RSC 2021/65
Robert Schuman Centre for Advanced Studies
Global Governance Programme-447

WORKING PAPER

Can export promotion reduce unemployment?

Cristian Ugarte and Marcelo Olarreaga

European University Institute
Robert Schuman Centre for Advanced Studies
Global Governance Programme

Can export promotion reduce unemployment?

Cristian Ugarte and Marcelo Olarreaga

RSC Working Paper 2021/65

ISSN 1028-3625

Published in August 2021 by the European University Institute.
Badia Fiesolana, via dei Roccettini 9
I – 50014 San Domenico di Fiesole (FI)
Italy
www.eui.eu

With the support of the Erasmus+ Programme of the European Union

The European Commission supports the EUI through the European Union budget. This publication reflects the views only of the author(s), and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Robert Schuman Centre for Advanced Studies

The Robert Schuman Centre for Advanced Studies, created in 1992 and currently directed by Professor Brigid Laffan, aims to develop inter-disciplinary and comparative research on the major issues facing the process of European integration, European societies and Europe's place in 21st century global politics.

The Centre is home to a large post-doctoral programme and hosts major research programmes, projects and data sets, in addition to a range of working groups and *ad hoc* initiatives. The research agenda is organised around a set of core themes and is continuously evolving, reflecting the changing agenda of European integration, the expanding membership of the European Union, developments in Europe's neighbourhood and the wider world.

For more information: http://eui.eu/rscas

The Global Governance Programme

The Global Governance Programme is one of the flagship programmes of the Robert Schuman Centre. It is a community of outstanding professors and scholars, that produces high quality research and engages with the world of practice through policy dialogue. Established and early-career scholars work on issues of global governance within and beyond academia, focusing on four broad and interdisciplinary areas: Global Economics, Europe in the World, Cultural Pluralism and Global Citizenship.

The Programme also aims to contribute to the fostering of present and future generations of policy and decision makers through its executive training programme: the Academy of Global Governance, where theory and 'real world' experience meet and where leading academics, top-level officials, heads of international organisations and senior executives discuss on topical issues relating to global governance.

For more information: http://globalgovernanceprogramme.eui

Abstract

The paper examines the impact of export promotion on aggregate unemployment. We find that increases in the share of Export Promotion Agencies' (EPAs) budgets on total exports lead to small decreases in aggregate unemployment. This effect is amplified when export promotion efforts are concentrated in sectors in which the country has a comparative advantage. On the other hand, when EPAs aim at reducing aggregate unemployment by focusing their efforts in sectors with high levels of unemployment, then aggregate unemployment increases. These results suggest that even if EPAs' priorities were to shift towards reducing unemployment, this would be better addressed by focusing on sectors in which the country has a comparative advantage rather than sectors with high labor market frictions.

Keywords

Export promotion, Unemployment, Comparative Advantage.

JEL codes: F13, F14, O19.

1 Introduction[1]

There is growing evidence that export promotion activities contribute to export growth (for example Atkin, Khandelwal and Osma, 2017, Broocks and Van Biesebroeck, 2017, and Volpe and Carballo, 2008, 2010a, 2010b, and 2012). While this export growth almost automatically lead to employment growth in exporting firms,[2] trade economists know at least since Brecher (1974) that this does not necessarily leads to reductions in aggregate unemployment. This paper examines the impact that increases in export promotion budgets have on aggregate levels of unemployment in a panel of 52 countries over the period 2005-2014. Using data on the sectoral expenditure of Export Promotion Agencies (EPAs) we also explore whether export promotion efforts should concentrate in sectors with a comparative advantage or in sectors with high unemployment, when aiming at reducing aggregate unemployment.

We find that a 1 percent increase in the share of EPAs' budgets in total exports leads on average to a 0.32 percent reduction in unemployment (or 0.03 percentage points). This is a qualitatively interesting and statistically significant result, but export promotion does not seem to have a very large impact on aggregate unemployment. However, the effect can be significantly amplified if export promotion efforts are concentrated in sectors with a comparative advantage without any need to increase EPAs' budgets. If EPAs were to fully align their promotion expenditure with each country's comparative advantage, unemployment would decline on average by 2.85 percent (or 0.23 percentage points). On the other hand, if EPAs expenditure were to be fully aligned with sectorial levels of unemployment, then unemployment would increase on average by 6.22 percent (or 0.50 percentage points). This suggests that the allocation of promotion efforts across sectors matter if EPAs were to target aggregate unemployment.

[1]We are grateful to Céline Carrère, Alvaro Garcia-Marin, Bernard Hoekman, Jaime de Melo, Amelia Santos-Paulino and participants at the ELSNIT 2019 conference in Paris. We are also grateful to the support from the R4D project on Trade and Labor Market Outcomes in Developing Countries funded by the Swiss National Science Foundation and the Swiss Development Cooperation under grant agreement no. 400340-147718, as well as the European Union's Horizon 2020 research and innovation programme under grant agreement no. 770680 (RESPECT).

[2]Unless they are accompanied by strong increases in labor productivity as shown for China in the late 1990s by Los, Timmer and de Vries (2015).

These results are important for at least three reasons. First, EPAs have proliferated over the last 20 years, and as their effectiveness has been shown in terms of export growth, it is important to understand whether there are unintended consequences on other important policy objectives such as unemployment. With export and income growth being often referred to as being jobless (see Ancharaz, 2011 or Schmitt-Grohé and Uribe 2017), it is important to ensure that resources put into export promotion are not contributing to jobless growth, or worse, increases in unemployment. Second, the results highlight that not all export promotion efforts help reduce aggregate unemployment. The strategic choices made by EPAs when deciding where to focus their efforts matter. Perhaps more surprisingly, export promotion efforts that target sectors with high unemployment are more likely to lead to increases in unemployment, whereas those that target sectors with comparative advantage are more likely to reductions in unemployment. Understanding this heterogeneity is crucial to help policymakers trying to disentangle what works and what does not work when it comes to export promotion, and how this may depend on the policy objective associated with the intervention. It also clearly illustrates how focusing efforts in a sector that is slowing down or for which unemployment is increasing can backfire. Last, but not least, we provide evidence suggesting that the reallocation of export promotion efforts, rather than increases in export promotion budgets, are likely to have a larger impact on aggregate unemployment. With more than 50 percent of EPAs' budgets being publicly funded and large increases in government deficits and public debt over recent years, this is an important result for governments facing tighter budget constraints.

The main challenges were data related. First, to examine the impact of the allocation of export promotion expenditures across sectors, one needs data on export promotion expenditures at the sectoral level. This was obtained from three EPAs' survey where EPAs were asked to report their export promotion expenditure by sector. These surveys were undertaken by the World Bank and the European Trade Promotion Organization, and summarized in Olarreaga, Sperlich and Trachsel (2020). Second, because we want to examine how these sectoral expenditures correlate with comparative advantage, we need to compute measures of

comparative advantage across countries and sectors. This was undertaken following Costinot, Donaldson and Komunjer (2012) gravity model approach where for every year bilateral sectoral exports are run on a set of exporter*sector, importer*sector and exporter*importer fixed effects. The exporter*sector fixed effect of each year is then used as a proxy for the country's sectoral comparative advantage. Finally, we need sector level unemployment data, which is difficult to observe. We rely on an approach developed by Carrère et al. (2020) which shows that aggregate unemployment can be decomposed into sector level, country level and year components that can be then used to compute sector level unemployment for every country and year.

As mentioned earlier there is a large and growing literature showing that export promotion contributes to export growth. But to our knowledge this is the first paper examining the impact of export promotion on aggregate unemployment. The closest paper to ours is Munch and Schaur (2017) which focuses on export promotion by the Danish Trade Council and shows that it leads to a higher level of employment at the firm level, but no evidence is given for the impact at the aggregate level. It is important to note that this cannot be obtained by aggregating across exporting firms as resources are pulled away from other exporting and non-exporting firms which can potentially lead to a decline in aggregate employment. Similarly, several papers have examined what type of export promotion works best. Volpe and Carballo (2010) using data for ProChile show that higher returns are obtained when export promotion focuses on small exporters. Volpe and Carballo (2008) show that efforts should focus on the extensive rather than intensive margin, while Broocks and van Biesebroeck (2017) show that in the case of experienced exporters there could also be positive returns at the intensive margin. However, none of these papers have explored how the sectoral allocation of promotion efforts affects the overall returns, and whether efforts should be aligned with the country's comparative advantage. Chen, Poncet and Xiong (2017) foucs on this in the case of export processing zones in China. They showed that the returns in terms of export value are larger when the sectors that are targeted are aligned with the country's comparative advantage. The difference with our work is that we focus on unemployment rather than export value. In other words, their work suggests that targeting sectors in which

the country has a comparative advantage leads to larger increases in exports, while our work shows that this would also be accompanied by larger reductions in unemployment.

The remainder of the paper is organized as follows. Section 2 provides the empirical framework. Section 3 discusses data sources and estimates of comparative advantage and sectoral unemployment, as well as summary statistics. Section 4 discusses the empirical results and section 5 concludes.

2 Empirical framework

To assess the impact of export promotion and its allocation across sectors on aggregate unemployment, we use the following empirical model:

$$\begin{aligned} \ln U_{c,t} \;=\; & \beta_1 \ln\left(\frac{\text{Budget}}{\text{Exports}}\right)_{c,t} + \beta_2 \text{ corr}\left(\text{Budget}_{s,c,t}; CA_{s,c,t}\right)_{c,t} \\ & + \beta_3 \text{ corr}\left(\text{Budget}_{s,c,t}; u_{s,c,t}\right)_{c,t} + \beta_4 \text{ corr}\left(CA_{s,c,t}; u_{s,c,t}\right)_{c,t} \\ & + \beta_5 \ln\left(\frac{\text{GDP}}{\text{Population}}\right)_{c,t} + \beta_6 \ln\left(\text{Population}\right)_{c,t} + \beta_c + \beta_t + \epsilon_{c,t} \end{aligned} \tag{1}$$

where $U_{c,t}$ is the unemployment rate at the national level in country c at period t (in logs) and Budget/Exports is the share of the EPAs' budget on total exports (in logs), $\text{corr}\left(\text{Budget}_{s,c,t}; CA_{s,c,t}\right)_{c,t}$ is the correlation between the EPAs' budget expenditure across sectors and the countries' comparative advantage ($CA_{s,c,t}$), and $\text{corr}\left(\text{Budget}_{s,c,t}; u_{s,c,t}\right)_{c,t}$ is the correlation between the EPAs' budget expenditure across sectors and the sectoral unemployment ($u_{s,c,t}$). β_1 estimates the impact that increases in the share of EPAs' budget on total export have on aggregate unemployment. Note that we have no a priori on the sign of the coefficient. Increases in export promotion lead to export growth, but this can perfectly be jobless export growth, or worse, it can lead to increases in unemployment if the firms benefitting from export promotion are less labor-intensive than firms in the rest of the economy, or are in sectors with higher levels of sectoral unemployment; β_2 allows to

capture the impact of increases in the alignment between export promotion expenditures and comparative advantage at the sectoral level on unemployment. Again, we have no a priori on this coefficient as focusing on sectors with comparative advantage can in principle lead to more or less unemployment depending on labor-intensities or labor market frictions across sectors; β_3 captures the impact of increases in the alignment between export promotion expenditures and sectoral unemployment on aggregate unemployment. Again, there are no a priori here as focusing on sectors with high levels of unemployment increases labor demand in sectors with high levels of unemployment and therefore can help reduce unemployment, but it also shifts resources to sectors where labor market frictions may be stronger leading to an increase in aggregate unemployment due to a composition effect. Importantly, the sign of these last two coefficients will allow us to examine how the strategic choice of EPAs in the allocation of export promotion expenditure across sectors affects aggregate unemployment.

As control variables we have the correlation between comparative advantage and sectoral unemployment, GDP per capita, and population (the last two in logs), as well as country and year fixed effects. We control for the correlation between comparative advantage and sector level unemployment because as shown by Carrère et al. (2020) and Carrère, Grujovic and Robert-Nicoud (2020) this matters for aggregate unemployment. We expect $\beta_4 > 0$, as a higher correlation between comparative advantage and sector level unemployment leads to higher levels of aggregate unemployment as shown both theoretically and empirically by Carrère et al. (2020). Indeed, the labor force is attracted into sectors in which the country has a comparative advantage. If these sectors tend to have higher levels of unemployment, this will result in higher levels of aggregate unemployment.

The share of export promotion budgets in total exports can be endogeneous in equation (1). To address this concern we follow Olarreaga Sperlich and Trachsel (2020) instrumental variable strategy, and use a measure of the broadness of the EPA mandate to instrument for the share of EPA's budget. The variable takes the value 1 if export promotion is the only responsibility of the agency; 2 if it is the top two priority, 3 if it is one of the two top priorities, 4 if it is one of three or more top priorities, and 5 if it is secondary to other priorities. Thus,

as the value of the variable increases, the responsibility of the agency in terms of export promotion gets diluted. The more often cited responsibilities cited in the World Bank and International Trade Centre surveys that are given to EPAs apart from export promotion are investment and tourism promotion. We expect a positive correlation between the broadness of the agency's mandate/responsibilities and the size of the budget.

After estimating equation (1) we compute the changes in unemployment that would occur if EPAs were to fully align their promotion efforts with the country's comparative advantage or with the levels of unemployment observed at the sectoral level, illustrating a potential strategic choice for EPAs.

$$\Delta U(B = CA) = \beta_2 \left[1 - \text{corr}\left(\text{Budget}; CA\right)\right] + \beta_3 \left[\text{corr}\left(CA; u\right) - \text{corr}\left(\text{Budget}; u\right)\right] \quad (2)$$

$$\Delta U(B = u) = \beta_2 \left[\text{corr}\left(CA; u\right) - \text{corr}\left(\text{Budget}; CA\right)\right] + \beta_3 \left[1 - \text{corr}\left(\text{Budget}; u\right)\right] \quad (3)$$

The change in unemployment if EPAs were to fully align their promotion expenditure with their comparative advantage (CA) is given by equation (2). The change in unemployment if EPAs were to fully algin their promotion expenditure with the levels of unemployment at the sector level (u) is given by equation (3). In the results section we compute $\Delta U(B = CA)$ and $\Delta U(B = u)$ for each country year to see how a change in the allocation of promotion efforts would affect the aggregate level of unemployment without any need for increases in EPAs' budgets.

3 Data and Variable Construction

Aggregate unemployment rates are borrowed from ILO's Key Indicators of the Labour Market (KILM) indicators,[3] which cover 96 countries over the period 1995-2009. The KILM database provides the raw data reported by each country, and an adjusted series estimated

[3] https://www.ilo.org/ilostat.

by the ILO. Because we use this data in a regression framework where we allow for measurement error of the left-hand-side variable we prefer to use the raw data. Differences in values between the two series are rather small and therefore when we estimate equation (1) using the adjusted data results are qualitatively (and almost quantitatively) identical.[4]

Export data was obtained for the 2003-2014 is obtained from CEPII's BACI dataset.[5] The data is available at the six digit of the Harmonized System that we then filter into the sector disaggregation of the EPAs' survey.

To estimate equation (1) using corr (Budget; CA) and corr (Budget; u) we face three data challenges. The first one is to obtain data on the budget allocation of EPAs at the sector level. We borrow detailed data collected by EPAs' surveys conducted by the World Bank and the International Trade Centre in three separate waves (2005, 2010, and 2014) and used in Olarreaga, Sperlich and Trachsel (2020).[6] All countries in our analysis participated in at least two waves of these surveys and provide information on the operational budget of their national EPA[7] as well as their breakdown across 6 economic sectors. These sectors are agriculture & agro-industry, machinery, electrical & electronic products, textiles & leather products, other manufacturing, and services (IT, professional services, tourism, and other services). Countries without information on the sectoral allocation of their EPA's budget are excluded from the analysis.[8] The surveys contain information on the global EPAs' budget in between surveys, but the information on the allocation of the budget across different sectors is only provided for the year of the survey. For the 4 and 5 year span between surveys, we linearly project the budget shares in between two surveys. To check that this is not driving

[4]Results are available upon request.

[5]http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1.

[6]The World Bank was responsible for the first two waves and more than 80 EPAs responded to each of these surveys. The International Trade Centre conducted the third wave, although with a much narrower scope of countries and mainly focused on European countries. Despite these differences, questionnaires between different waves remain largely unchanged which allows us to construct some time-series.

[7]Note that export promotion agency (EPA) and trade promotion organization (TPO) are used interchangeably in these surveys. More recently, the institutions are also known as trade and investment promotion organizations (TIPO).

[8]These countries are Bulgaria, Cabo Verde, Canada, Indonesia, Japan, Netherlands, Oman, Papua New Guinea, and Sweden.

the results we will provide a robustness check in which only non-projected data is used.

The second data challenge is that we do not observe comparative advantage. However, several options exists in the literature to estimate it. We adopt the theoretically well-grounded Ricardian measure proposed by Costinot, Donaldson and Komunjer (2012) using the gravity framework. Using CEPII's BACI trade data described above we estimate for every year between 2003 and 2014 the following gravity equation (12 regressions are undertaken):

$$\ln export_{c,i,s} = \alpha_{c,s} + \alpha_{c,i} + \alpha_{i,s} \quad \forall \text{ year=2003..2014} \tag{4}$$

where $export_{c,i,s}$ are exports country c to importer i of goods from sector s; $\alpha_{c,s}$ are exporting country*sector fixed effects that capture the comparative advantage of the exporting country in sector s; $\alpha_{c,i}$ are bilateral fixed effects that capture bilateral trade costs between the two countries; and $\alpha_{i,s}$ captures the comparative disadvantage of the importer i in sector s. As shown by Costinot, Donaldson and Komunjer (2012) one can then construct a theoretically well-grounded measure of comparative advantage using the estimate of $\alpha_{c,s}$ for each year:

$$CA_{c,s,t} = \exp(\widehat{\alpha_{c,s,t}}/\sigma). \tag{5}$$

where σ is the elasticity of exports with respect to productivity, which is estimated at 6.53 by Costinot, Donaldson and Komunjer's (2012).

The third data challenge is that sector level unemployment rates are not observed neither. To estimate these unemployment rates at the sector level we followed the methodology developed by Carrère et al. (2020). The idea is simple. We observe aggregate unemployment from the ILO. We then assume that it can be decomposed into sector level component that is common across countries and time, a country component, and a year component. The country and year components can be easily estimated as they have the same disaggregate as aggregate unemployment which varies by country and year. The sector level component cannot be retried using sector fixed effects because aggregate unemployment does not vary by sector. However, it can be decomposed into the weighted sum of sectoral unemployment, where the

weights are given by the labor force in each sector. The labor force by sector is not observed but sectoral employment is observed and using the unemployment rate at the sector level (that we will estimate) is straightforward to see that the labor force looking for jobs in each sector is given by the observed level of employment divided by 1 plus the sector level unemployment. This implies that the sector level unemployment can be estimated using:

$$u_{c,t} = \sum_{s=1}^{7} \frac{u_s}{1+u_s} \ell_{c,s,t} + \gamma_c + \gamma_t + \epsilon_{ct} \tag{6}$$

where u_s is the sector-specific component of the sectoral unemployment rate that we estimate using equation (6); $\ell_{c,s,t}$ is the employment share in sector s in country c at time t; γ_c are country fixed effects that capture the country-specific component of the sectoral unemployment rate; and γ_t are year fixed effects that capture the year-specific component of the sectoral unemployment rate.

To estimate (6) we use employment data at the sector level from INDSTAT compiled by UNIDO[9] and match it to employment shares in each country for the seven sectors in EPAs' surveys. The estimation is run on an unbalanced panel of 847 observations at the country-year level resulting from the merging of ILO and UNIDO indicators for the largest possible span. We use a non-linear estimator than imposes u_s to be positive, as well as our estimate of sector level unemployment by country and year which given the additive form in equation (6) is given by $\widehat{u_{c,s,t}} = \hat{u_s} + \hat{\gamma_c} + \hat{\gamma_t}$.

3.1 EPAs' strategic choices

We then measure for every country and year the correlation of EPA's sectoral allocation of their export promotion budgets with the estimated sector level unemployment rates and comparative advantage. If the correlation between EPA's budget and comparative advantage is high this suggests that the EPA strategically focuses its promotion efforts in sectors in which the country has a comparative advantage. Similarly, if the correlation between EPA's

[9]See https://stat.unido.org/.

budget and the estimated sector level unemployment rate is high, then the EPA strategically focuses its promotion efforts in sectors where unemployment is more problematic. We also compute the correlation between sector level unemployment and comparative advantage that we use as a control variable as suggested by Carrère et al. (2020).

Summary statistics for all variables are provided in Table 1. The average correlation between export promotion budgets and comparative advantage in our sample is 0.296. However there is a lot of variation across countries and time and the correlation ranges between -0.997 and 0.975.[10] The average correlation between export promotion budgets and sector level unemployment is much lower at 0.066, but again there is a lot of heterogeneity, as it varies between -0.733 and 0.543. However, given the large difference between these two average correlations, one could argue that on average EPAs tend to focus their promotion efforts in sectors with comparative advantage, rather than sectors in which there are high levels of unemployment.[11]

Figure 1 provides further evidence on how EPAs allocate their export promotion budgets. The majority of agencies are not located in the lower left quadrant of Figure 1. This means that few agencies focus on promoting sectors with little comparative advantage (negative $\rho(CA, B)$) and low levels of unemployment (negative $\rho(u, B)$). Among the few agencies detected in this quadrant, we find Italy, Austria, and Kosovo. There are however some agencies that focus their efforts in sectors with high level of unemployment (positive $\rho(u, B)$), but without much of a comparative advantage (negative $\rho(CA, B)$). In this right bottom quadrant, we find developed countries such as Spain, Lithuania, and Cyprus, as well as emerging economies such as Brazil, and Mexico, Jordan, and Cambodia. On the top left quadrant, a small set of countries focus on sectors with a large comparative advantage and low levels of unemployment. This includes France, Turkey, Belgium, Czech Republic, Vietnam, Malaysia, and Trinidad & Tobago. As illustrated by the histograms on the axis of Figure 1, most agen-

[10] We also compute a measure of this correlation using a two-year lagged measure of comparative advantage as the impacts of export promotion on unemployment may be delayed.

[11] Note that on average there is a positive correlation between comparative advantage and sector level unemployment rates. This could suggest that there could be a high correlation between the two other correlations, which would be problematic in our econometric specification. As reported in Table 2 this is not the case. The correlation between $\rho(u, B)$ and $\rho(CA, B)$ is only 0.073.

cies focus their promotion efforts in sectors with comparative advantage, but with high levels of unemployment. This is the case of most Middle Eastern and African agencies (in green). European and Central Asian agencies (in blue) are more heterogeneous. These agencies also represent the largest share of our sample (56 percent). Latin American agencies (in red) tend to be in the right panels suggesting that they tend to focus on high unemployment sectors. They represent 18 percent of the sample. Agencies in Asia and Oceania (in orange) tend to be in the top panels suggesting that they tend to focus on sectors with high comparative advantage. They represent 14 percent of the sample.

4 Results

Table 3 presents the results of the estimation of equation (1). In the first column we only introduce the share of the export promotion in total exports on the right-hand-side without controlling for the correlations between budget and unemployment, budget and comparative advantage, and comparative advantage and unemployment. The second to fourth column introduce one by one each of these correlation, and then finally the fifth column runs the regression as in equation (1) with all correlations simultaneously.

Results in all columns suggest that increases in the share of export promotion on total exports leads to reductions in unemployment. The size of the impact is very small as a 1 percent increase in the share of the export promotion budgets seems to lead to a reduction in unemployment somewhere between 0.05 and 0.07 percent. With average unemployment at 8 percent in the sample, this implies a reduction in unemployment of only 0.004 percentage points. Thus increasing export promotion can on average help reduce unemployment, but the impact is not very large.

Interestingly the allocation of export promotion budgets across sectors matters. A higher correlation between export promotion budgets and comparative advantage leads to lower levels of unemployment as shown in columns (2) and (5). On the other hand a higher cor-

relation between export promotion budgets and sector level unemployment leads to higher levels of unemployment, although this effect is not statistically significant.

Control variables suggest that countries with higher GDP per capita tend to have lower levels of unemployment, perhaps capturing a better functioning of the labor market in these countries. Similarly, countries with a larger population also tend to have lower levels of unemployment. The correlation between comparative advantage and sector level unemployment has a positive impact on aggregate unemployment as shown by Carrère et al. (2020), but the effect is not statistically significant.

We perform several robustness tests reported in Table 4. We first examine the geographic robustness of the estimates. In column (1) we exclude Asian and Africa countries from the sample. Together they represent 26 percent of the observations in our sample. In column (2) we exclude Latin American countries, which represent 18 percent of the sample. In column (3) we exclude European and Central Asian countries which together represent 56 percent of the sample. In column (4) we run equation (1) using data only for European and Central Asian countries. In column (5) we use observations for which we had data in the EPA survey for the allocation of export promotion budgets across sectors, and without estimating the evolution of these shares in between surveys. Finally in column (6) we use a two-year lagged measure of comparative advantage to capture potential delays on the impact of export promotion budgets on the level of unemployment. The results in all columns are perfectly consistent with the ones reported in Table 3. Increases in the share of export promotion budgets will lead to small reductions in unemployment, and shifting the allocation of export promotion budgets towards sectors with a comparative advantage leads to lower levels of unemployment.

As discussed in section 2, these results could be biased due to endogeneity problems. Table 5 presents the instrumental variable estimates where the broadness of EPAs' mandate is used as an instrument for the share of export promotion budgets in total exports. Columns (1) shows the results of the second stage, whereas column (2) shows the results of the first stage.

Columns (3) and (4) provide the results of the second and first stage respectively, but when the sample is restricted to those observations for which export promotion budgets were not projected in between surveys. Results in column (1) suggest avlarge impact of increases on the share of export promotion budgets on aggregate unemployment, but the size of the impact is still quite modest. A 1 percent increase in the share leads to 0.322 percent reduction in unemployment (or 0.03 percentage points at the sample mean). The impact is slightly smaller in column (3) without the projected allocation of export promotion budgets across sectors.

More interestingly both columns (1) and (3) suggest that increases in the correlation between export promotion budgets and comparative advantage across sectors leads to decreases in aggregate unemployment. Similarly, increases in the correlation between export promotion budgets and sector level unemployment leads to increases in aggregate unemployment. Using the estimates of column (1), and plugging them into equations (2) and (3) we can then compute the change in unemployment that would occur if countries were to perfectly align their allocation of export promotion budgets with their comparative advantage, or the sector level unemployment observed in their country. The results are reported in Figure 2 where the horizontal axis reports changes in unemployment following a full alignment of export promotion budgets with comparative advantage, and the horizontal axis the change in unemployment following a full alignment of export promotion budgets with sector level unemployment.

In most countries a full alignment with comparative advantage leads to a reduction in aggregate unemployment. In only 23 percent of the observations there is an increase in unemployment when EPAs fully align their strategy with the country's comparative advantage. The average decline in unemployment is 2.85 percent (or 0.23 percentage points). On the other hand, a full alignment with sector level unemployment rates leads to an increase in unemployment in almost all countries (97 percent of the observations). The average increase of unemployment is equal to 6.22 percent (or 0.50 percentage points). These are much larger effects that the change in aggregate unemployment following increases in export promotion budgets. These results suggest that if unemployment were to be targeted by EPAs, their

focus should be on sectors with comparative advantage, and that relatively large reductions in unemployment can be reached without increases in EPAs' budgets.

Interestingly if EPAs were to concentrate their export promotion efforts in sectors with low unemployment (instead of high unemployment), the decline in aggregate unemployment is very similar to the decline observed when EPAs align with the country's comparative advantage. The correlation between the two changes is plotted in Figure 3. There is indeed an almost perfect fit between an alignment in sectors with high comparative advantage and an alignment in sectors with low unemployment. The correlation coefficient between the two series is 0.999. This is not because of the fact that on average countries have a comparative advantage in sectors with low unemployment. If anything our estimate suggest rather the opposite, with an average correlation of 0.21 between comparative advantage and sector level unemployment. The reason has to do with the fact that the coefficients in front of the correlation between EPAs' budget and comparative advantage, and between EPAs' budget and sector level unemployment estimated using equation (1) and reported in column (1) of Table 5 are of similar size, but different sign.[12]

The policy implications of these simulations on EPAs' strategic choices are quite clear. If EPAs' mandate were to change to target unemployment, this could be best achieved by EPAs targeting sectors with comparative advantage. The reduction in aggregate unemployment that will be reached will be similar to the one that would be obtained if EPAs were to target sectors with low unemployment. It is important to understand that this is not because EPAs will allocate export promotion efforts in the same sectors under the two scenarios. They would putting their efforts in different sectors, but the overall effect on aggregate unemployment would be the same.

[12]Indeed, it is straightforward to see that in that the change in aggregate unemployment when aligning with comparative advantage is given by: $-0.423 \times [1 - \rho\,(\mathrm{B}; CA)] + 0.491 \times [\rho\,(u; CA) - \rho\,(\mathrm{B}; u)] = 0.423 \times \rho\,(\mathrm{B}; CA) - 0.491 \times \rho\,(\mathrm{B}; u) + 0.491 \times \rho\,(u; CA) - 0.423$. And the change in aggregate unemployment when aligning with low sectoral unemployment is given by: $= 0.491 \times [-1 - \rho\,(\mathrm{B}; u)] - 0.423 \times [-\rho\,(u; CA) - \rho\,(\mathrm{B}; CA)] = 0.423 \times \rho\,(\mathrm{B}; CA) - 0.491 \times \rho\,(\mathrm{B}; u) + 0.423 \times \rho\,(u; CA) - 0.491$. Because of the two estimates being of very similar size, but opposite sign the two changes in aggregate unemployment are almost identical.

5 Concluding remarks

We examine the impact of export promotion on national unemployment. We consider three different channels through which export promotion can affect unemployment. The first are increases in the share of export promotion budgets in total exports. The second and third channels capture potential changes in the allocation of export promotion budgets towards sectors with a stronger comparative advantage or higher levels of unemployment.

We find that increases in EPA's budget help reduce unemployment, but the size of the impact is very small, suggesting that this is not necessarily the best tool to achieve large reductions in unemployment. However, much larger declines in unemployment can be obtained if EPAs change the strategic allocation of their export promotion efforts across sectors. A sizeable reduction in unemployment can be achieved by focusing export promotion efforts in sectors with a strong comparative advantage and away from sectors with high levels of unemployment.

This is an important result for policymakers as it suggests that important reductions in unemployment can be achieved through export promotion without necessarily increasing export promotion budgets. In a world where most EPAs are mainly publicly funded, and where governments face large and growing fiscal deficits, this could be an effective way for EPAs to contribute not only to export growth, but also to reductions in unemployment, which is arguable a more important policy goal.

Last, but not least, while focusing EPAs' promotion efforts in sectors with comparative advantage is clearly not a strategy that minimizes unemployment, our results show that EPAs could not do better in terms of reductions in aggregate unemployment by focusing their efforts in sectors with low unemployment. In other words, while export promotion efforts would clearly focus on different sectors under the two, the reduction in aggregate unemployment is almost identical. This is important as it suggests that focusing export promotion efforts in sectors with a strong comparative advantage is a strategy that also

minimizes aggregate unemployment.

References

Ancharaz, Vinaye, 2011. Trade, Jobs and Growth in Africa: An empirical investigation of the export-led jobless growth hypothesis. Paper presented at the 3rd ICITE Regional Conference on Trade, Jobs and Inclusive Development in Africa, Tunisia.

Atkin, David, Amit Khandelwal, and Adam Osman. 2017. Exporting and Firm Performance: Evidence from a Randomized Experiment. Quarterly Journal of Economics 132(2): 551–615.

Brecher, Richard, 1974. Minimum Wage Rates and the Pure Theory of International Trade. Quarterly Journal of Economics 88, 98-116.

Broocks, Annette, and Johannes Van Biesebroeck, 2017. The Impact of Export Promotion on Export Market Entry. Journal of International Economics 107: 19–33.

Cadot, Olivier, Ana M. Fernandes, Julien Gourdon, and Aaditya Mattoo, 2015. Are the Benefits of Export Support Durable? Evidence from Tunisia. Journal of International Economics 97(2): 310–24.

Carrère, Céline, Marco Fugazza, Marcelo Olarreaga, and Frédéric Robert-Nicoud, 2020. Comparative Advantage and Equilibrium Unemployment. European Economic Review 127.

Carrère, Céline, Anja Grujovic and Frédéric Robert-Nicoud, 2020. Trade and frictional unemployment in the global economy. Journal of the European Economic Association, forthcoming.

Chen, Zhao, Sandra Poncet, and Ruixiang Xiong, 2017. Inter-industry relatedness and industrial-policy efficiency: Evidence from China's export processing zones. Journal of Comparative Economics 45(4), 809-806.

Costinot, Arnaud, Dave Donaldson, and Ivana Komunjer, 2012. What goods do countries

trade? A quantitative exploration of Ricardo's ideas. Review of Economic Studies 79, 581-608.

Los, Bart, Marcel Timmer, and Gaaitzen de Vries, 2015. How important are exports for job growth in China? A demand side analysis. Journal of Comparative Economics 43(1), 19-32.
Munch, Jacob, and Georg Schaur, 2018. The Effect of Export Promotion on Firm-Level Performance. American Economic Journal: Economic Policy 10(1): 357–87.

Olarreaga, Marcelo, Stefan Sperlich, and Virginie Trachsel, 2020. Exploring the Heterogeneous Effects of Export Promotion. The World Bank Economic Review 34(2): 332-50.

Schmitt-Grohé, Stephanie, and Martin Uribe. 2017. Liquidity Traps and Jobless Recoveries. American Economic Journal: Macroeconomics 9(1): 165-204.

Volpe Martincus, Christian, and Jerónimo Carballo, 2008. Is Export Promotion Effective in Developing Countries? Firm-Level Evidence on the Intensive and the Extensive Margins of Exports. Journal of International Economics 76(1): 89–106.

Volpe Martincus, Christian, and Jerónimo Carballo, 2010a. Beyond the Average Effects: The Distributional Impacts of Export Promotion Programs in Developing Countries. Journal of Development Economics 92(2): 201–14.

Volpe Martincus, Christian, and Jerónimo Carballo, 2010b. Entering New Country and Product Markets: Does Export Promotion Help? Review of World Economics 146(3): 437–67.

Volpe Martincus, Christian, and Jerónimo Carballo, 2012. Export Promotion Activities in Developing Countries: What Kind of Trade Do They Promote? The Journal of International Trade & Economic Development 21(4): 539–78.

Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Unemployment rates (percent)	7.956	4.67	0.622	33.761	294
EPA's budget (000 USD)	68'181	100'558	166	606'738	294
EPA's budget / Exports (percent)	0.13	0.22	0.001	1.502	292
GDP per capita (USD)	21'779	18'850	458	97'008	294
Population (in thousands)	25'412	37'141	318	196'796	294
Correlation (CA, Budget)	0.296	0.463	-0.997	0.975	294
Correlation (lagged CA, Budget)	0.289	0.467	-0.999	0.994	294
Correlation (Unemployment, Budget)	0.066	0.297	-0.733	0.543	294
Correlation (CA, Unemployment)	0.209	0.246	-0.443	0.775	294

Data source: ILO's KILM, World Bank's WDI, and CEPII's BACI.

Table 2: Cross-correlation table

Variables		$\rho(CA, B)$	$\rho(u, B)$	$\rho(CA, u)$	$\rho(CA_{t-2}, B)$
Correlation (CA, Budget)	$\rho(CA, B)$	1.000			
Correlation (Unemployment, Budget)	$\rho(u, B)$	0.073	1.000		
Correlation (CA, Unemployment)	$\rho(CA, u)$	0.292	0.246	1.000	
Correlation (lagged CA, Budget)	$\rho(CA_{t-2}, B)$	0.986	0.069	0.272	1.000

Table 3: Regressions of unemployment rates

	Unemployment rates (in logs)				
	(1)	(2)	(3)	(4)	(5)
ln EPA's Budget/Exports	-0.045*	-0.058**	-0.053**	-0.047*	-0.071***
	(0.026)	(0.025)	(0.027)	(0.026)	(0.026)
$\rho(CA, \text{Budget})$		-0.325***			-0.323***
		(0.081)			(0.081)
$\rho(u, \text{Budget})$			0.130		0.153
			(0.121)		(0.117)
$\rho(CA, u)$				0.273	0.274
				(0.221)	(0.215)
ln GDP per capita	-1.011***	-0.989***	-1.021***	-1.036***	-1.025***
	(0.132)	(0.128)	(0.133)	(0.134)	(0.130)
ln population	-1.422**	-1.231*	-1.291*	-1.439**	-1.095*
	(0.650)	(0.631)	(0.661)	(0.649)	(0.641)
Year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Observations	292	292	292	292	292
R^2	0.409	0.448	0.412	0.413	0.456
Adjusted R^2	0.249	0.296	0.250	0.251	0.299

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Robustness checks

	Unemployment rates (in logs)					
	(1) excluding As. + Af.	(2) excluding L. Am.	(3) excluding Europe	(4) only Europe	(5) selected years	(6) lagged CA
ln EPA's Budget/Exports	-0.072**	-0.051*	-0.163***	-0.047	-0.097	-0.071***
	(0.029)	(0.029)	(0.049)	(0.032)	(0.064)	(0.027)
$\rho(CA, \text{Budget})$	-0.383***	-0.295***	-0.171*	-0.350***	-0.342**	-0.266***
	(0.098)	(0.089)	(0.097)	(0.111)	(0.156)	(0.077)
$\rho(u, \text{Budget})$	0.135	0.123	-0.017	0.077	0.223	0.155
	(0.142)	(0.126)	(0.153)	(0.157)	(0.233)	(0.118)
$\rho(CA, u)$	0.349	0.211	0.026	0.298	0.215	0.315
	(0.251)	(0.240)	(0.251)	(0.287)	(0.539)	(0.217)
ln GDP per capita	-1.127***	-1.106***	-0.529***	-1.420***	-0.901***	-1.057***
	(0.162)	(0.165)	(0.131)	(0.275)	(0.270)	(0.131)
ln population	-1.673*	-1.287*	1.503*	-2.542**	-0.964	-1.170*
	(0.852)	(0.693)	(0.860)	(1.124)	(1.340)	(0.645)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	229	239	116	176	90	292
R^2	0.484	0.472	0.513	0.513	0.387	0.446
Adjusted R^2	0.336	0.317	0.300	0.369	-0.705	0.287

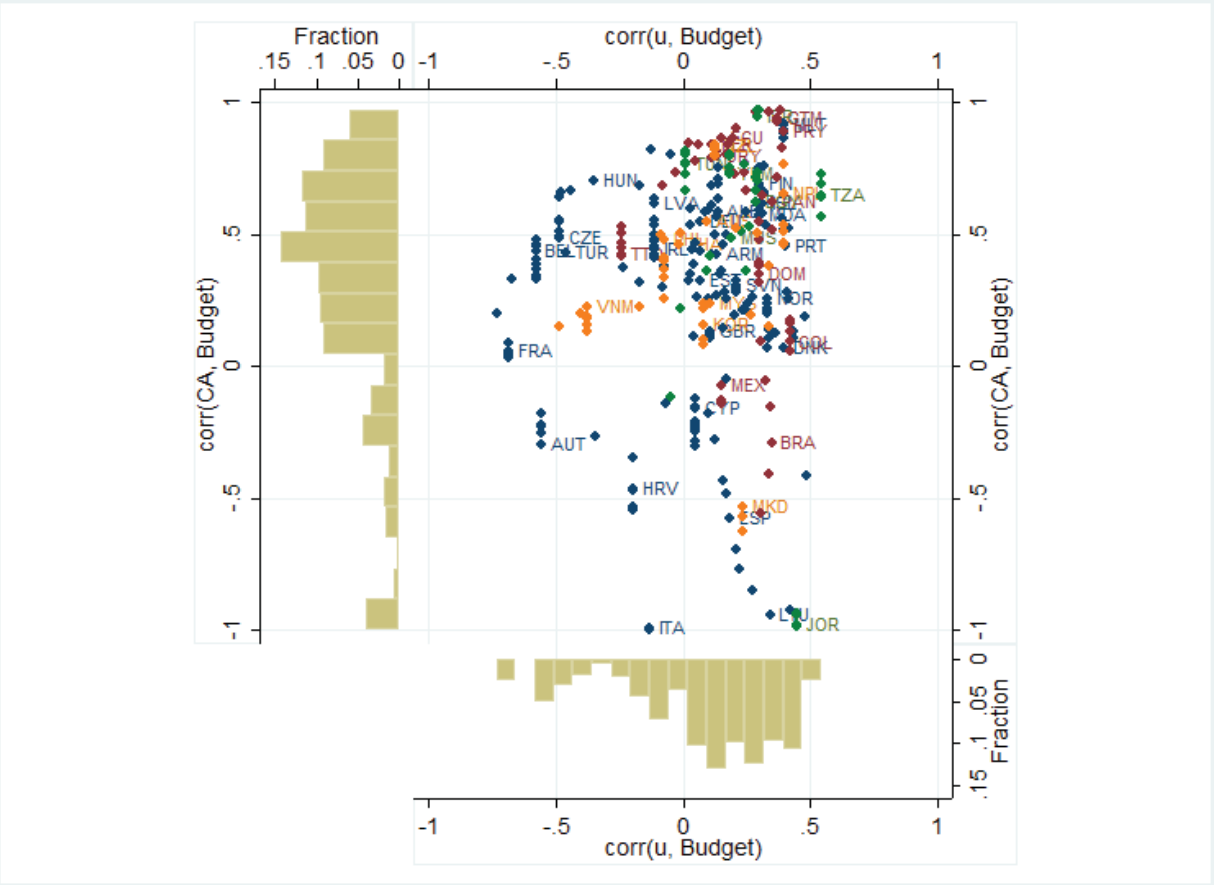
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Instrumental variable regressions of unemployment rates

	Whole sample		Selected years	
	(1)	(2)	(3)	(4)
	2^{nd}	1^{st}	2^{nd}	1^{st}
ln EPA's Budget/Exports	-0.322***		-0.249*	
	(0.119)		(0.149)	
$\rho(CA, \text{Budget})$	-0.423***	-0.399**	-0.385***	-0.525
	(0.096)	(0.196)	(0.109)	(0.437)
$\rho(u, \text{Budget})$	0.491**	1.311***	0.410*	1.241**
	(0.199)	(0.274)	(0.233)	(0.581)
$\rho(CA, u)$	0.495**	0.815	0.315	0.322
	(0.246)	(0.524)	(0.360)	(1.434)
ln GDP per capita	-1.043***	-0.065	-0.921***	0.043
	(0.135)	(0.318)	(0.176)	(0.723)
ln population	-1.713**	-4.237**	-1.468	-5.183
	(0.725)	(1.639)	(0.988)	(3.676)
EPA's responsibility/mandate broadness		0.234***		0.265
		(0.066)		(0.162)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	292	292	90	90
R-squared	0.858	0.922	0.921	0.920

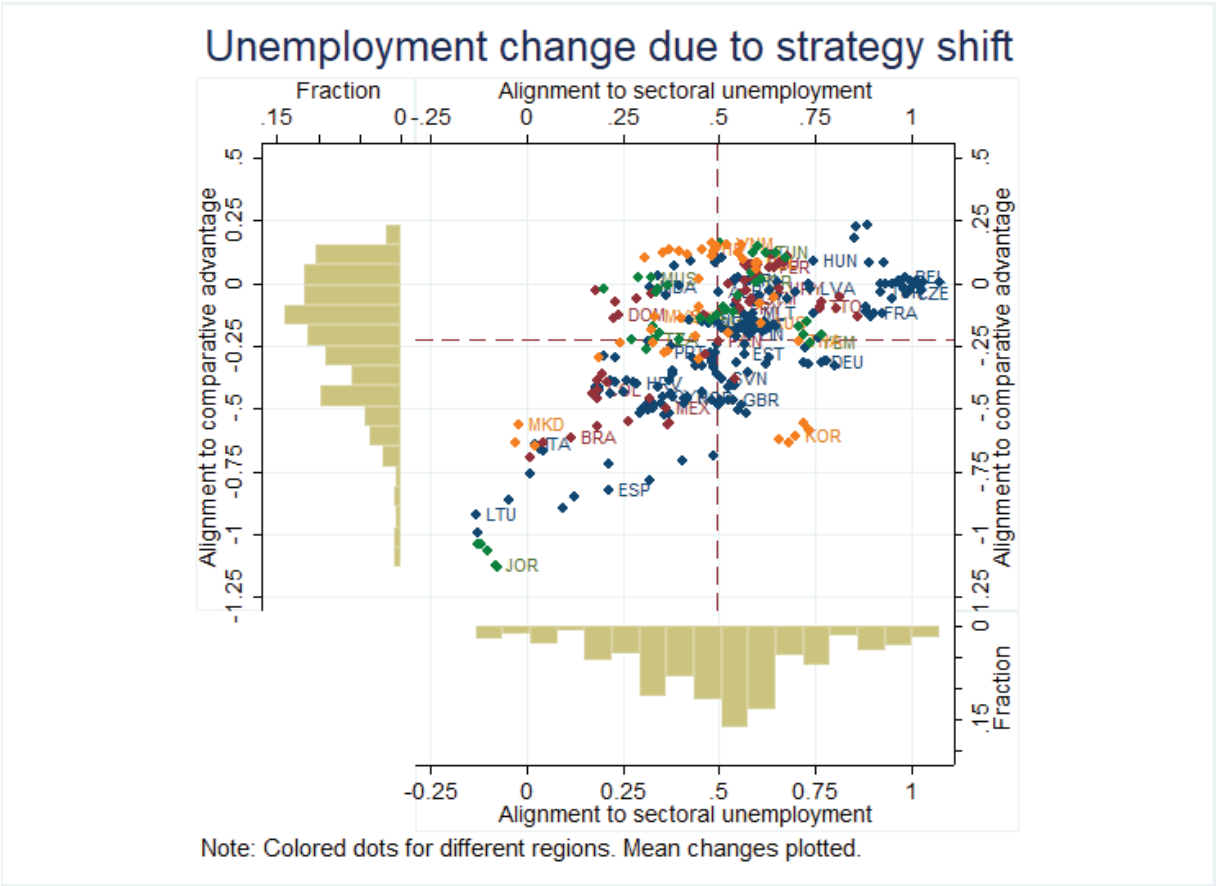
Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 1: Strategies for EPA budget allocation: comparative advantage vs unemployment



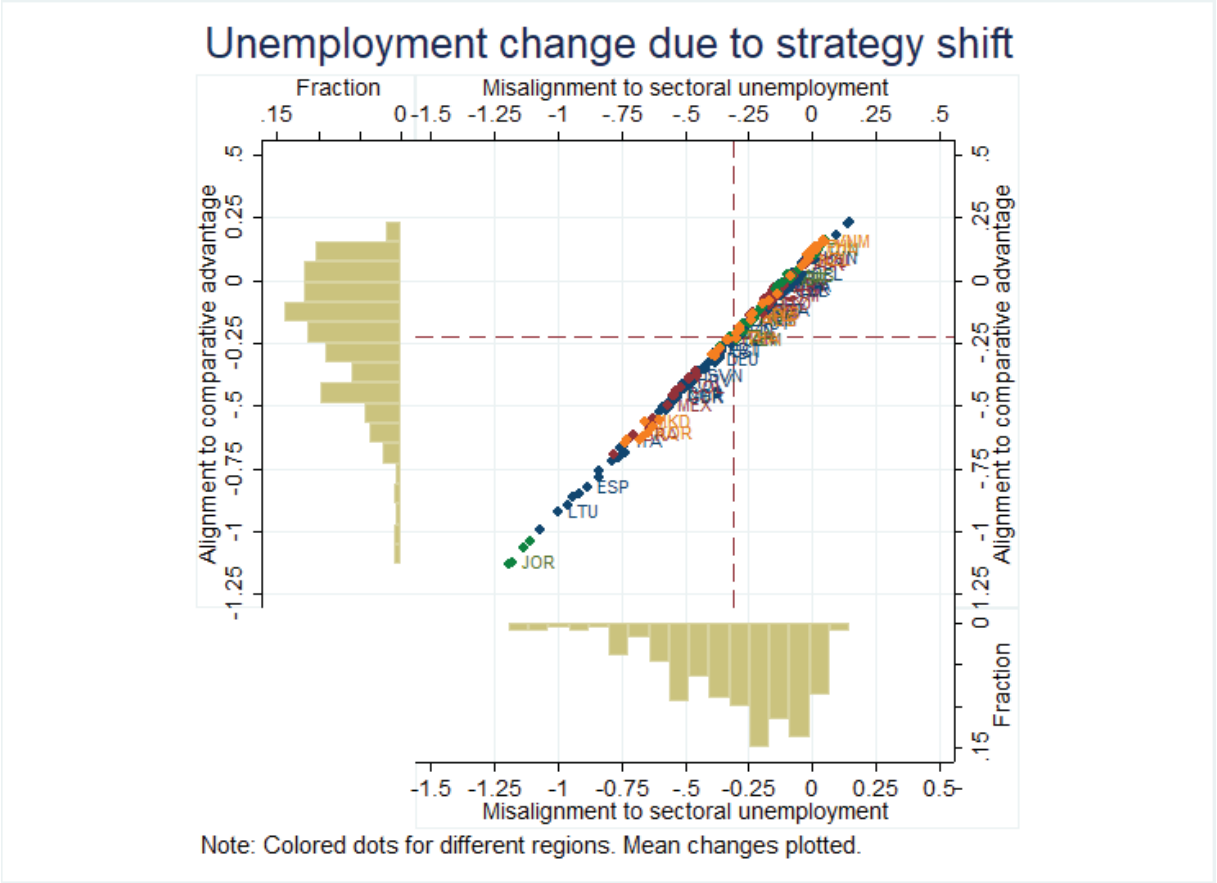
Note: $\rho(CA; \text{Budget})$ is the correlation between sectoral comparative advantage and EPA's budget shares and $\rho(u; \text{Budget})$ is the one between sectoral unemployment rates and EPA's budget shares. European and Central Asian countries are colored in blue, Latin American countries in red, Middle Eastern and African countries in green, and countries in Asia and Oceania in orange.

Figure 2: Changes in aggregate unemployment when EPAs adopt extreme strategies: High CA vs High unemployment



Note: European and Central Asian countries are colored in blue, Latin American countries in red, Middle Eastern and African countries in green, and countries in Asia and Oceania in orange.

Figure 3: Changes in unemployment when EPAs adopt extreme strategies: High CA vs Low unemployment



Note: European and Central Asian countries are colored in blue, Latin American countries in red, Middle Eastern and African countries in green, and countries in Asia and Oceania in orange.

Author contacts:

Cristian Ugarte
World Trade Organization
Rue de Lausanne 154
1211 Geneva 21
Switzerland

Email: cristian.ugarte@wto.org

Marcelo Olarreaga
University of Geneva
40 Blv du Pont d'Arve
1211 Geneva 4
Switzerland

Email: marcelo.olarreaga@unige.ch