that regional agencies were not considered when econometrically estimating the parameters of our model for employment returns, which is built to use data for national agencies. Using the estimated parameters we then compute the returns for each regional agency. In the case of Belgium, which does not have a national agency, we constructed a hypothetical one by putting together the characteristics of Flanders Investment and Trade and Wallonia Export and Investment Agency.

promotion activities help the labor market where they are most needed, i.e., when the country's comparative advantage is in sectors with strong labor market frictions.

**Figure A: TPE members' employment returns**



**Note:** The left panel shows direct employment returns to export promotion that exclude the indirect effect through GDP per capita, and the right panel shows total employment returns, including the indirect effect through GDP per capita returns. The round symbol (●) shows each TPO's point estimate of export returns. The lines through the symbols represent the 95 percent confidence intervals calculated using robust standard errors obtained using wild bootstrap.

TPO characteristics also matter. TPOs focusing on new, occasional, or non-exporters rather than established exporters have higher employment returns. Similarly, TPO that target all sectors and destinations rather than a few sectors or destinations have higher employment returns to export promotion. However, as can be seen from Figure A, these differences in TPO characteristics lead to small differences in employment returns, which remain small and mostly statistically insignificant.

These results suggest that using employment as a metric to evaluate the performance of TPO may be misleading. There are structural reasons why employment returns are negligible and, on rare occasions, even negative. Indeed, when the country has a comparative advantage in sectors with no labor market frictions, increasing TPOs budgets is likely to have no or a negative direct impact on employment. While this gets compensated in the sample of TPE members by the impact of export promotion on GDP per capita, this may not always be the case. This suggests

that a better metric for TPOs to target may be GDP per capita when moving beyond the impact of export promotion on exports. The GDP per capita returns to export promotion are large and always statistically different from zero in a sample of TPE members.

The targeted metric matters because TPO characteristics that increase GDP per capita returns may differ from those that increase employment returns. A higher expenditure share on export support services seems to increase employment and GDP per capita returns. However, targeting small firms leads to higher GDP per capita returns but has no impact on employment returns. Given the small impact of TPOs' activities on employment, it may seem appropriate to target GDP per capita returns while monitoring their impact on employment returns.

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# Employment Returns to Export Promotion

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## Abstract

We estimate the employment returns to export promotion using a merged database of five Trade Promotion Organization (TPO) surveys undertaken between 2005 and 2024. Including the indirect effects of export promotion on GDP per capita estimated in Olarreaga (2024), a 1 percent increase in TPO's budget leads, on average, to a 0.015 percent increase in employment. While the returns at the country level are all small, they are always positive except for one country, and half of them are statistically different from zero. Country and TPO characteristics matter. TPOs in countries with a stronger correlation between comparative advantage and labor market frictions across sectors, or a higher share of their budget spent on new, occasional, or non-exporting firms rather than established exporters, or that have a strategy that targets all sectors and destinations rather than a few sectors or destinations, tend to have higher employment returns.

JEL codes: F13, F14.

Keywords: Trade Promotion; Employment.

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## 1. Introduction

We estimate employment returns to export promotion in an unbalanced sample of 76 countries spanning from 2005 to 2024. We identify the employment returns to increases in the budget of Trade Promotion Organizations (TPO) using a control function estimator where TPO's characteristics that are likely to be uncorrelated with the error term in the employment equation are used as instruments to TPO budgets, as well as through the interaction of TPO's budget with TPO's characteristics that are likely to matter for employment returns. The varying coefficient model also allows us to estimate employment returns by country.

Results suggest that, on average, across the 76 countries in the sample and over the period 2005-2024, a 1 percent increase in TPOs' budget led to a 0.015 percent increase in employment once we include the indirect effect that export promotion has on GDP per capita estimated in Olarreaga (2024). While all countries, except Israel, have a positive employment return, it is statistically different from zero for only half of the countries in the sample. If we exclude the indirect effect through GDP per capita, the average employment return is five times smaller. It is negative in 14 countries and never statistically different from zero. This implies that the direct effect of export promotion on employment is negligible. Most of the small but positive effects on employment comes through the indirect impact of export promotion on GDP per capita.

The highest employment return is found in Morocco, with a 0.026 percent increase in employment following a 1 percent increase in the TPO budget, which is also statistically different from zero. The lowest export return is found in Israel, with a 0.002 percent decline in employment. Thus, while there is heterogeneity in export returns, it is limited. Note that Morocco's very high employment return is driven by the large impact that export promotion has on GDP per capita growth in Morocco. Indeed, as found by Olarreaga (2024), Morocco is the country in the sample with the highest GDP per capita returns to export promotion. The increase in GDP per capita due to increases in TPO's budgets then translates into higher employment growth.

We also explore whether there are non-linearities associated with the TPO's budgets. We found no evidence of non-linearities in TPO's budgets, meaning that employment returns do not vary with budget size: there are no increasing or decreasing returns to increases in TPO budgets. They are identical at all levels of TPO budgets.

Finally, we examine whether country and TPO characteristics matter for employment returns. An important country characteristic is the within-country correlation across sectors between comparative advantage and labor market frictions. Carrère et al. (2020) show that the correlation between comparative advantage and labor market frictions is an important determinant of aggregate unemployment. Countries with a higher correlation tend to suffer from higher levels of aggregate unemployment, as a larger share of the labor force is in sectors with strong labor market frictions. In this paper, we interact the correlation between comparative advantage and labor market frictions with TPO's budget to estimate how the impact of TPO's budget on employment varies with the correlation. We found that the higher the correlation, the higher the employment returns to increases in TPO budgets.<sup>3</sup>

These results are important for at least three reasons. First, while the direct objective of export promotion is to encourage exports, this cannot be its ultimate objective from a social welfare point of view. The impact of export promotion activities on employment is one metric through which politicians and the public will most likely evaluate what TPOs do. The results in this paper suggest that this may be the wrong metric, as there are structural reasons why employment returns are negligible and on rare occasions even negative. Indeed, when the country has a comparative advantage in sectors with no labor market frictions, increasing TPOs budgets is likely to have no or a negative direct impact on employment. While this tends to be

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<sup>3</sup> Ugarte and Olarreaga (2020) examine how the correlation itself affects unemployment and found that the impact was not statistically different from zero, but there are three important differences with their study. First, in this paper the outcome variable is employment and not unemployment for which the data is of better quality (it is easier to count and agree on what is an employed worker, than on what is an unemployed worker). Second, in this paper we examine how returns change as the correlation varies, whereas in their paper their focus on the impact of the correlation on unemployment. This paper uses a much larger sample that adds two TPO surveys.

compensated in our sample by the impact of export promotion on GDP per capita, it may not (the case of Israel). This suggests that a better metric to target may be GDP per capita when moving beyond the impact of export promotion on exports. Second, because governments may nevertheless require TPOs to target employment, understanding what TPO activities are more likely to lead to increases in employment is useful. The results in this paper suggest that focusing on new, occasional, or non-exporters and having a strategy that targets all sectors and destinations is likely to lead to higher employment returns than focusing on established exporters or targeting only a few sectors and destinations. We also find these results in the literature looking at exports and GDP per capita returns (Olarreaga et al., 2020, and Olarreaga, 2024). Third, TPO budgets are not large but are not negligible either. The average TPO budget in our sample is USD 42 million, but it can be higher than USD 500 million. Most are publicly funded, so understanding the impact of public spending is important.

The main challenge we faced was merging five different surveys of TPO activities and funding covering different countries and time spans undertaken by the World Bank, the International Trade Center (ITC), and Trade Promotion Europe (TPE) at different points in time. The resulting database is identical to the one used in Olarreaga (2024) except for the employment variables. We explore the potential heterogeneity of estimated returns across time and regions. We found no statistically significant differences in average returns between the full sample and a subsample of TPE members. Similarly, the employment returns for TPE members are not very different for the two periods 2011-2014 and 2021-2024.<sup>4</sup> This led us to consider the entire sample across all countries and periods rather than sub-samples when estimating country-specific employment returns. The advantage of using the entire sample is statistical power.

There is a recent literature examining the impact of export promotion on employment. Munch and Schaur (2018) use firm-level data for Denmark and found positive employment returns to export promotion in small firms during the period 2002-2012, but there are only half the

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<sup>4</sup> TPE members include Belgium, Bulgaria, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Malta, Netherlands, Poland, Portugal, Slovenia, Spain, Switzerland and Ukraine.

returns on exports. While we cannot directly look at the impact on small or large firms because we do not have firm level data, we can examine whether TPOs that focuses mainly on small firms have larger employment returns. The answer is that there is no heterogeneity across firm size in our sample across many countries and time periods. Keeping in mind the large differences in methodologies and data, we also estimate a small positive overall employment return for Denmark.

Similarly, Cassey and Cohen (2016) examine the impact of export promotion on employment in Washington State (USA) using firm-level data and a difference-in-difference estimator. Again, they find that the impact on employment is positive, small, but not statistically different from zero.

Ugarte and Olarreaga (2020) is the paper closest to this one. Using part of the TPO survey data we use in this paper, they find that export promotion reduces unemployment. They found that a 1 percent increase in TPO's budgets leads to a 0.07 percent decrease in unemployment. While these results seem a prime facie indicate a much larger impact than the one found in our paper where a 1 percent increase in TPO's budgets leads, on average, to a 0.015 percent increase in the employment ratio, this is not the case. The reason is that the average unemployment level in our sample is 8 percent, whereas the average employment ratio is 55 percent, which is almost seven times larger. So, in terms of percentage point change, Ugarte and Olarreaga (2020) found a 0.56 percentage point decline in unemployment, and we find a 0.84 percentage point increase in the employment rate, which is not very different.

However, the differences in outcome variables are not the only difference between the two papers. In this paper, we explore the heterogeneity of employment returns along different country and TPO characteristics, whereas there is no exploration of heterogeneous impacts in Ugarte and Olarreaga (2020). We also correct for the potential endogeneity of TPO budgets using a control function approach. Finally, the number of observations in our dataset is three times larger for two reasons: i) we have two additional TPO surveys, and ii) we focus on the

employment ratio rather than the unemployment rate for which there is more data available and of better quality.

The remainder of this paper is organized as follows. Section 2 discusses the data used in the empirical analysis methodology and section 3 presents the empirical methodology. Section 4 presents the estimates of employment returns to trade promotion and section 5 concludes.

## **2. Data**

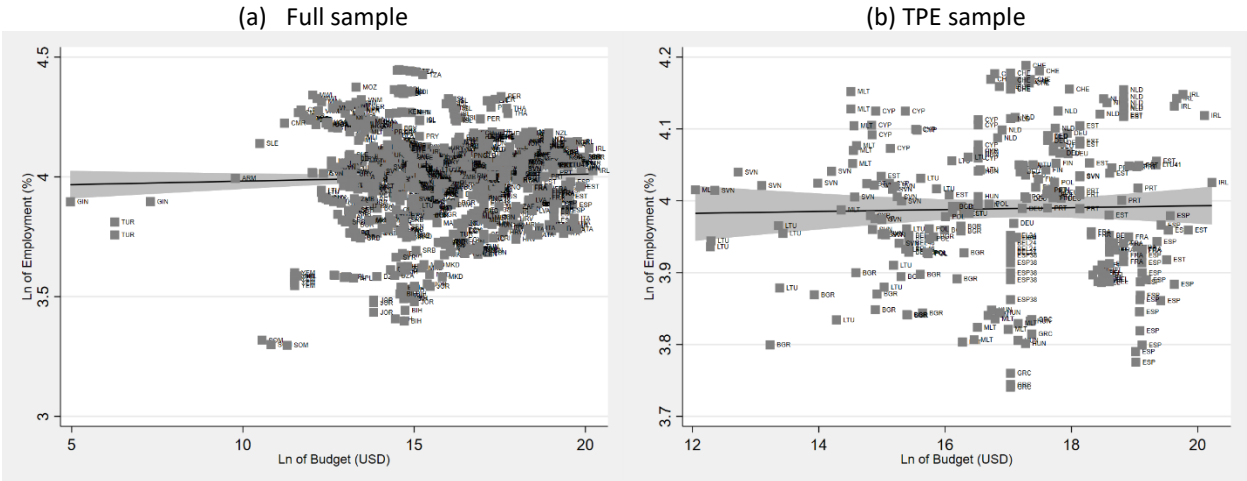
We merge five different data sources. The first survey of TPO we used was undertaken in 2005 by the World Bank in collaboration with the ITC and covered 103 developing and developed countries, but only for the year 2005. It is documented in Lederman, Olarreaga and Payton (2010). The second survey was undertaken in 2010 also by the World Bank in collaboration with the ITC and covered 95 countries for the period 2006-2010. It is documented in Cruz, Lederman and Zoratto (2018). The third survey was undertaken by the ITC in 2014 and covered the period 2010-2014 but only for fourteen European TPOs. It is documented in the International Trade Center (2016). The fourth survey was undertaken by the World Bank in 2021 and covered the period 2011-2021 for 57 developing and developed countries and is described in Choi et al. (2024). The final survey was undertaken by Trade Promotion Europe and covered the period 2019-2024 for 15 European countries and is used in Olarreaga (2024).

To estimate the returns in terms of employment, we merge these five datasets with data on employment ratio, working-age population and GDP per capita from the World Bank's World Development Indicators. The merging of the five TPO surveys was straightforward when questions are identical across surveys. However, not all questions are found in all surveys, as some are dropped and others added depending on the needs of each survey and the important constraint of not having too long surveys, leading to a low response rate. The merging was done so that if a question is dropped in a given survey, the answer is assumed to remain unchanged in the next survey. Similarly, when a question is added, it is assumed that the answer to that question was identical to the one in the previous survey. These assumptions allow us to have a

less unbalanced panel. Finally, in the last TPE survey, it was decided that to overcome confidentiality issues, we should not ask for the exact value of the TPO budget but rather provide brackets. Because we had the exact values in all four surveys, we decided to convert the brackets with their mid-point value instead of converting the exact values in the four previous surveys into brackets.

After merging these datasets, we explore the simple correlation across countries and time between TPOs’ budgets and employment ratio (i.e., the ratio of employment to working-age population). On the left-hand side panel of Figure 1 we illustrate the correlation for the full sample, and on the right-hand-side panel, we illustrate this correlation in the sub-sample of TPE members. Both panels exhibit an absence of correlation. The fitted line in both samples is flat, implying that increases in TPO’s budgets lead neither to an increase nor a decrease in employment ratios.

**Figure 1: Correlation between TPO budgets and employment ratio**



**Note:** These are unconditional correlations in a panel dataset spanning from 2005 to 2024 between the natural log of TPOs’ budget in the horizontal axis and the log of the employment rate in the full sample in panel (a) and in a sample composed only of TPE members in panel (b).

However, nothing causal should be interpreted from these graphs as these correlations can be biased due to omitted variables (for example, larger countries tend to have both larger institutional budgets and smaller employment ratios) or reverse causality (countries with higher employment ratios may be able to have larger TPO budgets). The methodology described in the

next section allows us to address these potential and estimate export returns that do not suffer from omitted variable bias or reverse causality.

Nevertheless, one can draw two important messages from Figure 1. First, there is no smoking gun: TPO budgets are uncorrelated with employment ratios. If there is an impact, it will be subtle. Second, there is some important heterogeneity across countries. For similar levels of TPO's budgets some countries have much higher employment ratios than others.

Table 1 provides summary statistics for all the variables used to estimate the results presented in section 4. The average TPO budget in the sample is USD 43 million, with a standard deviation of USD 82 million. The average employment ratio is 55.4 percent, with a standard deviation of 9.3. So, there is a lot of variation in the sample in terms of TPO budgets, employment ratios, and GDP per capita.

**Table 1: Summary Statistics**

	Mean	Std. dev.	Min	Max	Obs
TPO budget (millions USD)	43	82	0.04	700	1,042
Employment to population ratio 15+(%)	55.4%	9.3	27.0%	85.4%	846
GDP per capita (USD)	16818	19526	217	99995	1,022
Share of TPO budget in total exports (%)	0.5%	1.7%	0.0%	28%	982
Population 15-64 (million)	22	92	0.07	950	1,027
Share of expend. on export support services	10-25%	10%	<10%	75-100%	1,041
Share of expenditure on small firms	25-50%	15%	<10%	75-100%	1,022
Share of expenditure on medium-sized firms	25-50%	15%	<10%	75-100%	1,022
Share of expenditure on large firms	10-25%	10%	<10%	75-100%	1,022
Share of expenditure on non-exporting firms	<10%	10%	0%	75-100%	1,005
Share of expend. on new/occasional exporter	10-25%	10%	<10%	75-100%	1,021
Share of expenditure on established exporters	25-50%	15%	<10%	75-100%	1,021
Rank of KPI number of exporters	Med	NA	Low	Top	909
Rank of KPI value of exports	High	NA	Low	Top	909
Rank of KPI number of clients	Me	NA	Low	Top	909
Rank of KPI client satisfaction	Med	NA	Low	Top	909
Rank of other KPI	Low	NA	Low	Top	909
Rank of strategy: promote all exports	High	NA	None	Top	917

**Note:** Author's calculation using data from 5 TPO surveys covering 120 countries during the period 2005-2024, as well as data from the World Trade Organization and the World Bank.

There is also a lot of variation in the sample in terms of country size (working-age population) and income levels. The average country has a working-age population of 22 million, but this

varies between 70,000 and 950 million individuals. The average GDP per capita is USD 16818 and it varies between USD 217 and USD 99,995.

The variance in TPOs' characteristics is less pronounced. Interestingly, on average, TPOs tend to spend a large share of their expenditure on small and medium-sized firms rather than large firms. They also tend to concentrate their expenditure on established exporters. The main Key Performance Indicator (KPI) they use is the value of exports, and most TPOs tend to focus their strategy on promoting exports of all sectors to all destinations.

In Table 2 we provide summary statistics for TPE members only. The different statistics are again computed over the 5 TPO surveys, i.e., over the period 2005-2024. As in the full sample, there is variance in TPO budgets, employment ratio, and GDP per capita that will help us identify the impact of increases in TPO budgets on employment.

**Table 2: Summary Statistics for TPE members**

	Mean	Std. dev.	Min	Max	Obs
TPO budget (millions USD)	72.1	100	0.2	700	266
Employment to population ratio 15+ (%)	54.3%	5.4	42.1%	65.9%	262
GDP per capita (USD)	33044	18741	3899	99994	257
Share of TPO budget in total exports (%)	0.1%	0.4	0.0%	0.5%	257
Population 15-64 (million)	12.8	16.0	0.3	54.9	262
Share of expend. on export support services	10-25%	<10%	1	75-100%	266
Share of expenditure on small firms	25-50%	<10%	2	75-100%	266
Share of expenditure on medium-sized firms	25-50%	<10%	2	75-100%	266
Share of expenditure on large firms	<10%	<10%	1	25-50%	266
Share of expenditure on non-exporting firms	10-25%	<10%	1	75-100%	266
Share of expend. on new/occasional exporter	50-75%	<10%	1	75-100%	266
Share of expenditure on established exporters	<10%	<10%	0	75-100%	265
Rank of KPI number of exporters	Med	NA	Low	Top	252
Rank of KPI value of exports	Med	NA	Low	Top	252
Rank of KPI number of clients	Med	NA	Low	Top	252
Rank of KPI client satisfaction	Med	NA	Low	Top	252
Rank of other KPI	Low	NA	Low	Top	252
Rank of strategy: promote all exports	Med	NA	No	Top	255

**Note:** Author's calculation using data from 5 TPO surveys covering the 18 countries which are part of TPE and for which we have data during the period 2005-2024. We also use data from the World Trade Organization and the World Bank. The 18 TPE members for which we have data in at least one survey are Belgium, Bulgaria, Cyprus, Estonia, Finland, Germany, France, Hungary, Ireland, Lithuania, Malta, Netherlands, Poland, Portugal, Slovenia, Spain, and Switzerland.

Perhaps the more interesting difference is that TPE members seem to spend, on average, a larger share of their budget on new and occasional exporters and less on established exporters than what is observed on average in the full sample. Also, there is not so much focus on export value as a KPI.

### 3. Methodology

Before estimating heterogeneous returns for each country, we estimate the average returns for the entire sample using the following model:

$$\ln(\text{employment rate}_{ct}) = \alpha_c + \alpha_t + \beta \ln(\text{budget}_{ct}) + \sigma \ln(\text{population}_{ct}) + \omega \ln(\text{GDPpc}_{ct}) + \varepsilon_{ct} \quad (1)$$

where  $\text{employment rate}_{ct}$  is the ratio of total employment and working-age population,  $\text{budget}_{ct}$  is the TPO budget in country  $c$  at time  $t$ ,  $\text{GDPpc}_{ct}$  is GDP per capita of country  $c$  at time  $t$ , and  $\text{population}_{ct}$  is the working-age population in country  $c$  at time  $t$ . The coefficient of interest is  $\beta$  that captures the returns to increases in TPOs' budget in terms of employment. Because we are controlling for country size using working age population,  $\beta$  can be thought as the percent increase in conditional employment after a 1 percent increase in TPO's budgets;  $\alpha_c$  and  $\alpha_t$  are country fixed effects, and  $\alpha_t$  are time fixed effects;  $\sigma$  and  $\omega$  are the coefficients on the working-age population and GDP per capita respectively; and  $\varepsilon_{ct}$  is an error term.

Because TPOs' budgets may be endogenous even after controlling for country and year fixed effects (and other control variables), we use not only an ordinary least square estimator but also a control function estimator where TPO characteristics that are unlikely to be correlated with the error term and were used in Olarreaga (2024) are used as instruments when estimating exports and GDP per capita returns to export promotion (i.e., the ranking that each TPO gives to different Key Performance Indicators (KPI), such as the number of clients, number of exporters, export value, client satisfaction, or other indicators). Arguably, the type of KPI used by the TPO is unlikely to be correlated with the error terms in equation (1). Because the control function is the predicted error of a regression of the endogenous variable (ln of TPOs' budgets) on all

instruments and other exogenous variables, we use wild bootstrap sampling with 500 repetitions to obtain robust standard errors as in Olarreaga et al. (2020).

To estimate the heterogeneous returns per country, we estimate a varying coefficient model as in Olarreaga, Sperlich, and Trachsel (2020), where we use interactions of TPO budgets with variables that capture TPO characteristics that are likely to lead to different employment returns, such as the share spent on firms of different size, the share spent on firms with different exporting status, and whether the TPO strategy focuses on certain sectors and destinations rather than all sectors and destination.

We also allow for employment returns to vary with the correlation between comparative advantage and labor market frictions. Indeed, as shown by Carrère et al. (2020) when the correlation between comparative advantage and labor market frictions is high, aggregate unemployment tends to be higher, as a larger share of the labor force tends to work in sectors with strong labor frictions. Thus, the employment returns to export promotion which focuses on sectors with comparative advantage may depend on whether or not there is a strong correlation between comparative advantage and labor market frictions. We borrow this variable from Carrère et al. (2020).

To sum up, the identification of employment returns to increases in TPO budgets relies not only on the control function estimator but also on the varying coefficient model. The standard errors are estimated using wild bootstrap as in Mammen (1992) with 500 repetitions. The advantage is that the procedure controls for unknown heteroscedasticity.

#### **4. Results**

We start by estimating the average employment returns without allowing for heterogeneity across countries. Table 3 reports the estimation results of equation (1) using an ordinary least square estimator. The first two columns report results without any control variable other than country fixed effects. The last two columns introduce controls. The odd-numbered columns

report results for the full sample, and the even-numbered columns report results for the subsample of TPE members. As we add controls, the employment returns associated with a 1 percent increase in TPOs' budgets tend to become negative and statistically significant, although they are relatively small. As expected, the last two columns indicate that increases in GDP per capita lead to increases in employment and larger countries in terms of working-age population have smaller employment ratios. These two coefficients are statistically different from zero in both samples.

Importantly, the employment returns in the full and TPE sample are almost identical and not statistically different from each other regardless of whether we only control for country fixed effects or we also control for year fixed effects and GDP per capita and the size of the working-age population. When using all controls, the average employment return in the full sample is equal to -0.011, and in the TPE subsample it is equal to -0.011. This implies that a 1 percent increase in TPOs' budget leads, on average, to a 0.011 percent decrease in conditional employment in the full sample, and a 0.010 percent decrease in in the TPE sub-sample.

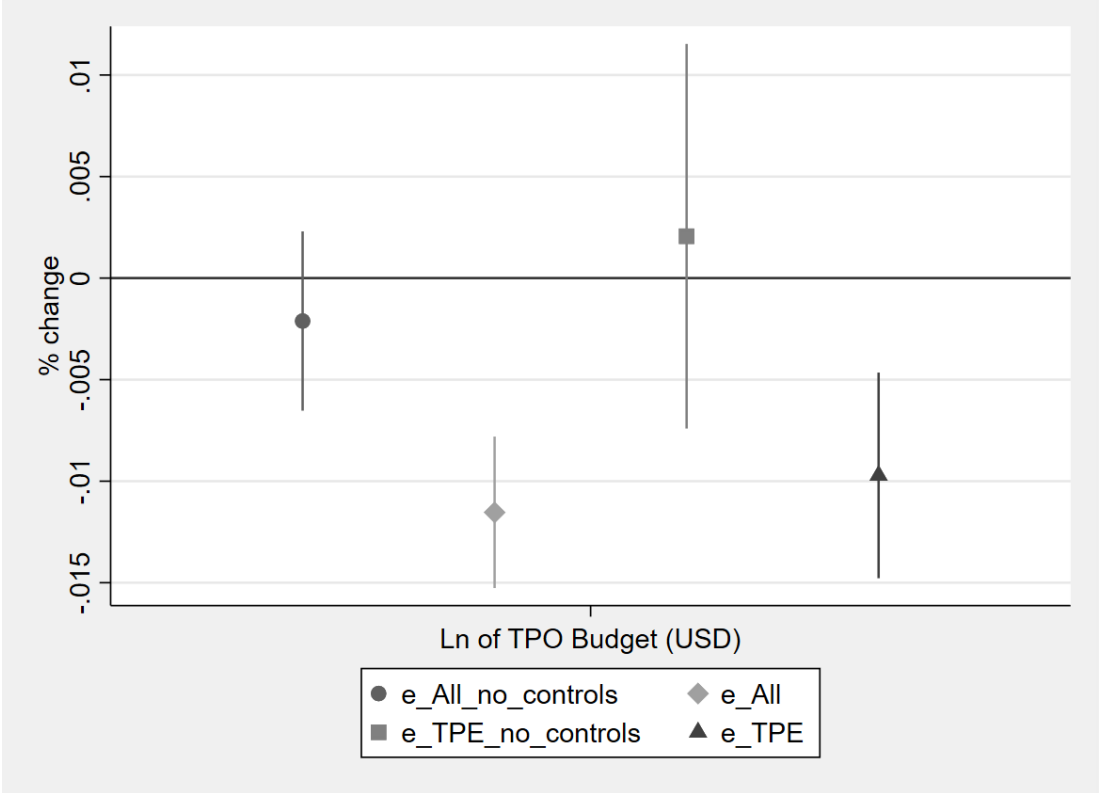
**Table 3: Average employment returns in the full and TPE sample (OLS)**

	Ln of Employment			
	Without controls		With controls	
	All (1)	TPE (2)	All (7)	TPE (8)
Ln of TPO budget	-0.002 (0.002)	0.002 (0.005)	-0.011* (0.002)	-0.010* (0.003)
Ln of Population			-0.279* (0.029)	-0.212* (0.073)
Ln of GDP per capita			0.106* (0.014)	0.307* (0.025)
Country FE	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes
Adjusted R <sup>2</sup>	0.95	0.71	0.97	0.91
# observations	982	262	977	257

**Note:** All columns use an ordinary least square (OLS) estimator. The first two columns report the results using no other controls than country-fixed effects. The last two columns report results with controls. Robust standard errors are reported in parenthesis. \* stands for statistical significance at the 1 percent level, and § stands for statistical significance at the 5 percent level.

The fact that the average returns are not statistically different in the full and TPE sample implies that we do not need to estimate the returns for TPE members separately, which would have implied a loss of statistical power. Figure 2 shows the average returns corresponding to the estimates in the four columns of Table 3. It is clear that within the same specification (with or without controls), estimates in the full sample and TPE sub-sample are not statistically different.

**Figure 2: Average employment returns (OLS)**



**Note:** Each symbol shows the point estimate of average employment reported in Table 3. The round symbol (●) shows the point estimate of average employment returns in the full sample controlling only for country fixed effects (column 1 in Table 3). The square symbol (■) shows the point estimate of average employment returns in the TPE sample controlling only for country fixed effects (column 2 in Table 3). The diamond symbol (◆) shows the point estimate of the average employment return in the full sample and controlling for employment, GDP per capita and year fixed effects. (column 3 in Table 3). Finally, the triangle symbol (▲) shows the average employment returns in the TPE sample controlling for population, GDP per capita and year fixed effects (column 4 in Table 3). The lines through the symbols represent the 95 percent confidence intervals corresponding to the robust standard errors of the estimated returns reported in each corresponding column in Table 3.

When using all controls, the 95 percent confidence interval for employment returns in the full sample oscillates between -0.007 percent and -0.015 percent, whereas the 95 percent

confidence for export returns in the TPE sample oscillates between -0.004 and -0.016. Thus, the 95 percent confidence intervals largely overlap, suggesting they are not statistically different.

The estimates in Table 3 and Figure 2 may suffer from endogeneity bias even after controlling for country and year fixed effects. We address this using a control function estimator in a specification with all control variables. The results are reported in Table 4. The first column reports results for the full sample, and the second column for the TPE sub-sample.

**Table 4: Average employment returns in the full and TPE sample (control function)**

	ln of Employment	
	All (1)	TPE (2)
ln of TPO budget	0.000 (0.008)	-0.007 (0.010)
ln of Population	-0.263* (0.028)	-0.231* (0.071)
ln of GDP per capita	0.099* (0.015)	0.308* (0.024)
Control function	-0.013 (0.009)	-0.002 (0.010)
Country FE	Yes	Yes
Year FE	Yes	Yes
Adjusted R <sup>2</sup>	0.96	0.90
# observations	977	257

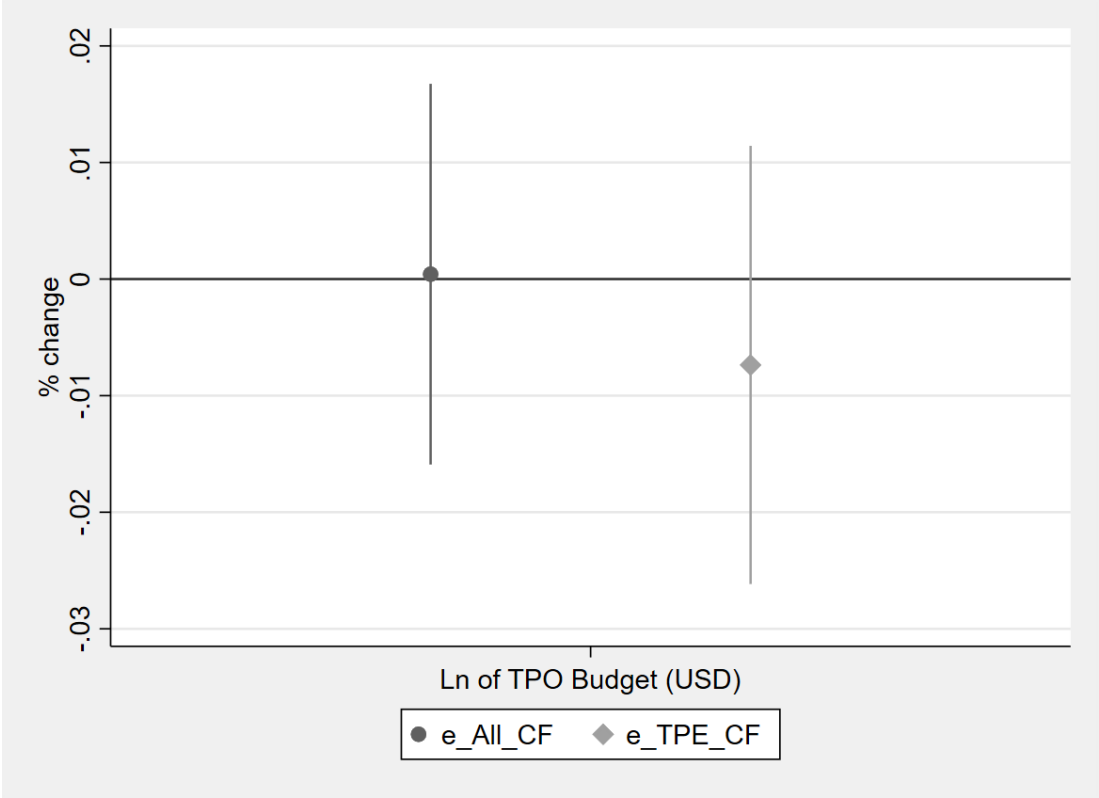
**Note:** Both columns report results of a control function estimator where the importance given by each TPO to different Key Performance indicators is used as instruments for the ln of the TPO budget. The first column reports results for the full sample, and the second column the results for the TPE sample. Robust standard errors are obtained through bootstrap with 500 repetitions and using as strata the country identifier. They are reported in parentheses. \* stands for statistical significance at the 1 percent level, § stands for statistical significance at the 5 percent level.

In both samples, the average returns to export promotion become very small and statistically insignificant. Thus, the negative and statistically significant returns reported in Table 3 and Figure 2 were driven by endogeneity bias. The endogeneity of TPOs' budgets was downward biasing the estimates. Indeed, the return estimates reported in Table 4, even though they are small, tend to be higher than the export returns reported in Table 3. The results reported in Table 4 show that when using the control function estimator, a 1 percent increase in TPO

budgets leads to a 0.000 percent increase in conditional employment in the full sample and a --- -0.007 percent decrease in the full sample but again, both coefficients are not statistically different from zero.

This can also be seen in Figure 3, which reports the average returns in the full and TPE samples and their 95 percent confidence intervals. The 95 percent confidence interval in the full sample varies between -0.016 and 0.016. In the TPE sample, it varies between -0.027 and 0.013. The overlapping of confidence intervals implies there is no need to estimate the returns for the TPE sub-sample separately from the other countries in the full sample.

**Figure 3: Average employment returns (control function)**



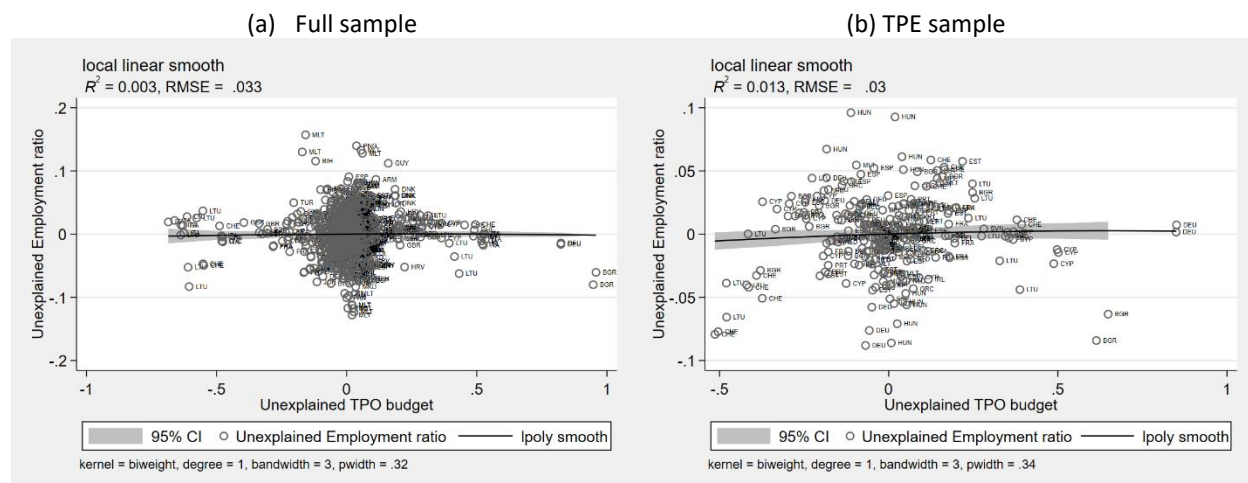
**Note:** Each symbol shows the point estimate of average employment returns in Table 4. The round symbol (●) shows the average export returns point estimate in the full sample (column 1 in Table 4). The diamond symbol (◆) shows the point estimate average employment return in the TPE sample (column 2 in Table 4). The lines through the symbols represent the 95 percent confidence intervals corresponding to those average returns computed using robust standard errors. The returns are estimated using a control function estimator where variables capturing the importance of different Key Performance Indicators used in TPOs are used to address the potential endogeneity of TPOs’ budgets.

## Exploring the heterogeneity of returns

We first explore whether there is heterogeneity in employment returns across TPO budget size. To do so, we use a semiparametric version of equation (1), where a fully flexible function captures the impact of TPOs' budgets on exports and GDP per capita. In contrast, all other variables (fixed effects and the natural log of GDP per capita and working-age population) appear linearly, as in equation (1). In other words, we try to disentangle whether there are increasing or decreasing returns to increases in TPOs budgets: does a 1 percent increase in the budget of a TPO has a stronger impact on exports and GDP per capita when the TPO budget is small (decreasing returns) or large (increasing returns)?

Figure 4 clearly shows the absence of any returns to increases in TPO budgets regardless of the TPO budget or whether we conduct the analysis in the full sample or the TPE sub-sample. The two panels show a flat line at zero that is quite precisely estimated between TPO budgets and the employment ratio. The constant slope always includes the zero at all levels of TPO budgets.

**Figure 4: Semiparametric estimates of the relationship between TPO budgets and the employment ratio in the full and TPE samples (control function)**



**Note:** These are semiparametric estimates of the relationship between TPO budgets and the employment ratio. Panel (a) is for the full sample and panel (b) for the sample of TPE members. All other control variables, including the control function to address the endogeneity of TPOs' budgets, are introduced parametrically. The shaded areas provide the 95 percent confidence intervals.

We then turn to estimate the varying coefficient model, in which we interact the TPO budget with country characteristics (the correlation between comparative advantage and labor market frictions) and TPO characteristics (the share of the budget spent on small firms, the share of the budget spent on medium size firms, the share spent on established exporters, the share spent on export support services, and the extent to which the strategy focus on certain sectors or destinations rather than all sectors and destinations) that are likely to affect employment returns to export promotion.

Results are reported in Table 5. The first column in Table 5 only includes interactions of TPO budgets with country characteristics and the second column also adds interactions of TPO budgets with TPO characteristics. As in Table 4, the TPO budget has a point estimate that is small and not statistically different from zero. GDP per capita and population have large and statistically significant coefficients. The large and statistically significant coefficient on GDP per capita is important because when computing the impact of export promotion on employment through GDP per capita, we will use the estimated coefficient in the second column of Table 5 that we will multiply by the percentage increases in GDP per capita following a 1 percent increase in GDP per capita estimated in Olarreaga (2024). The idea is that we need to control for GDP per capita in equation (1) as the employment ratio will be partly determined by the level of economic activity. This implies that our estimates of the impact of export promotion on the employment rate captured by the coefficient on TPO's budgets do not include the indirect effect through GDP per capita. Our two-step approach allows to include them.

In the first column of Table 5, we include only the interaction of the TPO budget with the within-country correlation between comparative advantage and labor market frictions estimated by Carrère et al. (2020). The interaction is positive, and the coefficient is statistically significant at the 5 percent level. This implies that employment returns increase as the correlation increases. Thus, in countries that are specialized in sectors with stronger labor market frictions (basic metals, leather and footwear, machinery) tend to have higher employment returns to export promotion.

**Table 5: Exploring heterogeneity across countries and TPO characteristics (control function)**

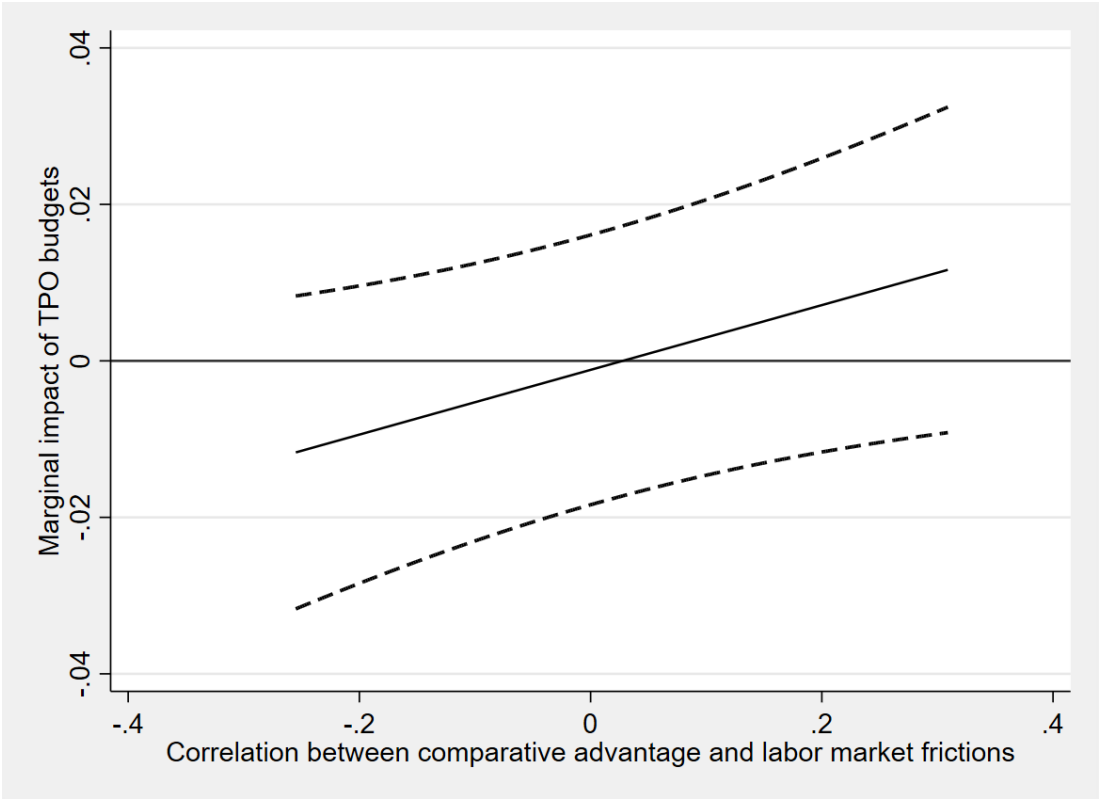
	Ln of Employment ratio Country heterogeneity (1)	Ln of Employment ratio Country and TPO heterogeneity (2)
Ln of TPO budget	-0.003 (0.008)	-0.001 (0.009)
Ln of Population	-0.233* (0.027)	-0.251* (0.030)
Ln of GDP per capita	0.119* (0.013)	0.120* (0.015)
Interaction TPO budget & correlation CA and frictions	0.043§ (0.022)	0.041§ (0.020)
Interaction TPO budget & share spent on small firms		0.000 (0.000)
Interaction TPO budget & share spent on medium size firms		0.000 (0.000)
Interaction TPO budget & share spent on established exporters		-0.0002° (0.0001)
Interaction TPO budget & share spent on export support services		0.000 (0.000)
Interaction TPO budget & priority given to all sectors and destinations		-0.0003° (0.002)
Control function	-0.015° (0.009)	-0.017° (0.010)
Country FE	Yes	Yes
Year FE	Yes	Yes
Adjusted R <sup>2</sup>	0.95	0.95
# observations	832	720

**Note:** Both columns use a control function estimator where the importance given by each TPO to different Key Performance indicators is used as instruments for the Ln of the TPO budget. The left-hand-side variable is the log of the employment ratio. The first column explores only country heterogeneity by interacting the log of the TPO budget with the correlation between comparative advantage and labor market frictions across sectors. The second column further explores heterogeneity by introducing interactions with country characteristics. Robust standard errors are obtained through bootstrap with 500 repetitions and using as strata the country identifier. They are reported in parentheses. \* stands for statistical significance at the 1 percent level, § stands for statistical significance at the 5 percent level, and ° for statistical significance at the 10 percent level.

One mechanism could be that export promotion targets sectors with labor market frictions because it is in those sectors that the country has a comparative advantage and therefore export promotion helps address those labor market frictions and stimulate demand by

promoting those sectors. Figure 5 illustrates how employment returns evolve with the correlation between comparative advantage and labor market frictions. In countries where the correlation is close to 0, the employment return of a 1 percent increase in TPO budgets is also close to zero. In countries with a negative correlation, the employment returns are negative, and in countries with a positive correlation, the employment returns are positive. But note that they are always small and not statistically different from zero, as the 0 is always included in the 95 percent confidence intervals indicated by the dotted lines.

**Figure 5: Employment returns to increases in TPO budget and the correlation between comparative advantage and labor market frictions (control function)**



**Note:** The solid line shows the estimated employment returns to increases in TPO budgets as the correlation between comparative advantage and labor market frictions increases. The dotted lines show the 95 percent confidence interval. The coefficient estimates and their standard errors are taken from the estimation of the second column in Table 5.

In the second column of Table 5, we report the results of the varying coefficient model, where we include the interactions with TPO characteristics. Two TPO characteristics have a statistically significant coefficient at the 10 percent level, but the point estimates are small, implying that

they will not be a source of a high degree of heterogeneity. A higher share of expenditure on established exporters tends to reduce employment returns. This result echoes some of the existing literature on export promotion that shows that focusing on new, occasional and non-exporting firms is more likely to lead to higher export returns. Similarly, a strategic focus on all sectors and destinations rather than a few sectors and destinations leads to higher employment returns.<sup>5</sup>

We also interacted the TPO budget with the share spent on small and medium-size firms because the literature shows that export returns are higher when focusing on smaller firms. The point estimates of these interactions, however are literally equal to zero and not statistically different from zero. We also interact the TPO budget with a variable capturing the share the TPO spend on export support services, and found no statistically significant impact.

Using the specification in the second column of Table 5, we estimate returns per country and their standard error using wild bootstrap. The results are reported in Table 6. The first and fifth columns report results without including the indirect effect that export promotion has on employment through GDP per capita. The second and sixth columns report the standard error of those point estimates. The third and seventh columns report the employment returns including the indirect effect through GDP per capita. Because the coefficient on GDP per capita in Table 5 is positive and all GDP per capita returns to export promotion estimated by Olarreaga (2024) are positive, when we include this indirect effect, the employment returns are higher.

**Table 6: Employment returns with and without indirect GDP per capita effects**

Country	Without GDPpc		With GDPpc		Country	Without GDPpc		With GDPpc	
	Empl. Returns (%)	Empl. Returns (s.e.)	Empl. Returns (%)	Empl. Returns (s.e.)		Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)
Albania	0,010	0,010	0,019	0,010	Jordan	0,003	0,009	0,016	0,008
Australia	0,000	0,009	0,010	0,008	Kenya	0,006	0,009	0,020	0,008

<sup>5</sup> Note that the estimated coefficient is negative because the variable provides the rank that is given to a strategy that focuses on all sectors and destinations, where 1 is the value given to the strategy when this is the TPO's top priority, and 8 when all sectors and destination is not a relevant strategy for that TPO.

Austria	0,000	0,009	0,011	0,008	Korea	-0,004	0,009	0,010	0,008
Bangladesh	0,002	0,009	0,017	0,008	Latvia	0,008	0,010	0,019	0,009
Barbados	0,002	0,009	0,016	0,008	Lebanon	0,005	0,009	0,016	0,008
<i>Belgium</i>	0,002	0,009	0,013	0,008	<i>Lithuania</i>	0,002	0,009	0,014	0,008
Belize	0,007	0,010	0,020	0,009	Macedonia	0,010	0,010	0,021	0,010
Brazil	0,008	0,010	0,022	0,009	Malawi	0,003	0,009	0,017	0,008
<i>Bulgaria</i>	0,007	0,009	0,019	0,009	Malaysia	-0,006	0,009	0,005	0,008
Burkina Faso	0,003	0,009	0,017	0,008	<i>Malta</i>	-0,003	0,009	0,008	0,008
Cabo Verde	0,010	0,010	0,022	0,010	Mauritius	-0,003	0,009	0,004	0,008
Chile	0,010	0,010	0,020	0,010	Mexico	0,000	0,009	0,014	0,008
Colombia	0,006	0,009	0,018	0,009	Moldova	0,007	0,009	0,017	0,009
Costa Rica	0,002	0,009	0,013	0,008	Morocco	0,007	0,010	0,026	0,008
Cote d'Ivoire	0,008	0,010	0,021	0,009	<i>Netherlands</i>	0,001	0,009	0,011	0,008
Croatia	0,010	0,010	0,020	0,010	Nicaragua	0,004	0,009	0,012	0,009
<i>Cyprus</i>	0,004	0,009	0,015	0,008	Oman	0,007	0,009	0,017	0,009
Czech Rep.	0,003	0,009	0,015	0,008	Panama	0,002	0,009	0,013	0,008
Denmark	-0,006	0,010	0,005	0,009	Paraguay	0,007	0,010	0,020	0,009
Dominica	0,003	0,009	0,015	0,008	Peru	0,005	0,009	0,018	0,008
Ecuador	0,003	0,009	0,016	0,008	Philippines	-0,004	0,009	0,008	0,008
Egypt	0,005	0,009	0,021	0,008	<i>Portugal</i>	0,004	0,009	0,015	0,008
El Salvador	0,006	0,009	0,018	0,009	Rwanda	0,006	0,009	0,021	0,008
<i>Estonia</i>	0,006	0,009	0,017	0,009	Senegal	0,005	0,009	0,020	0,008
<i>Finland</i>	-0,001	0,009	0,010	0,008	Seychelles	0,001	0,009	0,013	0,008
<i>France</i>	0,000	0,009	0,010	0,008	<i>Slovenia</i>	0,001	0,009	0,011	0,008
<i>Germany</i>	-0,002	0,009	0,009	0,008	<i>Spain</i>	0,003	0,009	0,014	0,008
Ghana	0,007	0,010	0,022	0,009	Sweden	-0,003	0,009	0,008	0,008
<i>Greece</i>	0,002	0,009	0,013	0,008	<i>Switzerland</i>	-0,006	0,010	0,007	0,008
Guatemala	0,005	0,009	0,016	0,009	Tanzania	0,007	0,009	0,021	0,009
Honduras	0,005	0,009	0,015	0,009	Thailand	-0,001	0,009	0,013	0,008
Hungary	0,004	0,009	0,014	0,008	Trinidad&Tob.	0,010	0,010	0,021	0,009
Iceland	0,000	0,009	0,011	0,008	Tunisia	0,008	0,010	0,025	0,009
Indonesia	0,005	0,009	0,017	0,008	Turkey	0,004	0,009	0,017	0,008
<i>Ireland</i>	-0,005	0,009	0,006	0,008	Uganda	0,005	0,009	0,019	0,008
Israel	-0,012	0,011	-0,002	0,010	U.K.	-0,001	0,009	0,010	0,008
<i>Italy</i>	0,000	0,009	0,011	0,008	Uruguay	0,004	0,009	0,018	0,008
Jamaica	0,008	0,010	0,020	0,009	Zambia	0,008	0,010	0,022	0,009
					<b>Average</b>	<b>0,003</b>	<b>0,009</b>	<b>0,015</b>	<b>0,008</b>

**Note:** The first and fifth columns report employment returns without considering the indirect effects of export promotion on GDP per capita. The third and seventh columns report employment returns including indirect effects through GDP per capita. The second, fourth, sixth, and eighth columns report wild bootstrapped standard errors with 500 repetitions associated with each of those point estimates. Country names in *italics* signal TPE members.

The average employment return when we do not include the indirect effect through employment is 0.003. This implies that a 1 percent increase in TPOs' budgets leads, on average, to a 0.003 percent increase in conditional employment. At the mean of the sample the employment rate is 55.4, so a 0.003 percent increase means that the employment rate increases to 55.6, arguably a small impact.

More importantly, when comparing the point estimates in the first and fourth columns to their standard errors in the second and fifth columns, it is clear that none of the point estimates are statistically different from zero, as the standard errors are often as large as the point estimates. Thus, without including the indirect effect through GDP per capita all employment returns are zero.

However, the employment returns are five times higher once we include the indirect effect through GDP per capita. On average, a 1 percent increase in TPO's budget leads to a 0.015 percent increase in the conditional employment rate. Apart from Israel, which has the strongest negative correlation between comparative advantage and labor market frictions, all countries have a positive employment return. Half of the countries have a return that is statistically different from zero at the 5 percent level (i.e., have an estimated return at least 1.96 times larger than its standard error). Thus, after including the effect through GDP per capita, the employment returns become positive although small and not always statistically significant.<sup>6</sup>

We also estimate returns for TPE members from 2011 to 2014 and 2021 to 2024, as TPO characteristics may have changed during this period. The results are reported in Table 7. Differences in returns for the two periods are small and not statistically significant. Two factors drive this lack of differences in estimated returns. First, there have not been very big differences in TPO characteristics during these two periods, and second, the impact of these differences in employment returns tends to be small and/or compensate for each other.

The average employment return observed for TPE members is 0.001 in both periods and are never statistically significant from 0 when excluding the effect through GDP per capita. Including the effect through GDP per capita, the employment returns become more than ten times larger in both periods. The estimated returns are statistically different from zero in half of the cases.

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<sup>6</sup> At the mean of the sample, the employment ratio increases from 55.4 percent to 56.2 percent after a 1 percent increase in TPO's budget

**Table 7: Returns for TPE members in 2011-2014 and 2021-2024**

Estimates for TPE members in 2011-2014					Estimates for TPE members in 2021-2024				
Country	Without GDPpc		With GDPpc		Country	Without GDPpc		With GDPpc	
	Empl. Returns (%)	Empl. Returns (s.e.)	Empl. Returns (%)	Empl. Returns (s.e.)		Export Returns (%)	Export Returns (s.e.)	GDPpc Returns (%)	GDPpc Returns (s.e.)
Belgium	0.002	0.009	0.013	0.008	Belgium	0.001	0.009	0.012	0.008
Bulgaria	0.007	0.009	0.018	0.009	Bulgaria	0.007	0.010	0.018	0.009
Cyprus	0.004	0.009	0.015	0.008	Cyprus	0.003	0.009	0.015	0.008
Estonia	0.006	0.009	0.017	0.009	Estonia	0.005	0.009	0.016	0.009
France	NA	NA	NA	NA	France	0.001	0.009	0.011	0.008
Germany	-0.002	0.009	0.009	0.008	Germany	-0.002	0.009	0.009	0.008
Hungary	NA	NA	NA	NA	Hungary	0.004	0.009	0.014	0.008
Iceland	0.000	0.000	0.011	0.008	Iceland	0.000	0.009	0.010	0.008
Italy	0.000	0.009	0.011	0.008	Italy	0.000	0.009	0.011	0.008
Lithuania	0.002	0.009	0.014	0.008	Lithuania	0.002	0.009	0.014	0.008
Malta	NA	NA	NA	NA	Malta	-0.002	0.009	0.009	0.008
Netherlands	0.001	0.009	0.011	0.008	Netherlands	0.001	0.009	0.011	0.008
Portugal	NA	NA	NA	NA	Portugal	0.004	0.009	0.015	0.009
Slovenia	0.000	0.009	0.011	0.008	Slovenia	0.000	0.009	0.010	0.008
Spain	0.003	0.009	0.014	0.008	Spain	0.003	0.009	0.014	0.008
Switzerland	-0.006	0.009	0.007	0.009	Switzerland	-0.006	0.009	0.007	0.009
<b>Average</b>	<b>0.001</b>	<b>0.009</b>	<b>0.012</b>	<b>0.008</b>	<b>Average</b>	<b>0.001</b>	<b>0.009</b>	<b>0.012</b>	<b>0.008</b>

**Note:** The first and third columns report employment returns associated with a 1 percent increase in TPO budgets during the 2011-2014 period. The first column excludes the indirect effect through GDP per capita, and the third includes it. The second and fourth columns are the standard errors corresponding to the point estimates in the first and third columns, respectively. The fifth and seventh columns report employment returns associated with a 1 percent increase in TPO budgets during the 2021-2024 period. The fifth column excludes the indirect effect through GDP per capita, and the seventh includes it. The sixth and eighth columns are the standard errors corresponding to the point estimates in the fifth and seventh columns, respectively.

The returns computed in the previous analysis were undertaken using data for national TPOs. In Table 8, we compute the employment returns for regional TPOs that are members of TPE. In Belgium and Spain, important regional players were not considered when estimating returns reported in the previous tables. For Spain, we ignored regional agencies and focused on the data for the national agency (ICEX). For Belgium, which does not have a national agency, we constructed a hypothetical one by putting together the characteristics of Flanders Investment and Trade and Wallonia Export and Investment Agency. In Table 10, we compute the employment returns for the period 2021-2024 for six regional TPOs that are members of TPE. The estimated returns to increases in their budgets are therefore in terms of *regional* employment. Again, all returns are positive, but they are small and only in the case of Acciò and Instituto de Fomento de Murcia they are statistically different from zero and only at the 10 percent confidence level after including the indirect effect through GDP per capita. As for

national TPO estimates, there is little heterogeneity in employment returns which tend to be very similar.

**Table 8: Returns for TPE regional members in 2024**

Institution	Without GDP per capita		With GDP per capita	
	Employment Returns (%)	Employment Returns (s.e.)	Employment Returns (%)	Employment Returns (s.e.)
Flanders Investment & Trade	0.002	0.009	0.013	0.008
hub.brussels invest Inv & Export	0.002	0.009	0.014	0.008
Wallonia Export & Invest	0.000	0.009	0.012	0.008
Acciò	0.004	0.009	0.015	0.008
Basque Trade & Investment	0.003	0.009	0.014	0.009
Instituto de Fomento de Murcia	0.003	0.009	0.014	0.008
<b>Average</b>	<b>0.002</b>	<b>0.009</b>	<b>0.014</b>	<b>0.008</b>

Note: The first and third columns report employment returns associated with a 1 percent increase in TPO budgets in 2024. The first column reports estimates excluding the indirect effect through GDP per capita and the third column includes the indirect effect. The second and fourth columns report wild bootstrapped standard errors with 500 repetitions associated with the point estimates in the first and third columns.

## 5. Concluding remarks

While there is a strong consensus in the empirical literature arguing that export promotion positively affects exports, the literature on employment returns tends to show inconclusive results. Part of the explanation for the inconclusive results could be differences in country and TPO characteristics that can lead to differences in export promotion's impact on employment. This paper estimates employment returns to export promotion using a varying coefficient model. This allows us to capture the heterogeneity in returns across countries and TPO characteristics and examine whether we can explain ambiguous results.

We found that countries with a high positive correlation between comparative advantage and labor market frictions, or where TPOs spend more of their budget on new, occasional, or non-exporting firms rather than established exporters, or where TPOs' strategy focuses on promoting exports in all sectors and to all destinations rather than a few sectors or destinations, tend to have higher employment returns. However, the impact of these country and TPO

differences on employment returns is small, even though they are statistically different from zero. This implies that there will be little heterogeneity across countries in employment returns.

The average employment returns are negligible if one excludes the indirect effect of export promotion through GDP per capita and are always statistically insignificant. Including the effect through GDP per capita, all countries have small positive employment returns, which are statistically different from zero in half of the sample.

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