Export Promotion: what works?*

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Abstract

A recent literature has argued that resources spent on export promotion tend on average to help export growth, see e.g. Lederman et al. (2010) or Volpe (2014). In this paper we focus on the determinants of the heterogeneity of returns and examine the type of policy instruments and governance of export promotion agencies that are more likely to generate higher returns. Preliminary results suggest that on average one dollar spent on export promotion generates 15 dollars on exports (with a 95 percent confidence interval between USD 11 and USD 19), confirming results of earlier literature. More interestingly, agencies that focus on new exporters rather than occasional or experienced exporters experience higher returns. Similarly agencies that focus on medium size firms rather than small or larger firms are also likely to have higher returns. A larger share of board's seats in the hands of the private sector also tends to improve returns. The impact of the share of funding coming from customs fees on returns to export promotion has an inverted u-shape form. When the share of funding coming from customs fees is small, then increasing this share yields higher returns, but when the share of funding coming from customs fees is already large, then increasing the share further leads to a decline. The importance given to export promotion within the institution or the share spent on marketing activities do not seem to systematically affect returns to export promotion.

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1 Introduction

Export promotion agencies (EPAs) are present in most countries. The first EPA - still existing - was created in 1919 in Finland. They differ in their economic size, their governance, and on the type of activities they engage in. For instance, the export promotion budget to export ratio varies from 0.22 percent in Portugal to 0.15 percent in Chile and Colombia and 0.03 percent in Bolivia and Tanzania. The budgets vary from 500 million dollars in the UK to 60 thousand dollars in Sierra Leone. The agencies' activities range from providing financial assistance (credit, insurance), to market intelligence (firms and products), technical assistance for transport logistics, product certification, and participation in trade fairs. Some promote exports across all sectors; others focus on non-traditional exports. Some agencies spend half their budget on offices abroad (United Kingdom), others are only present in the home country (Uruguay). Some are fully financed by the private sector (Hong Kong) and others are fully financed by the government (Chile). The objective of this project is to find out which of these different activities and/or governance are more effective at promoting exports.

Merging data from three rounds of surveys of export promotion agencies conducted between 2005 and 2014, we obtain an unbalanced panel across European and non-European countries which spans from 2005 to 2014 with information on agencies budget, funding sources and activities. Using semi-parametric methods we then econometrically explore the heterogeneity in export returns as a function of agencies' characteristics with the help of varying coefficient models (see Park et al., 2013, for a recent review) and generalized additive models (see Wood, 2006, for the here implemented methods). Preliminary results suggest that on average a 1 percent increase in the agencies budget generates a 0.08 percent increase in exports.[1] At the sample mean, this implies that a 1 dollar increase in the export promotion budget generates a 15 dollar increase in exports.[2] The results of the varying coefficient estimates suggest that agencies that focus on new exporters rather than occasional or experienced exporters experience higher returns. Similarly firms that focus on medium size firms rather than small or larger firms are also likely to have higher returns. A larger share of board's seats in the hands of the private sector also tends to help returns. The impact of the share of funding coming from customs fees on returns to export promotion has an inverted U-shape form. When the share of funding coming from customs fees is small, then increasing this share yields higher returns, but when the share of funding coming from customs fees is larger, then increasing the share leads to a decline in returns. The importance given to export promotion within the institution or the share spent on marketing activities do not seem to systematically affect returns to export promotion.

It is important to note that these are not the social welfare returns because part of the increase in exports is associated with the cost needed to produce those exports. Also, exports may have positive or negative

[1] The 5 percent confidence interval suggest an elasticity of exports with respect to the budget in the [0.01-0.07] range, which includes previous estimates obtained in in the literature, see e.g. Lederman et al. (2010).

[2] To see this, note that the average export promotion budget in the sample is 48 million dollars. Average exports across countries and years is 9 billion dollars. Thus a 1 percent increase in the export promotion budget implies a 0.48 million increase. This leads to a 0.0008 percent increase in exports, which is equivalent to 7.2 millions dollars. Thus, the dollar return is given by 7.2/0.48=15. Using the estimated 5 percent confidence interval yields a return in the 11 to 19 dollar range.

externalities on non exporters which are not taken into account. In order to partly correct for this and get closer to a welfare measure, we provide an extension of our empirical model in which we look at the impact of export promotion not only on exports, but on GDP per capita. A straight-forward extension could be to simply replace exports by GDP per capita on the left-hand-side.

These results are important for at least three reasons. First, they base on much more sophisticated identification strategies than all so far existing results. For example, we use a panel dataset; this allows us to correct for unobserved heterogeneity either over time (but fixed for country) and over country (but fixed in time). This way we see that export promotion has an important impact on export growth even for within country budget variation. Second, we are the first to explore the heterogeneity in the returns to export promotion expenditure as a function of activities and governance of different agencies. Part of our analysis relies on an identification strategy that directly models the heterogeneity in returns (via varying coefficient models) rather than trying to estimate average returns of subpopulations that are implicitly defined by instrumental variables. Consequently, the results in this paper can help agencies design better governance and policies to help exporters. Because we are able to produce returns by agency (as a function of their characteristics), each agency can evaluate its relative performance and undertake the steps that the data suggest will help increase the returns on exports. Finally, we are also the first to link export promotion activities to GDP per capita growth, and this is important as export growth cannot be the ultimate goal of export promotion policies, but rather an instrument to achieve social and economic growth.

We face several econometric challenges when estimating the returns of export promotion. First, their may be omitted variable bias as exports and budget per capita may be jointly determined. This was an important limitation of earlier cross-section studies where omitted variable bias relied on adding as many controls as possible and instrumental variable strategies. The panel data structure of our dataset allows us to partly circumvent this problem using country and year fixed effects to control for unobserved heterogeneity. A second problem is measurement error in the size of the export promotion budget. In many countries the budget is part of a larger institutional budget (export and investment promotion for example) and disentangling what belongs to export promotion may be tricky. We address this using an instrumental variable approach where the rank of the budget is used as an instrument. A third problem is reverse causality. Indeed, the political economy of government programs is such that it is likely that large sectors are more likely to get more government assistance. Thus, it may well be that the causality runs from larger exports to larger export promotion programs. We follow two strategies to address it. First we use lagged variables of export promotion budgets rather than current values. This is consistent with the observation by export promotion experts that the impact of export promotion would be observed one to three years later depending on whether firms export already. The second strategy relies on the use of an instrumental variable estimator. We use as instruments of export promotion budget's industry characteristics, such as the share of the budget coming from user fees, and the share of the seats in the agency's board which are in the hands of the private sector, which are both clearly correlated with the size of the budget, but otherwise much less

correlated with exports than budget itself. This certainly changes the definition of the coefficients and its interpretation as will be explained later. Fourth, sample selection bias is also an issue, as some agencies did not answer our survey or questions related to budget. Even thought these represented less than 10 percent of agencies surveyed, there is still a large number of countries that we did not surveyed because we could not find any information regarding a national export promotion agencies or there were simply too many (the United States being an example with agencies in several by State).

Early assessments of the impact of export promotion agencies (Keesing and Singer, 1991, 1991a) were quite critical of their performance in developing countries. EPAs in those countries were criticized for lacking strong leadership, being inadequately funded, hiring staff which was bureaucratic and not client oriented, and suffering from government involvement. As a result, many development institutions withdrew their support to EPAs. More recent quantitative assessments of the role of export promotion are more positive. Rose (2005) finds that the presence of diplomatic representation (i.e., a consulate) can increase bilateral exports by 6 to 10 percent. Lederman, Olarreaga and Payton (2010) suggest that on average a 1 percent increase in export promotion agencies budgets leads to a 0.05 percent increase in exports (which given the fact that budgets are a tiny fraction of exports yields a very large return).

More importantly none of these papers explore the heterogeneity of the impact on exports of different types of governance, funding sources or activities of export promotion agencies. Our paper fills this gap and provides a quantitative evaluation.

There is also a large and growing literature using firm level data that explores which are the type of firms that benefit the most from export promotion. Volpe and Carballo (2008) found that export promotion affects exports mainly along firm's extensive margin in terms of both new export markets and products, but has little impact on the intensive margins of exports in a sample of Peruvian firms. Volpe and Carvallo (2010) found that smaller firms are more likely to benefit from export promotion services in Chile. Schminke and Van Biesebroeck (2013) confirm that export promotion works mainly through the extensive margin in a sample of Belgian firms, but experienced exporters do observe increases in their intensive margin. Vargas da Cruz (2014) provides evidence of export promotion services helping medium size firms enter the export market in Brazil, as well as new exporting firms in terms of their managerial organization.

The advantage of the literature using firm level data is that it can better identify the type of firm or worker that is benefiting from the program. The disadvantage of micro-data is that it is not clear how to aggregate results from individual firms or workers to obtain an impact on total exports or GDP. This is important, because the case for export promotion agencies is often based on externalities (positive and negative). By simply observing that firms that benefit from export promotion, export larger amounts than firms that do not benefit from the program, we have no clue on how big is the aggregate impact and even the sign of that impact. It is potentially conceivable that badly designed export promotion schemes will lead to a fall in exports of firms not benefitting from the program that is larger than the increase in exports of firms that benefit from the program. Another, obvious problem is that the problem of sample selection bias

is even more severe for various reasons. In this paper we take the alternative route which is to work with aggregate data directly.

Section 2 presents the empirical strategy we follow to estimate the determinants of the returns to export promotion. Section 3 discusses the surveys used in our dataset, and provides some descriptive statistics regarding the budget, sources of funding, governance and activities of export promotion agencies. Section 4 presents the preliminary results and section 5 concludes.

2 Empirical strategy

Our objective is to measure the impact of changes on export promotion budgets on exports and determine what are the type of agency characteristics (governance, activities, funding) that leads to higher returns. For the sake of presentation we split the introduction and discussion of the models we have looked at into two steps; first the standard linear fixed effects panel models, then its extension toward a semiparametric varying coefficient panel model with fixed effects.

2.1 Standard linear fixed effects panel models

The basic specification of fixed effects panel models is the following:

$$\ln(\text{exports})_{c,t} = \beta \ \ln(\text{budget})_{c,t} + \gamma_c + \gamma_t + \epsilon_{c,t} \tag{1}$$

where $\ln(\text{exports})_{c,t}$ is log of exports of goods and services in country c at time t; ln(budget) is the log of the budget of the export promotion agency in country c at time t; β is our coefficient of interest that captures the returns associated with export promotion as it is defined as the percentage increase in exports following a 1% increase in the export promotion budget; γ_c and γ_t are country and fixed effects, respectively; and $\epsilon_{c,t}$ is an i.i.d error term.

The country fixed effects control partly for the size of the country among other unobserved time invariant country characteristics. However, size is time variant and therefore the country fixed effect does not perfectly controls for it. We cannot use GDP as a control because it is clearly endogenous as exports are part of GDP. But population is unlikely to be endogenous and we therefore use it as a control. Equation (1) becomes:

$$\ln(\text{exports})_{c,t} = \beta \ \ln(\text{budget})_{c,t} + \delta \ \ln(\text{population})_{c,t} + \gamma_c + \gamma_t + \epsilon_{c,t} \tag{2}$$

where $\ln(\text{population}_{c,t})$ is the population in country c at time t.

Because we have a particular interest in the performance of European export promotion agencies, we also ran the above equation on an sample containing observations only for European countries. To be able to determine whether the returns of European export promotion agencies is statistically different from the returns in the rest of the sample we also estimate equation (2) and add an interaction term between the

budget and a dummy that takes the value 1 for all European countries and zero otherwise:

$$\ln(\text{exports})_{c,t} = \beta \ \ln(\text{budget})_{c,t} + \delta \ \ln(\text{population})_{c,t} + \pi \ \text{Europe} \ \ln(\text{budget})_{c,t} + \gamma_c + \gamma_t + \epsilon_{c,t} \qquad (3)$$

The statistical significance of π answers the question of whether the returns are different in Europe than in the rest of the sample.

Measurement error is a potential problem in the variable capturing the export promotion budget, as with any survey data. Moreover in the case of export promotion budgets the problem may be larger, as many of the export promotion agencies are embedded in larger institutions with larger budgets, and it is not always easy to assess the share of the budget granted to export promotion rather than other activities. For example many of our agencies are part of a trade and investment promotion agencies, where it is not always clear the share given to export promotion versus investment promotion. The country fixed effects partly solve this problem, as we are identifying the coefficients with the within country variation. But measurement error remains a problem that we address with an instrumental variable estimator. As it is standard in the literature we use the rank of the export promotion budget within a country as an instrument for the export budget measured in dollars. The idea is that the rank is less subject to measurement error.

Because export promotion can impact exports with a time delay, we will also estimate (2) using the first, second and third lag of the export promotion budget. According to export promotion experts, the impact of their programs could be delayed by as much as three years when aiming at helping non-exporting firms to become exporters.

Reverse causality and any time varying omitted variable correlation with the export promotion budget can still cause endogeneity problems. Indeed, in a political economy where larger firms tend to have more political clout, it is likely that as exports grow, more lobbying by exporting firms may lead to stronger export promotion programs. Also export growth is likely to lead to GDP growth, which in turn will affect the size of governments' programs. In order to correct for this, we will use a series of instruments based on export promotion agencies characteristics. We need these instruments to be correlated with the size of budget, but uncorrelated with the error term of the export equation. We propose two instruments: the share of the budget that comes from public funding and the share of the executive board seats in the hands of the private sector. Both are likely to be correlated with the size of the export promotion budget, but uncorrelated with exports a part from their effect through the budget.

Because we are interested on the impact of export promotion not only on exports, but also on GDP per capita, we will estimate (2) but using GDP per capita rather than exports on the left-hand-side. To correct again for measurement error in the export promotion budget we will use the rank rather than the level of the budget.

2.2 Modeling heterogeneous impact

Already above in model (3) we started to explore a bit potential heterogeneity in returns to budget. However, as will be discussed in the next section, export promotion agencies are very different from each other in terms of governance, funding, and priorities given to different activities. It is unlikely that the impact of the budget on exports is not sensitive to these characteristics. In order to identify which are the characteristics that are likely to generate different returns, we propose the following varying coefficient model:

$$\ln(\text{exports})_{c,t} = \beta_{c,t}\ \ln(\text{budget})_{c,t} + \delta\ \ln(\text{population})_{c,t} + \gamma_c + \gamma_t + \epsilon_{c,t} \tag{4}$$

where our coefficient of interest β capturing the returns to the export promotion budget may now vary by country and time (i.e., it has a c and t subscript). A most simple way to make $\beta_{c,t}$ a function of agencies' characteristics is a standard linear approach

$$\beta_{c,t} = \beta + \sum_x \beta^x\ \text{Agency characteristic}^x_{c,t}\ , \tag{5}$$

where x indicates the different agencies characteristics, all β^x are unknown parameter that can be relatively easily estimated in a panel context, and β the mean over all $\beta_{c,t}$. We can then replace (5) into (4) to estimate a parametric linear version of how returns to export promotion depend on agencies' characteristics:

$$\begin{aligned} \ln(\text{exports})_{c,t} \quad = \quad & \beta\ \ln(\text{budget})_{c,t} + \sum_x \beta^x\ \text{Agency characteristic}^x_{c,t}\ \ln(\text{budget})_{c,t} \\ & +\delta\ \ln(\text{population})_{c,t} + \gamma_c + \gamma_t + \epsilon_{c,t} \end{aligned} \tag{6}$$

Note that there are strong assumptions in the estimation of (6) as for example the linearity between returns and agencies' characteristics. If they are none, then this leads automatically to the bias which in economics typically subsumed the notation of 'endogeneity due to unobserved heterogeneity'. Solving this with instruments requires to assume (among other strong assumptions) that the used instrument exhibits no correlation with $\ln(\text{budget})_{c,t} \cdot \sum_x \beta^x\ \text{Agency characteristic}^x_{c,t}$ but still has a strong correlation with $\ln(\text{budget})_{c,t}$.

Therefore, it is preferable to consider a model that allows for much less restricted export returns, namely using a semi-parametric varying coefficient model. The most general varying coefficient model version of (4) would certainly be to let $\beta_{c,t}$ arbitrarily vary over a set of agency characteristics that we consider to be interesting or important. Take for example x =(share of customers fees in budget, share of budget spent on new exporters, share of private sector seats in executive board)= $(fees, new-exp, sh-priv)$, then $\beta_{c,t}$ would be a three dimensional surface (could only be made visible with 3D contour plots), i.e. while we could predict the return to budget for many interesting combinations of these characteristics, it would be hard to draw further conclusions. A natural simplification is to exclude interactions of the elements of x on returns,

and to work only with

$$\ln(\text{exports})_{c,t} = \{b_f(fees_{c,t}) + b_n(new\text{-}exp_{c,t}) + b_s(sh\text{-}priv_{c,t})\}\ln(\text{budget})_{c,t} + \delta\ln(\text{population})_{c,t} + \gamma_c + \gamma_t + \epsilon_{c,t} \tag{7}$$

with $b_k(\cdot)$, $k = f, n, s$ being one-dimensional smooth functions. For our purpose we approximate them by piece-wise cubic polynomials (so-called Penalized cubic splines) in the next sections. While it is true that the assumption of additive separability is also a strong assumption, it so far has nonetheless been one of the most accepted simplifications in empirical economics.

3 Data sources and summary statistics

We merged information from three rounds of export promotion agencies surveys. The first survey was conducted in the fall of 2005 by the World Bank and the data was used in Lederman et al. (2010). The second round was conducted in the fall of 2010 also by the World Bank, and the final round was conducted in the fall of 2014 by the International Trade Center (ITC).

The initial survey contacted all agencies in the ITC's contact information database available at www.intracen.org/tpo. The list was complemented with the help of World Bank country economists who provided contact information on national export promotion agencies that were not listed in the ITC database. A total of 116 agencies were contacted by email; 92 answered of which only 4 percent responded negatively. In 2010, the same 116 agencies were contacted, and 93 answered positively.[3] In the fall of 2014 the ITC survey concentrated in agencies in fourteen European countries, which all responded positively.[4] This leaves with an unbalanced panel containing information on export promotion agencies budget, sources of funding, governance, and activities for 94 countries.

The survey contains nineteen-questions to better understand the budget, sources of funding, governance, and activities of EPAs around the world.[5] Table 1 provide summary statistics for each of the variables in the survey in three different samples: one containing all countries surveyed, the second one focusing on all European countries in the sample, and the third on the fourteen European countries surveyed by the ITC in 2014 that we labelled the ETPO sample. It is important to note that this is an unbalanced panel so the average are not necessarily for the same time period in each country. For non-European countries the sample stops in 2010, whereas for some European countries the sample only starts in 2010.

From the figures listed in the Table 1, we notice that agencies participating to the ITC ETPO 2014 survey are on average older, have more employees, and have approximately the same share of private board members than the rest of the agencies present in the survey. The ITC ETPO agencies also tend to spend

[3]The response rates is around 80 percent, which is astonishing for an email survey. The high response rate is probably explained by the numerous follow-ups done by phone.

[4]These are Austria, Belgium, Bosnia, Cyprus, Denmark, Estonia, Iceland, Italy, Lithuania, Malta, Netherlands, Slovenia, Switzerland, and the United Kingdom.

[5]The survey is available from the authors upon request.

a larger share of their budget on small firms which are established exporters than other European or rest of the world agencies. They also seem to spend a larger share of their budget in the service sector. It is important to note that most of the answers to the question in the survey are in a scale that goes from 1 to 6. For example, all the questions regarding the share of the budget spent on different activities or type of firms take the value 1 if this share is 0, the value 2 if the share is between 0 and 10 percent, the value 3 if the share is between 10 and 25 percent, the value 4 if the share is between 25 and 50 percent, the value 5 if the share is between 50 and 75 percent and the value 6 if the share is between 75 and 100 percent.

Figure 1 and 2 provide the average budget to export ratio of the fourteen ETPO countries for the period 2005 to 2010 using boxplots.[6] Figure 1 includes a boxplot for Estonia and Figure 2 excludes Estonia as it seems an important outlier. The first important thing to notice is that the export promotion budget represents a very small share of exports. The sample median (in red) is marginally above 0.1 percent with only Estonia, Iceland and Malta being above 0.01 percent. Regardless of Estonia's values there is quite a bit of variance among the fourteen ETPOs in terms of their share of the export promotion budget on exports. In countries such as Lithuania, Slovenia and Switzerland the shares are very small and have a tiny variance across time, whereas in other countries such as Iceland and Malta the share is more than ten times larger and has a much larger variance across time.

Table 2 provides the size of the budget (not as a share of exports) for each of the thirteen ETPO countries as well as its evolution in terms of growth for the period 2005-2014. It confirms that in absolute terms, the budgets for Switzerland, Lithuania, Slovenia and Bosnia are much smaller than in the other countries. Interestingly, the budget show a quite high variance across time and within countries, as indicated by the growth rates given for the years 2006-2014 in Table 2, which is probably problematic for the functioning of these agencies, but it is paradise for the econometrician, as it will help us in identifying the impact of changes of export promotion budgets on exports.

Figure 3 illustrates the share of budget spent on small, medium and large firms in the three samples of Table 1. It is quite clear that ETPO agencies tend to spend a relatively larger share on small firms rather than medium and large size firms. There is clear decline in the share of the budget spent by the ETPO agencies as a function of firm size. Other European agencies seem to spend a larger share in medium size firms which is also reflected in the average for the total sample at the bottom of Figure 3.

Figure 4 illustrates the share of the budget spent on four different types of activities (marketing, image building, support services, and market research) in the three different samples of Table 1. In all samples the largest share of the budget is spent on marketing, export support services seem to come second and then is followed by image building and market research. There is no striking differences in the shares across these three different samples, but there is still an important amount of variance that could help us identify how the returns to export promotion varying depending on the type of activities on which agencies focus.

[6]The bottom of the box gives the value at the 25 percentile, the top of the box the value at the 75 percentile. The line in the middle of the box provides median value. The whiskers provide the top and bottom 90 percentile, and the dots above and below the wiskers, the outliers.

Regarding the returns to export promotion, figure 5 provides the unconditional correlation between exports and export promotion budgets. No causal interpretation should be given to this figure, but it simply illustrates that exports increase as export promotion budgets increase. The fourteen ETPOs are highlighted in red in this figure. For countries above the lowess smoothing line exports tend to be above the average level for countries with similar export promotion budgets, and for those below the lowess line exports are below the average level for countries with similar export promotion budgets.

4 Results

Table 3 presents the results of the estimation of (1). The estimates suggest that 1 percent increase in the export budget leads to a 0.046 percent increase in exports. The coefficient on the export budget is statistically significant at the 5 percent level and a very large share of the variation in exports is explained by our fixed effect models with an adjusted R^2 of 0.997.

Table 4 presents the results of the estimation of (2) which adds as an additional control the population of the country and results are qualitatively unchanged.

Table 5 presents the results of the estimation of (2) using data for European countries only and it suggests that returns to export promotion may be smaller in Europe than in the rest of the world with a 1 percent increase in the export budget leading to a 0.025 percent increase in exports. This is confirmed by the the results of the estimation of (3) reported in Table 6, which shows a negative coefficient on the interaction of the budget with a dummy for Europe although the coefficient on the interaction is not statistically different from zero, suggesting that the returns in Europe are not statistically different from those in the rest of the world.

Table 7 presents the results of the estimation of (2) but where we instrument the budget with the rank of the budget to control for measurement error. The estimated coefficient suggests that a 1 percentage increase in exports leads to a 0.078 percent increase in exports. These are the results we are using in our benchmark calculations.

We also run (2) with the one, two and three years lag of the export promotion budget jointly and independently. None of the regressions yields statistically significant results and we there do not report them here. Because the lag budget was not statistically significant in the export equation we use it as an instrument and the results are reported in Table 8. The returns to export promotion are not statistically different from our benchmark estimates in Table 7.

Table 9 presents the results of the instrumental variable estimation using agencies characteristics rather than the rank of lag budget which are more likely to satisfy the necessary exclusion restrictions for the validity of the instruments. We use as instruments the share of public funding and the share of seats in the executive board of the agency which are in the hands of the private sector, as well as their interaction. Again results suggest a large impact of export promotion on exports, and the point estimate is not statistically

different from the one reported in Table 7.

Table 10 presents the results of the estimation of (2) but with GDP per capita rather than exports on the left-hand-side. Results suggest a positive and statistically significant impact of export promotion on GDP per capita. Table 11 presents the same specification but where we instrument the budget with its rank to correct for measurement error. It confirms a large and positive effect of export promotion budgets on GDP per capita. Table 12 does the same but using as instruments the same instruments as in Table 9 and again we find a positive and large impact of the export promotion budget on income per capita.

4.1 What works?

Tables 13 and 14 provide the results of the parametric and linear varying coefficient model where we interacted six agencies characteristics with the log the export promotion budget to explore how returns vary with these characteristics. The six characteristics explore are the share of the budget that comes from customer fees, the share of the seats of the executive board in the hands of the private sector, the share of the budget spent on new exporters, an indicator of the importance given to export promotion within the agency in comparison with other agency's objectives (e.g., investment promotion), the share of the budget spent on marketing activities, and the share of the budget spent on medium size firms. Table 13 suggests that increases in any of these agencies characteristics seem to increase the returns of export promotion in terms of exports, except for the importance given to export promotion within the agency, and the share of the budget spent on marketing activities. Note that only some of the interaction terms are statistically significant and therefore should be interpreted with caution. Table 14 shows similarly results for GDP per capita.

We now turn to the results of the semi-parametric varying coefficient models. Figure 6 shows the results of the estimation of the semi-parametric varying coefficient model, where returns depend on the share of the budget that comes from customer fees, the share of the budget spent on new exporters, and the share of seats in the executive board of the agency which are in the hands of the private sector. The top three diagrams show that the returns to export promotion are larger the larger are any of these characteristics with the exception perhaps of the share of the budget that comes from customer fees which has an inverted-u shape. Figure 7 examines the residuals from the semi-parametric model which confirm normality.

Figure 8 shows the results of the estimation of the semi-parametric varying coefficient model, where returns depend on the importance given in the agency to export promotion rather than other objectives, the share of the budget spent on medium size firms, and the share of the budget spent on marketing activities. The top three diagrams show that the returns to export promotion do not seem to vary much with these characteristics, except for the share of the budget spent on medium size firms rather than small or large firms. As more money is put into medium size firms the returns to export promotion are larger. Figure 9 examines the residuals from the semi-parametric model which confirm normality.

5 Concluding remarks

In this paper we focused on the determinants of the heterogeneity of returns and examine the type of policy instruments and governance of export promotion agencies that are more likely to generate higher returns. Using parametric and semi-parametric techniques, we find that on average one dollar spent on export promotion generates 15 dollars on exports, confirming results of earlier literature. Agencies that focus on new exporters rather than occasional or experienced exporters experience higher returns. Similarly agencies that focus on medium size firms rather than small or larger firms are also likely to have higher returns. A larger share of board's seats in the hands of the private sector also tends to improve returns. The impact of the share of funding coming from customers fees on returns to export promotion has an inverted u-shape form. When the share of funding coming from customs fees is small, increasing this share yields higher returns, but when the share of funding coming from customers fees is already large, then increasing the share further leads to a decline. The importance given to export promotion within the institution or the share spent on marketing activities do not seem to systematically affect returns to export promotion.

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Table 1: Summary statistics (standard deviation in parenthesis)

	(1) World	(2) Europe	(3) ETPO
Non oil exports of goods and services from WDI	9.13e+10	2.26e+11	2.17e+11
	(2.45e+11)	(3.12e+11)	(2.37e+11)
EPA budget in USD	4.79e+07	7.74e+07	6.49e+07
	(8.96e+07)	(1.07e+08)	(9.31e+07)
Whether EPA in country	.8492647	1	1
	(0.36)	(0.00)	(0.00)
Date of creation of EPA	1986.743	1983.543	1979.696
	(21.61)	(27.15)	(30.02)
Number of employees	267.8821	357.2337	335.032
	(511.70)	(416.90)	(473.74)
Q1:0=private,1=pub/pri;2=pub aut etc	2.191262	2.107407	2.264286
	(0.85)	(0.87)	(1.02)
Q2:membership of Board	9.59847	9.793233	8.461538
	(6.43)	(6.85)	(3.21)
Q2: private sector membership	5.183236	4.684211	4.823077
	(4.47)	(3.08)	(2.50)
Q2: cabinet level membership	2.822068	2.398496	1.407692
	(3.39)	(3.73)	(1.94)
Share of private sector over total at board	.4825755	.4879667	.5836462
	(0.29)	(0.29)	(0.29)
Q3: rank of EPAs responsability	2.532847	2.786232	2.528571
	(1.09)	(1.23)	(1.06)
Agency is only or main agency in country	.89	.9777778	1
	(0.31)	(0.15)	(0.00)
public source of funding	4.924953	5.253623	5.007143
	(1.66)	(1.38)	(1.75)
private source of funding	1.502868	1.765625	2.341667
	(1.14)	(1.34)	(1.74)
budget coming from fees from services	1.949811	2.214286	1.961538
	(1.20)	(1.05)	(0.72)
budget from bilateral donors	1.462715	1.117188	1.116667
	(1.05)	(0.32)	(0.32)
budget from multilateral donors	1.501912	1.214844	1.208333
	(1.09)	(0.72)	(0.65)
budget spent on salaries and benefits (incl. bonuses)	3.832692	3.815789	3.828571
	(1.01)	(0.92)	(0.80)
budget spent on travel and training of staff	2.153846	2.203252	2.071429
	(0.55)	(0.49)	(0.26)
budget spent on rents	1.990385	2.300752	2.25

Continued on next page...

... table 1 continued

	(1) World	(2) Europe	(3) ETPO
	(0.79)	(0.72)	(0.50)
budget spent on publications and promotional materials	2.263107	2.169173	2.114286
	(0.69)	(0.62)	(0.59)
budget spent on fees paid to consultants	2.082278	2.128866	2.125
	(0.74)	(0.52)	(0.60)
budget spent on financial assistance to exporters	1.810127	1.979381	1.875
	(1.34)	(1.32)	(1.06)
Q10: budget spent on country image building	2.375	2.365942	2.292857
	(0.86)	(0.79)	(0.68)
Q10:budget spent on export support services	2.6587	2.460145	2.278571
	(0.98)	(1.07)	(0.81)
Q10: budget spent on marketing	3.512428	3.141304	3.285714
	(1.09)	(1.06)	(0.98)
Q10:budget spent on market research	2.533144	2.5	2.45
	(0.82)	(0.92)	(0.76)
Q10:budget spent on policy advocacy	1.949425	1.875	1.9
	(0.59)	(0.56)	(0.59)
Q10:budget spent on other export promotion activities	1.611111	1.988722	1.838462
	(0.99)	(1.16)	(0.99)
Q10:budget spent on other activities not related to EP	2.076255	2.045113	2.346154
	(1.33)	(1.31)	(1.32)
Q12:budget to agriculture agro-industry animal products 2005	3.243038	2.557692	2.35
	(1.19)	(0.77)	(0.63)
Q12:budget to machines 2005	2.05679	2.660714	2.738462
	(0.93)	(0.88)	(0.67)
Q12:budget to IT and IT-enabled services sector 2005	2.0375	2.392523	2.416667
	(0.72)	(0.62)	(0.64)
Q12:budget to tourism sector 2005	1.734177	1.841121	2.076923
	(0.90)	(0.93)	(0.90)
Q12: budget to services 2010	2.375	2.898734	3.166667
	(0.96)	(0.99)	(1.08)
Q13: budget on new / occasional exporters	3.220884	3.376812	3.357143
	(1.00)	(0.96)	(0.76)
Q13:budget on established exporters	4.309237	4.300725	4.292857
	(1.24)	(1.24)	(1.10)
Q13:budget on non exporters	2.134091	1.936	1.984615
	(1.10)	(0.86)	(0.92)
Q14:budget on small firms	3.759443	3.862319	4.271429
	(1.02)	(1.12)	(1.15)
Q14:budget on medium size firms	3.807157	3.818841	3.614286
	(0.98)	(0.98)	(0.88)

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... table 1 continued

	(1) World	(2) Europe	(3) ETPO
Q14:budget spent on large firms	2.410643	2.466165	2.376923
	(1.04)	(0.79)	(0.76)
0=no,1=offices abroad funded by agency;2=no office abroad	.8079151	.9015152	1.042857
	(0.73)	(0.55)	(0.60)
Budget allocated to offices abroad in USD	1.42e+07	1.15e+07	380798.4
	(1.08e+08)	(2.09e+07)	(465585.51)
1=Impact measurement mechanism in EPA	.7755102	.8421053	.8571429
	(0.42)	(0.37)	(0.35)
1=formal follow up process with clients	.8469388	.921875	.9230769
	(0.36)	(0.27)	(0.27)
KPI number of exporters	2.248744	3.144578	3.333333
	(1.36)	(1.38)	(1.17)
KPI value of exports	1.740196	2	2.083333
	(1.22)	(1.51)	(1.56)
KPI number of clients	2.333333	2.7375	3.111111
	(1.40)	(1.33)	(1.28)
KPI clients satisfaction	2.298765	2.166667	2.32
	(1.21)	(0.80)	(0.79)
other KPIs	1.789272	1.426471	1.878049
	(1.79)	(1.50)	(1.62)
Agency is only or main agency in country	.89	.9777778	1
	(0.31)	(0.15)	(0.00)
More than 50% budget to established exporters	.2554474	.4861111	.5
	(0.44)	(0.50)	(0.50)
More than 50% public funding	.3755216	.7951389	.8071429
	(0.48)	(0.40)	(0.40)
EPA is autonomous or private	.6592233	.6925926	.6357143
	(0.47)	(0.46)	(0.48)
N	2157	288	140

Table 2: Evolution of ETPO's export promotion budgets 2005-2014
(in millions of USD in 2005 and % change from 2006 to 2014)

Year	AUT	BEL	BIH	CHE	CYP	DNK	EST	GBR	ISL	ITA	LTU	MLT	NLD	SVN	Avrg*
2005†	74.64	99.98	1.88	2.09	2.79	73.88	119.2	410.91			0.21	11.69	45.81	0.23	46.3
2006	2.61	5.67	30.17	-12.87	-0.62	0.96	0.92	2.32			0.92	20.25	10.87	110.36	14.30
2007	14.52	3.28	2.32	6.74	6.51	17.91	-27.23	3.85			191.07	5.25	4.54	-31.10	16.47
2008	17.38	-2.18	-6.39	63.87	60.24	5.55	189.76	7.58			7.32	90.79	106.08	338.03	73.17
2009	-5.17	-13.76	13.67	23.70	17.75	-12.75	-95.62	-10.38			-5.17	-14.55	5.33	-19.53	-9.71
2010	-7.67	7.41	0.81	60.87	2.27	-1.23	31.95	-47.26	-0.21	2.96	145.95	-18.69	-10.48	79.23	17.57
2011	-42.25	8.61	-10.33	-56.44	-34.60	-2.12	1.25	-2.93	235.28	-26.82	112.88		-73.91	54.11	12.52
2012	13.75	5.38	21.28	19.84	-1.60	-6.13	-21.30	-2.57	-18.11	-27.68	16.06		-6.87	-13.87	-1.68
2013	-0.83	-2.95	0.45	1.68	-20.27	-5.17	-72.90	0.42	4.95	6.21	21.53		-12.58	52.41	-2.08
2014	6.14	2.63	-3.39	1.58	-7.10	0.43	25.72	10.03	16.50	25.16	1.19		-7.02	-23.63	3.71

*Average over total sample of 96 countries.

Table 3: Average impact of export promotion budgets on exports (ordinary least squares)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.046*	(0.015)
Intercept	25.339**	(0.338)
N	533	
R^2	0.997	
$F_{(102,430)}$	1412.755	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 4: Average impact of export promotion budgets on exports (controlling for population size)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.046*	(0.022)
Log of population	2.217**	(0.500)
Intercept	-39.493**	(13.924)
N	530	
R^2	0.997	
$F_{(103,426)}$	1544.617	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 5: Average impact of export promotion budgets on exports (Europe sample)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.025†	(0.019)
Log of population	-1.149**	(0.653)
Intercept	40.153**	(9.589)
N		189
R^2		0.998
$F_{(37,151)}$		2379.977

All regressions include country and year fixed effects. Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 6: Average impact of export promotion budgets on exports (Europe versus Non-Europe)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.073*	(0.031)
Log budget x Dummy Europe	-0.043	(0.039)
Log of population	2.113**	(0.338)
Intercept	-36.360*	(14.319)
N		530
R^2		0.997
$F_{(104,425)}$		1534.214

All regressions include country and year fixed effects. Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 7: Average impact of export promotion budgets on exports
(IV correction with the rank of the budget)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.078**	(0.024)
Log of population	2.163**	(0.489)
Intercept	-38.432**	(13.683)
N	530	
R^2	0.997	
$F_{(103,426)}$	1527.857	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 8: Average impact of export promotion budgets on exports
(IV correction with lag budget and rank of budget)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.055*	(0.026)
Log of population	2.740**	(0.612)
Intercept	-38.432**	(13.683)
N	530	
R^2	0.997	
$F_{(103,426)}$	1527.857	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 9: Average impact of export promotion budgets on exports (IV correction with agency characteristics)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.193*	(0.075)
Log of population	2.058**	(0.563)
Intercept	-37.113*	(15.359)
N	499	
R^2	0.997	
$F_{(95,402)}$	.	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 10: Average impact of export promotion budgets on GDP per capita (ordinary least squares)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.056**	(0.014)
Log of population	0.725*	(0.283)
Intercept	-2.951	(4.637)
N	515	
R^2	0.996	
$F_{(97,417)}$	3606.076	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 11: Average impact of export promotion budgets on GDP per capita (IV correction with rank of the budget)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.073**	(0.018)
Log of population	0.731**	(0.280)
Intercept	-6.560	(4.390)
N	549	
R^2	0.997	
$F_{(102,444)}$	.	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 12: Average impact of export promotion budgets on GDP per capita (IV correction with agency characteristics)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.133**	(0.045)
Log of population	0.724*	(0.291)
Intercept	-2.951	(4.637)
N	515	
R^2	0.996	
$F_{(97,417)}$	3606.076	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 13: Linear exploration of impact of export promotion budgets on exports (IV correction with rank of the budget)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.064*	(0.030)
Budget x share of fees	0.005*	(0.003)
Budget x share of private seats	0.008	(0.006)
Budget x share of new exporters	0.005†	(0.003)
Budget x Dummy for main mandate	-0.005†	(0.003)
Budget x share of marketing activ.	-0.003	(0.003)
Budget x share of medium size firms	0.001	(0.002)
Log of population	2.780**	(0.542)
Intercept	-18.028*	(7.361)
N	470	
R^2	0.997	
$F_{(97,372)}$	32116.977	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Table 14: Linear exploration of impact of export promotion budgets on GDP per capita (IV correction with rank of the budget)

Variable	**Coefficient**	**(Std. Err.)**
Log of EPA budget in USD	0.043*	(0.019)
Budget x share of fees	-0.001	(0.002)
Budget x share of private seats	-0.002	(0.003)
Budget x share of new exporters	0.001	(0.001)
Budget x Dummy for main mandate	0.000	(0.002)
Budget x share of marketing activ.	0.004†	(0.002)
Budget x share of medium size firms	0.001	(0.001)
Log of population	0.763*	(0.299)
Intercept	-13.766†	(8.333)
N	480	
R^2	0.997	
$F_{(97,382)}$	4383.619	

All regressions include country and year fixed effects. Significance levels : † : 10% * : 5% ** : 1%

Figure 1: Budget to export ratio for ETPO participating countries

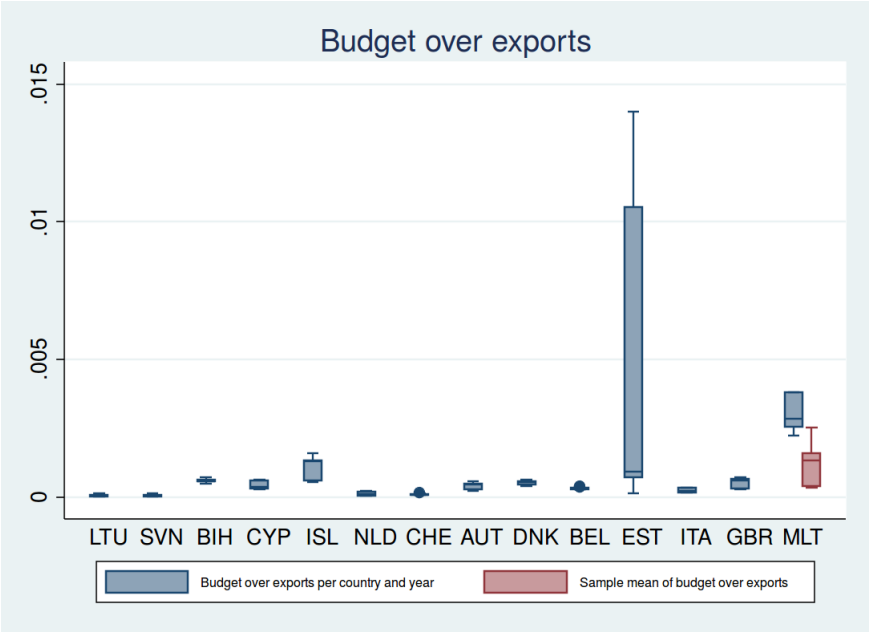

Figure 2: Budget over exports for ETPO participating countries (without Estonia)

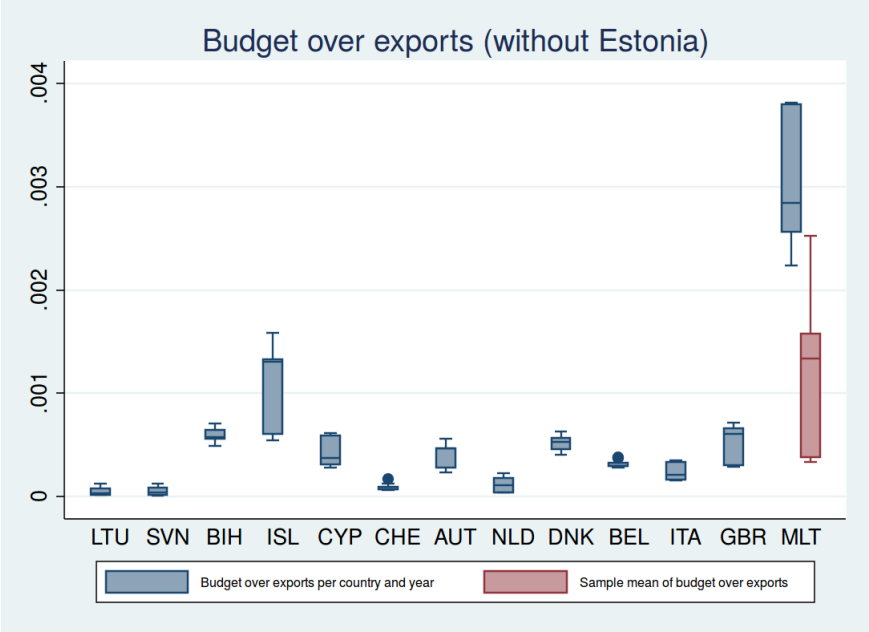

Figure 3: Share of budget spent on small, medium and large firms

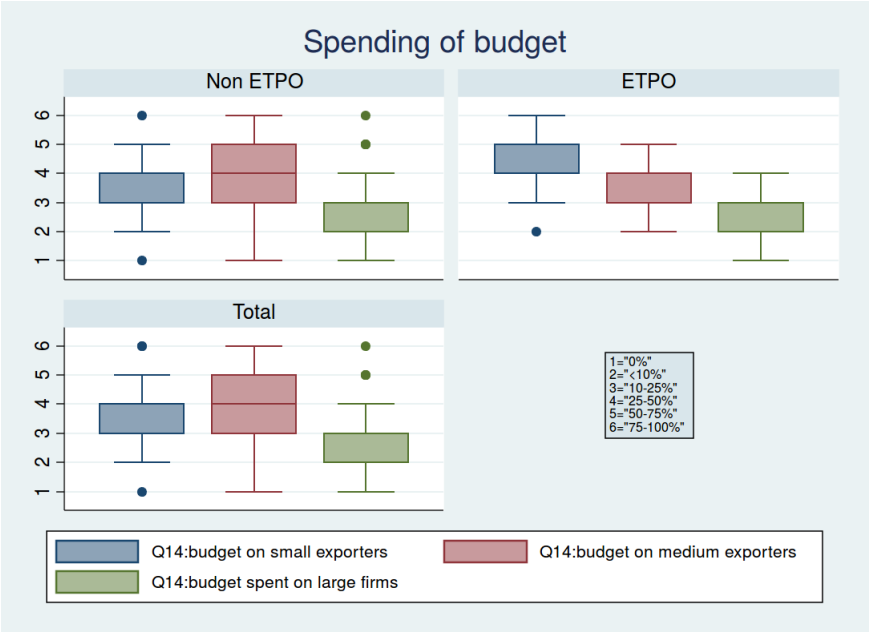

Figure 4: Share of budget by type of activity

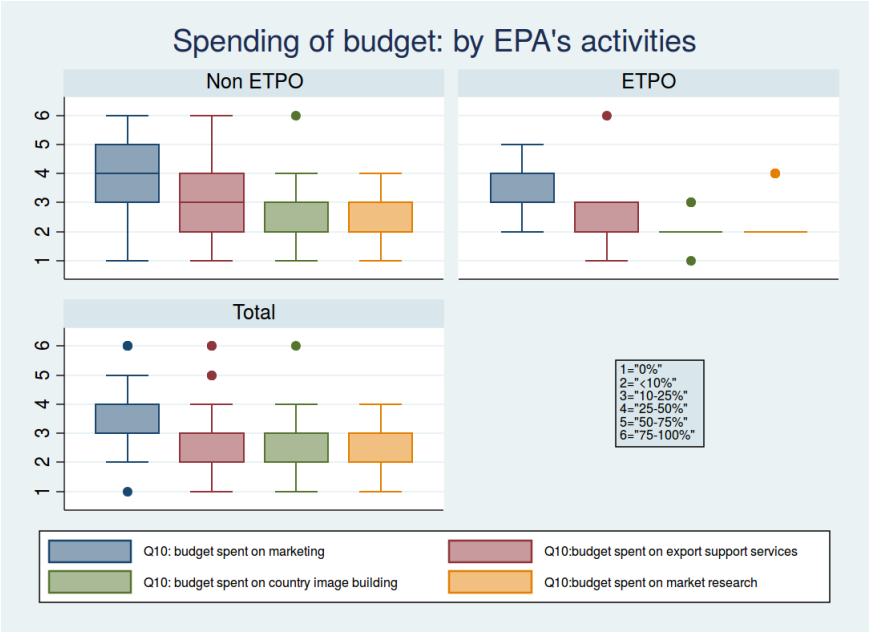

Figure 5: Correlation between exports and export promotion budget (lowess)

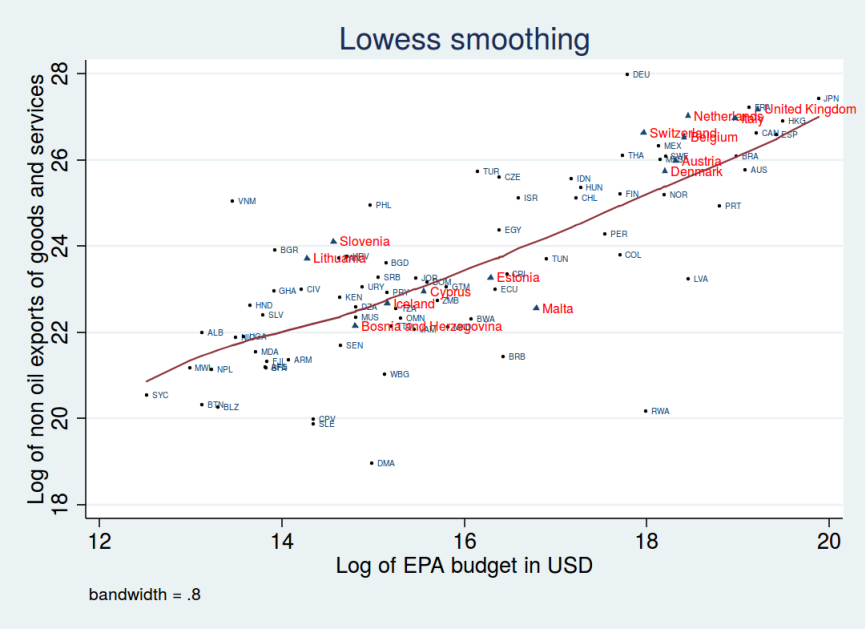

Figure 6: Regression plots of model 1 with shpriv, sou_fee, cli_new

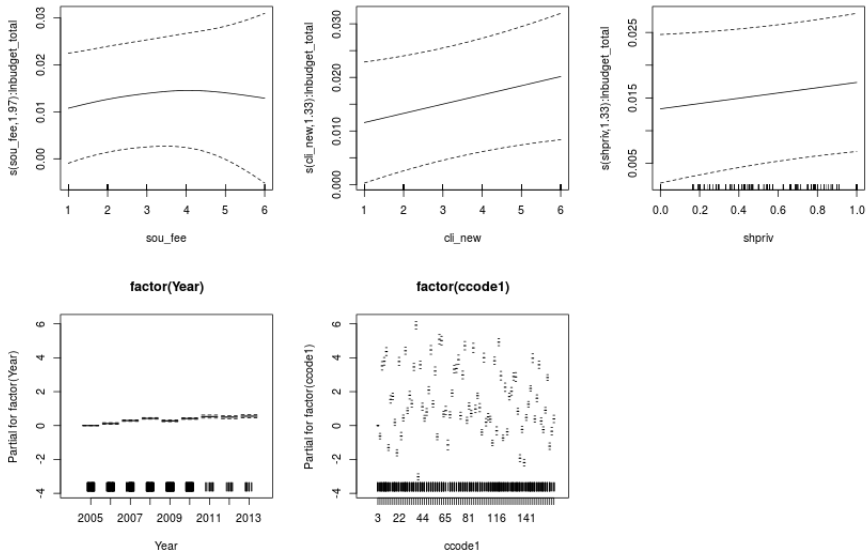

Figure 7: Results of model 1 with shpriv, sou_fee, cli_new

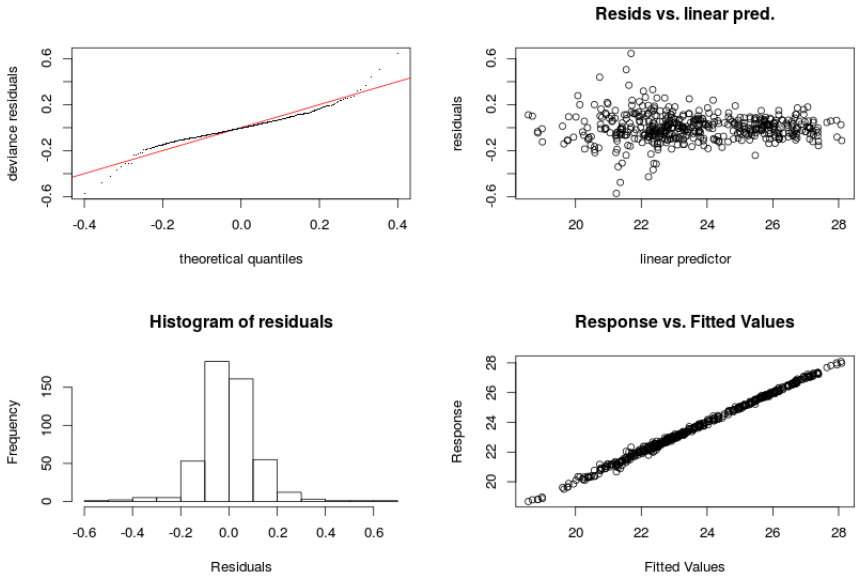

Figure 8: Regression plots of model 2 with resp, act_mar, cli_med

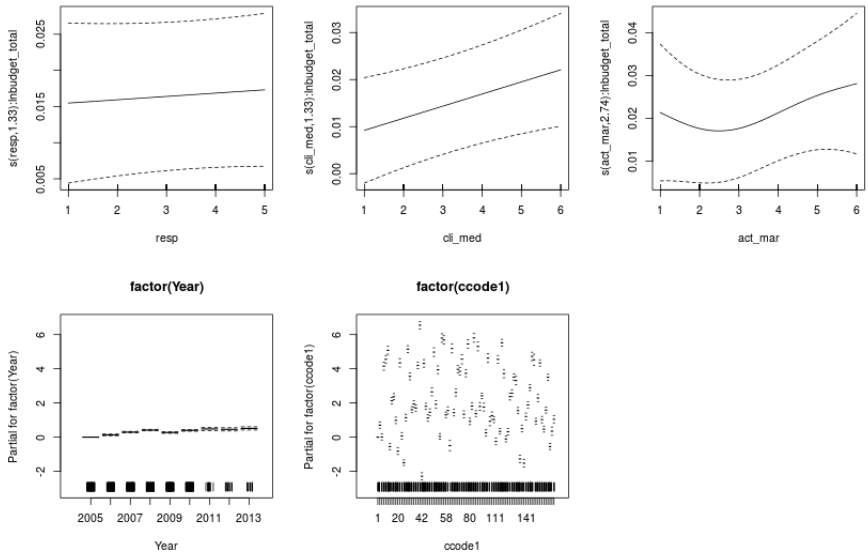

Figure 9: Results of model 2 with resp, act_mar, cli_med