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# Opening the Black Box of Austerity: Evidence from Fiscal Consolidation Plans

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# Opening the Black Box of Austerity: Evidence from Fiscal Consolidation Plans *

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**Abstract**

This paper explores the effects of austerity measures on labour markets and on income inequality and finds evidence of a mechanism that can mitigate the size of the economic contraction. The results indicate that: (i) Fiscal consolidation causes greater distortions for the youth, hence they deserve a special attention to avoid severe long-term economic costs. (ii) While at first glance transfers cuts seem to be ideal, a careful examination suggests that these policies can jeopardise the success of fiscal consolidation. (iii) Tax hikes, negatively affecting the productive sector, trigger frictions in the labour market that give rise to recessionary effects. (iv) Spending cuts, targeting public sector wages and employment, can endanger the capabilities of the current and future labour force. (v) Lastly, income inequality increases with tax hikes and spending cuts, whereas the muted response to transfers cuts is explained by the reaction of labour demand.

**Keywords** Fiscal policy, Austerity, Labour market, Income inequality

**JEL Codes** D3, E24, E62, H3

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# 1 Introduction

In the past four decades the steady increase in government debt as a fraction of GDP has rehabilitated the role of austerity policies as the cure for debt sustainability and excessive budget deficits. Nevertheless, the economic cost of these policies has been generally misunderstood or underestimated, especially in the course of the European sovereign debt crisis. During these years many governments have embarked on substantial fiscal adjustments through a combination of tax hikes, spending and transfer cuts, and these events have added new empirical evidence to the fiscal literature aimed at quantifying the output multiplier for fiscal adjustments (Blanchard and Leigh 2014; Guajardo et al. 2014; Yang et al. 2015; Jorda and Taylor 2016; Alesina et al. 2015a, 2015b, 2017, 2018, 2019).

This paper builds on Alesina et al. (2017), wherein the authors provide evidence that on average fiscal adjustments based upon spending or transfer cuts have very small output costs compared to tax hikes, and explores the role of these policies for labour market and income inequality conditions. While most of the empirical literature focuses on the effect of austerity on economic growth and components of the aggregate demand, this investigation sheds light on a comparatively underdeveloped area. This gap in the literature is troubling because a thorough understanding of the role that fiscal consolidation has in promoting fiscal stability is paramount for macroeconomists and policymakers.

On the one hand, the literature on the effect of austerity measures on labour markets is inexplicably scarce with the main contribution given by the International Institute for Labour Studies (World of Work Report, 2012). The Institute proved ineffective the approach that growth follows austerity and that, in turn, jobs follow growth, suggesting a different approach (job-centred). Thus, the goal of austerity should not be focused merely on quickly stabilising fiscal balances, but on finding a combination of measures that will allow for a sustainable deficit reduction without endangering economic, labour market and social conditions.

On the other hand, credits for studying the distributional effect should be given both to the OECD and the IMF (IMF 2012, 2014; Ball et al. 2013; Cournède et al. 2013; Rawdanowicz et al. 2013; OECD 2015; Furceri et al. 2016; Woo et al. 2017). While the IMF stresses that fiscal adjustments that are perceived as being fundamentally unfair will be difficult to maintain (IMF, Fiscal Monitor 2012), the OECD highlights that austerity programs, which excessively worsen income inequality conditions, can undermine long-term growth. It is therefore important for governments to adopt strategies that minimise these adverse side-effects (Cournède et al. 2013). Rawdanowicz et al. (2013) point out that fiscal consolidation might trigger higher income inequality via several channels, among which we find the labour market. Overall, the substantial consensus in the literature is that spending cuts are more damaging than tax hikes (Ball et al. 2013; Woo et al. 2017; Heimberger 2020).

Nowadays, following the extraordinary pandemic-related stimulus packages, government debt-to-GDP ratios have risen to unprecedented peacetime levels with central banks playing the crucial role of under-

taking large-scale purchases of government bonds. However, monetary institutions cannot intervene in government debt markets on such a large scale for any great length of time and eventually the natural boundaries between fiscal and monetary policy will need to be fully restored to preserve central bank independence and credibility. Inevitably, this will leave policymakers in need of fiscal interventions aimed at restoring the soundness of public finances, minimising adverse economic effects. Thus, now more than ever there is the need for better understanding the role of these policies.

The goal of this paper is to improve our understanding of austerity measures moving beyond their final effect on economic growth, hence to highlight the implications that can help for a better design. In particular, the analysis exploits the view that fiscal consolidation might have caused significant distortions in income inequality conditions and in labour markets, especially for the youth. This view is based on two observations. The first is that austerity measures aimed at deregulating labour markets in order to foster flexibility have caused long-lasting negative effects on the labour market, especially for the youth, undermining the viability of a sustained period of fiscal consolidation. In particular, periods of fiscal adjustments are associated with high and persistent youth unemployment, and this this leads to severe economic consequences, such as higher fiscal costs in terms of foregone output, lower tax revenues for the future and, sooner or later, higher public spending to support young people. Thus, with youth unemployment that has reached its record levels in many OECD countries, we are putting our societies at high risk as these dynamics bear long-term consequences for young people's future careers, such as the deterioration of human capital stock. These dynamics are detrimental also for the society as a whole because they trigger lower productivity and economic growth for years to come. Overall, the gravest threat to economic stability and political cohesion is when mass (youth) unemployment translates into permanent labour market hysteresis in rapidly ageing economies. In this context, it is reasonable to conceive fiscal adjustments as key policies for labour markets, especially for vulnerable segments of the population, such as the youth. In fact, these measures reduce social safety nets in labour market policies that, together with growing misalignment with the demand for the skills of a rapidly changing and very competitive global economy, translate into substantial difficulties for the youth. The evidence presented in this paper shows that fiscal consolidation causes great distortions in the labour market and that the youth paid a higher price for such interventions.

The second observation is that, since the 1980s, important factors behind the rise in income inequality in advanced economies might have been the reforms aimed at lessening the generosity of social benefits and the progressivity of income tax systems. Over these years, the idea that welfare states were becoming 'unaffordable' has gained ground, causing policymakers to consider social spending as expendable when designing austerity interventions. This argument has, voluntarily or not, overlooked the fact that reductions in social transfers by their very nature negatively affect households in lower parts of the income distribution. In fact, lower social spending (transfers), for which financially vulner-

able people benefit the most, should increase income inequality; however, this analysis shows that after transfer cuts the Gini coefficient of disposable income does not react. The reason for this is explained by the needs of agents that receive public subsidies. Given that these agents are more likely to be part of a liquidity-constrained household, we should expect their reaction aimed at compensating the lost transfer income. In fact, once they observe a reduction in their disposable income, due to lower public subsidies, they will try to compensate the missing transfer income with additional labour income (i.e. working more hours), offsetting the expected negative impact on the Gini coefficient for income inequality.

What makes the analysis interesting is that I exploit the labour market as the main stage where we can observe how agents, both workers and firms, react to austerity measures along with the effect on income inequality of households. The analysis of labour market variables helps us shed light on the reaction of firms, workers and the youth population, whereas the inclusion of income inequality responses additionally contributes to better outlining the role of these policies. In doing so, the paper paves the way to understanding several implications of fiscal adjustments and then promotes the necessary condition of disaggregating this set of policies among the budget's three main components (taxes, spending and transfers) when investigating the role of such interventions.

This empirical analysis paints an exhaustive picture on the role of austerity policies and the findings can be summarised as follows. In order to avoid acute long-term economic costs, vulnerable segments of the population, such as the youth, should be a priority for policymakers when they design fiscal adjustments. Austerity measures that reduce transfers should be avoided as they specifically target low-income individuals, leaving the most financially vulnerable people with lower monetary resources. By their nature, these policies trigger social turmoil and jeopardise the success of fiscal consolidation. Policies that raise taxes, negatively affecting both the productive sector and individuals, cause frictions in the labour market and produce strong recessionary effects. The recommendation for avoiding such frictions and their consequences is that tax hikes should exclude low-income individuals. Finally, spending cuts targeting public sector wages and employment can endanger the capabilities of the current and future labour force and could have positive spillovers for the productive sector.

The rest of the paper is organised in four sections. Section 2 introduces the database employed for fiscal consolidation and for income inequality. Section 3 illustrates the empirical model. Section 4 presents the results, and Section 5 concludes the paper.

# 2 Data

The empirical analysis covers 16 OECD countries between 1978 and 2014 at annual frequency.[1] The identification of exogenous fiscal consolidation plans is done employing the narrative approach proposed in Alesina et al. (2017). The peculiarity of their measure is that it allows me to take into consideration the multiyear nature of fiscal adjustments for tax, spending and transfers together, rather than isolated shocks. For the measure of income inequality, I obtained the data on the net measure of the Gini coefficient (disposable income) from Version 8.2 of the Standardized World Income Inequality Database (SWIID) of Solt (2019).

## 2.1 Fiscal Consolidation Plans

Alesina et al. (2017) first showed that the effects of fiscal consolidations depend on their design and in particular on two characteristics: their composition[2] (taxes, spending or transfers) and their consistency overtime (whether changes are permanent or transitory). In particular, this analysis studies the effect of fiscal "plans", defined as announcements and implementation of shifts in fiscal variables over a horizon of several years. In fact, real-world fiscal adjustments adopted by parliament at time $t$ consist of three components:

1. Unexpected measures (announced upon implementation at time t), $e_t^u$;
2. Measures implemented at time t, but which were announced j years before, $e_{t-j,t}^a$;
3. Measures announced at time t, and to be implemented in j future years, $e_{t,t+j}^a$.

For the sake of illustration, Table 1 summarises the fiscal adjustment measures introduced in Denmark in 1983-1985, without disaggregation among fiscal instruments.

Table 1: **Denmark - Fiscal adjustments in 1983-1985**

| Year | $e_t^u$ | $e_{t-1,t}^a$ | $e_{t,t+1}^a$ | $e_{t,t+2}^a$ | $e_{t,t+3}^a$ |
|---|---|---|---|---|---|
| 1983 | 2,90 | 0,11 | 1,20 | 0 | 0 |
| 1984 | 0,54 | 1,20 | 1,81 | 0 | 0 |
| 1985 | 0 | 1,81 | 0 | 0 | 0 |

In 1983 Denmark announced a new plan worth 4.21% of its GDP. This measure comprised an "unexpected" part ($e_t^u$) that went into effect immediately for a total of 2.90% of GDP, an "expected" part that was announced the preceding year ($e_{t-1,t}^a$) amounting to 0.11% of GDP, and measures announced in 1983 but with implementation for the following year ($e_{t,t+1}^a$), with no announcements made for measures of implementation beyond the first year - $e_{t,t+2}^a$ and $e_{t,t+3}^a$ are equal to zero. In 1984 the Danish government revised the previous fiscal adjustment plan introducing additional unexpected measures amounting to

[1] The countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Portugal, Spain, Sweden, United Kingdom, United States.

[2] See Appendix C for the classification of tax, spending and transfers defined by Alesina et al. (2017).

0.54% of GDP and announced for the next year fiscal adjustments for 1.81% of GDP. Notice that the $e^a_{t,t+1}$ component in 1983 now is labelled as an expected measure implemented in 1984. Finally, in 1985 no additional measures, both unexpected and announced, were introduced and the plan only consisted of previously approved measures.

### 2.1.1 The intra-temporal dimension

A fiscal consolidation includes an increase in taxes (T), a reduction in government consumption and investment (CI) and in transfers (TR). These measures are intra-temporally correlated and their correlation poses a challenge to the simulation of a plan's effect. To allow for a potentially heterogeneous effect of plans according to their nature, and due to limitations in sample sizes, I follow Alesina et al. (2017), reducing the dimension of the model by separating the sample into tax-based (TB), consumption-based (CB) and transfer-based (TRB) plans depending on the largest among the three components (measured as a percent of GDP) over the horizon of the plan, formally:

$$\textit{Case 1:} \quad \left(\tau^u_t + \tau^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} \tau^a_{t,t+j}\right) > \left(\mathrm{g}^u_t + g^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} g^a_{t,t+j}\right) \quad \textit{and} \quad > \left(\mathrm{tr}^u_t + tr^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} tr^a_{t,t+j}\right)$$

$$\textit{Case 2:} \quad \left(\mathrm{g}^u_t + g^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} g^a_{t,t+j}\right) > \left(\tau^u_t + \tau^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} \tau^a_{t,t+j}\right) \quad \textit{and} \quad > \left(\mathrm{tr}^u_t + tr^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} tr^a_{t,t+j}\right)$$

$$\textit{Case 3:} \quad \left(\mathrm{tr}^u_t + tr^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} tr^a_{t,t+j}\right) > \left(\mathrm{g}^u_t + g^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} g^a_{t,t+j}\right) \quad \textit{and} \quad > \left(\tau^u_t + \tau^a_{t-1,t} + \textstyle\sum_{j=1}^{horiz} \tau^a_{t,t+j}\right)$$

$$\textit{Then} \quad \begin{cases} Case1: & TB_t = 1, \ CB_t = 0, \ TRB_t = 0; \\ Case2: & CB_t = 1, \ TB_t = 0, \ TRB_t = 0; \\ Case3: & TRB_t = 1, \ CB_t = 0, \ TB_t = 0, \ \forall t. \end{cases}$$

As shown above, these plans are (by assumption) mutually exclusive, hence it is possible to simulate each of them independently. Table 2 shows the number of plans in each category.[3] There are 46 CB plans and 61 TRB plans, while TB plans are more frequent, amounting to 74 plans out of a total of 181.[4] I do not apply any further disaggregation for taxes into direct and indirect taxes as I would have only

[3] Note that if a plan is changed while being implemented, it is considered as a new plan.

[4] Following Alesina et al. (2017) definition, I count as a plan every year when a new measure is introduced. Not every year in which a fiscal shock occurs is labelled as a plan: this is the case in all years when no new measures are announced, and the government implements measures voted upon in previously years.

21 episodes for indirect tax-based consolidations. Hence the effect of tax-based plans should be largely attributed to direct taxes.

Table 2: **Plans Classifications, 1981-2014**

| Country | TB | CB | TRB | |
|---|---|---|---|---|
| AUS | 3 | 1 | 3 | |
| AUT | 2 | 0 | 6 | |
| BEL | 6 | 0 | 9 | |
| CAN | 8 | 7 | 4 | |
| DEU | 6 | 0 | 8 | |
| DNK | 3 | 1 | 4 | |
| ESP | 8 | 7 | 0 | |
| FIN | 2 | 1 | 6 | |
| FRA | 4 | 4 | 2 | |
| GBR | 5 | 2 | 4 | |
| IRL | 7 | 6 | 1 | |
| ITA | 5 | 6 | 7 | |
| JPN | 4 | 5 | 1 | |
| PRT | 6 | 5 | 0 | |
| SWE | 0 | 0 | 5 | |
| USA | 5 | 1 | 1 | |
| Tot. | 74 | 46 | 61 | **181** |

Note. *Plans are classified according to the category that is most affected. The Table reports new plans only.*

Note that the classification strategy of Alesina et al. (2017) for multiyear fiscal plans does not lead to marginal cases in which a label is attributed on the basis of a negligible difference between the largest components. It appears from the data that in most cases a political decision was made first on the nature of the fiscal consolidation. In only 30 out of 181 new plans the difference in share between the two biggest components is lower than 10 percent of the total fiscal correction. In only 16 cases the main components are less than 5 percent bigger than the second largest component.

### 2.1.2 The inter-temporal dimension

As shown in Table 1, the inter-temporal feature of fiscal policy generates "fiscal foresight", because agents learn in advance about future announced measures. and it prevents the identification of exogenous shifts in fiscal variables from VAR residuals. This is the reason for using a direct measurement of the shifts in fiscal variables, which is what the narrative approach does. The auxiliary equations in (1) describe the correlation between the immediately implemented and the announced parts of a plan:

$$e^a_{i,t,t+j} = \varphi^{TB}_j e^u_{i,t} * TB_{i,t} + \varphi^{CB}_j e^u_{i,t} * CB_{i,t} + \varphi^{TRB}_j e^u_{i,t} * TRB_{i,t} + \nu_t \qquad j = 1, 2 \tag{1}$$

Overlooking announcements would mean assuming that they are uncorrelated with unanticipated policy shifts, incurring the risk of omitted variable bias. Hence, the inter-temporal dimension of the plan should also be preserved when simulating the impulse response functions that compute fiscal multipliers.

Notice that consolidation plans based on increases in taxes feature the highest inter-temporal cor-

relation, indicating that TB plans typically take the form of sequences of tax changes distributed over time. In other words, they are not front-loaded. CB plans have the smallest (but statistically significant) inter-temporal correlation, indicating that governments tend to front-load cuts in public consumption and investments. Finally, Table 3 shows the length of the three types of plans (CB, TB and TRB). Most of the plans ($\approx 75\%$) have more than a one-year horizon, implying that the vast majority of fiscal consolidations include announcements of future measures. Overall, more than 60% of the announcements happen in the first two years, hence, in line with Alesina et al. (2017), I restrict the length of announcements for the empirical exercise to a two-year horizon.

Table 3: Time Horizon of Fiscal Plans

| | **Horizon of Plans in Years** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type of Plan** | 1 | 2 | 3 | 4 | 5 | 6 | Average |
| CB | 16 | 17 | 3 | 4 | 1 | 5 | 2.39 |
| TB | 19 | 25 | 9 | 12 | 5 | 4 | 2.61 |
| TRB | 12 | 23 | 4 | 6 | 9 | 7 | 2.97 |
| All Plans | 47 | 65 | 16 | 22 | 15 | 16 | |

## 2.2 The Standardised World Income Inequality Database (SWIID)

Solt (2019) has provided a broadly cross-national dataset on mainly disposable and market income Gini coefficients by maximising the comparability of income inequality data maintaining the widest possible coverage across countries and over time. The SWIID's income inequality estimates are based on thousands of reported Gini indices from hundreds of published sources, including the OECD Income Distribution Database, Eurostat, the World Bank and national statistical offices around the world, among many others. The database currently incorporates comparable Gini measures for disposable income inequality for 196 countries for as many years as possible from 1960 to the present.

To sum up, the advantages of using the SWIID dataset are threefold. First, the data include a large group of countries and allow me to obtain the longest series on the Gini coefficient for disposable income for all the 16 OECD advanced economies in my sample. Second, the data ensure perfect comparability across countries, given the harmonised way of calculating the coefficients. Third, comparability across countries is enhanced by a transparent procedure of how the data were collected.

The primary focus of this study is on disposable income inequality given that this is what ultimately matters for the household's actual spending, i.e. disposable income, and it has the following welfare definition: the amount of money coming into the household plus government transfer payments minus direct taxes, hence it is the 'post-tax, post-transfer' income. Note that it is important to understand that the Gini coefficient for disposable income still does not take into account indirect taxes such as sales or value-added taxes or public services, and indirect government transfers such as price subsidies. The reason being the very limited information about the distribution of such 'final income', which is

why Solt (2019) excluded indirect taxes from the SWIID source data. The Gini coefficient is bounded between 0, where each reference unit receives exactly the same share of income, and 100, which would imply that a single reference unit gets all the income. The average Gini coefficient for disposable income in my dataset is 29.1, with a minimum of 20.4 and a maximum of 38.1.

# 3 Econometric Model

I study the effect of three types of fiscal consolidation plans (CB, TB, TRB) employing a panel with country and time fixed effect for 16 OECD countries over the sample of annual data 1978-2014.

Beyond the equation in (2), the model also includes a set of auxiliary equations (1) to keep track of the correlation between the announced and the unanticipated components of plans. These equations are crucial for the simulation of plans because, as already mentioned, in the data unexpected shifts in fiscal variables do not happen in isolation but are typically accompanied by announcements of future shifts. These auxiliary regressions allow to simulate the average plan estimated in the data in the sense that when the effect of an unanticipated shift in some fiscal variable is simulated, announcements move consistently with what has been observed in the sample. I estimate the following system:[5]

$$Y_{i,t} = \alpha + \left[ \sum_{j=0}^{3} \left( \overbrace{\beta_j e^u_{i,t-j}}^{\text{Unexpected}} + \overbrace{\gamma_j \underbrace{e^a_{i,t-j-1,t-j}}_{\text{Past}} + \delta \underbrace{(e^a_{i,t,t+1} + e^a_{i,t,t+2})}_{\text{Future}}}^{\text{Announced}} \right) \right] \begin{bmatrix} TB_{i,t} \\ CB_{i,t} \\ TRB_{i,t} \end{bmatrix} + \lambda_i + \xi_t + u_{i,t} \quad (2)$$

where the index $i$ refers to the countries in the panel and the index $t$ refers to the year a plan is first introduced. $Y_{i,t}$ is the variable of interest, in turn a labour market variable or the Gini coefficient for disposable income. The narrative austerity measures, $e^u_{i,t-j}$, $e^a_{i,t-j-1,t-j}$ and $e^a_{i,t,t+k}$ (k=1,2), are the unexpected, past and future components of the total magnitude of the plan, respectively. $\beta_j = \left[\beta_j^{TB} \beta_j^{CB} \beta_j^{TRB}\right]$ is a 3-element coefficient vector corresponding to the unanticipated component of the three plans. Likewise, $\gamma_j$ corresponds to the measures implemented in period $t$ that were previously announced and $\delta$ to the announced measures $e^a_{i,t,t+j}$ for the future period $t+j$. $TB_{i,t}$, $CB_{i,t}$ and $TRB_{i,t}$ are dummies that take the value 1 depending on the component with largest size over the total plan, and $\lambda_i$ and $\xi_t$ are country and time fixed effect, respectively.

There are two things to note in (2). First, I have restricted the coefficients $\delta$ to be equal for all announced measures $e^a_{i,t,t+k}$ (k $= 1, 2$). I have done so to increase power and because the dynamic effect is already captured by the coefficients of the plan's past component. Second, (2) is a truncated moving average, hence the efficient estimation of the relevant parameters requires that the left-hand side variables are time-series with a low degree of persistence, as it is the case for all the dependent variables

[5] Using a joint generalised least squares method (SUR) to take into account the simultaneous cross-correlations of residuals.

employed. I compute impulse responses to the announcement of a fiscal plan as the difference between two model-based forecasts: those obtained conditionally upon a fiscal adjustment plan and an alternative scenario when there is no plan. More formally:

$$IR(t,s) = E(\mathbf{Z}_{i,t+s} \mid plans_t; I_t) - E(\mathbf{Z}_{i,t+s} \mid no\, plans_t; I_t) \qquad \text{with } \{\text{s} = 0,\ 1,\ 2,\ 3,\ 4\}$$

Specifically, I simulate a baseline scenario for all variables by setting to zero all the fiscal consolidation plans of the model, and an alternative model for all variables conditional on having the plans. Then, I compute impulse responses as the difference between the simulated baseline and the alternative model. Confidence intervals are calculated by block bootstrapping to take into account the possibility of autocorrelation in the residuals of the estimated system.

# 4 Results

From the estimated coefficients of the model and the auxiliary regressions I simulate the effect of fiscal consolidation plans with different composition (CB, TB, TRB) on labour market variables and on the Gini coefficient of disposable income. Notice that the heterogeneity in the $\varphi$'s implies that an initial unanticipated correction of 1% of GDP will generate plans of different size depending on the intertemporal structure of the plan. Hence, to make the results comparable across them I normalise multiyear plans by computing the impulse responses to a plan, rather than to $e_t^u$, of the size of 1% of GDP. Transfer-based plans are marked in green (triangle), plans based on reductions in current and investment spending in blue (square) and plans based on tax hikes in red (circle). Responses are cumulated over time so that the points along the impulse responses measure the deviation of the outcome from its level absent the change in fiscal policy.

## 4.1 The Effect on Labour Markets

The results for the labour market are presented in Figures 1 and 2 and are divided among the employment- and the unemployment-related variables, respectively. The first are the employment rate, the log of hours worked per employee [6] and the log of total real wages. The second are the unemployment rate and, to keep track of its denominator, the labour force participation rate. In addition, following the intuition that the youth population[7] is more vulnerable to fiscal adjustments, the second group of variables includes the unemployment rate and the labour force participation rate for this segment of the population.

Figure 1 reports the impulse responses for the employment rate (1a), the log of hours worked per

[6] Appendix D shows a robustness check with an alternative data-set for average hours worked per person employed.
[7] Aged 15-24 years.

employee (1b) and the log of real wages (1c).[8]

The responses of the employment rate (Figure 1a) show different degrees of intensity across the types of interventions with cuts in spending being the costliest. This is in line with the composition of spending cuts, mainly focused on reduction in public wages and employment. By contrast, after cuts in transfers we observe a negligible decline in the employment rate, with the cumulative multiplier reaching -0.72 in the fourth year. The rationale is straightforward. A reduction in transfers impacts primarily the most financially vulnerable part of the population, leaving the productive sector mostly unaffected. Hence, there are no particular incentives in the labour markets, both for supply and demand forces, to generate a higher reduction in the employment rate. Conversely, after tax hikes, which impact both firms (net profits) and individuals (disposable incomes), we observe a larger decrease in the employment rate. This is potentially driven by a declining labour demand: firms will try to compensate for lower net profits by lowering labour costs or investments. Nevertheless, reducing labour costs takes time and it implies a cost for the firm, hence the modest magnitude in the multiplier, reaching -1.47 in the fourth year. For this reason, firms might be induced to reduce investments, as they don't include apparent costs. In line with that, the literature has found TB plans to be more recessionary, with private investments and consumption explaining most of the drop in GDP.

Figure 1b shows that tax hikes and spending cuts lower hours worked whereas cuts in transfers boost hours worked. The interpretation of this result comes without ambiguity. By their nature, fiscal interventions aimed at reducing transfers unequivocally target households that are financially vulnerable, hence we can presume that agents reacting to cuts in transfers are, or are close to being, liquidity-constrained. A reduction in transfers translates for these agents (currently employed) into a reduction of their disposable income, forcing them to compensate for the missing transfer income with additional labour income. By doing so, they are able to maintain their consumption expenditure and then to contribute to supporting aggregate private spending at the cost of reducing their leisure.[9] A different scenario is outlined by TB and CB plans. Tax hikes, unlike transfer cuts, do not have as their main target individuals that are financially vulnerable, but rather all taxpayers. Nonetheless, in this scenario the reaction of low-income households might be comparable to the one following the transfer cuts, as an increase in taxes translates into a reduction of their disposable income. Yet, after TB plans we do not observe an increase in hours worked but rather the opposite, albeit with a small magnitude. This can be explained by the reaction of the productive sector. Differently from cuts in transfers, where the productive sector is not particularly affected, in this scenario firms observe a reduction in their net profits. As highlighted for the employment rate, the new context suggests that firms want to compensate for lower

[8] Impulse responses for total employment are available upon request.

[9] The potential implications of lower leisure on the quality of life of workers is beyond the scope of this paper given the difficulties in quantifying such a measure, but some thoughts are available in Appendix B.

net profits by reducing their expenses (mainly investments), consequently refusing any increase in hours worked. At the same time, liquidity-constrained households, in need of compensating for the reduction in their disposable income, will want to work more hours; however, given the reaction of the productive sector, most of them will not succeed. As a result, individuals that are left with lower disposable incomes contribute to a contraction in private aggregate spending, in accordance with previous findings in the literature. Finally, the negative reaction to CB plans is the result of the direct reduction in public sector wages, eventually followed by the private sector, in a simple cost-cutting strategy that ultimately drives down hours worked.

Overall, we observe that all the variables analysed in this paper show moderate responses after cuts in transfers. The motivation is twofold. First, the productive sector is essentially unaffected by this type of fiscal intervention and, accordingly, the results show that firms tolerate an increase in hours worked. Second, liquidity-constrained agents compensate for the lost subsidy, grant or other social benefit with additional labour income, and firms accommodate the higher labour supply. Given that the supplementary earning operates as a replacement for the transfer income, i.e. the extra money allows households to cover their monthly expenses, we should assume that the entire additional labour income, or at least a large share of it, will certainly be spent. As a result, this supports aggregate private spending and, in general, economic activity.

As shown in Figure 1c, the impulse responses of real wages take longer to manifest their statistically significant reaction after the introduction of a plan, with CB plans being the most harmful, confirming that labour markets are most affected by this type of plan. To this extent, the slow adjustments of wages is in line with the real rigidities of the New Keynesian models. The big drop after the third year cannot be entirely attributed to a reduction of the public sector wages alone, hence this impulse response might provide additional evidence of the positive spillover effect on private sector wages. Workers that lose their public employment increase the labour supply for the private sector driving down real wages over time.

The evidence supporting the more harmful role of CB plans on labour market conditions might be connected with fiscal interventions that cut public sector pay and employment. The motivation for these cuts is twofold. First, reduction in public spending is considered the most effective and rapid way to achieve short-run improvements in the fiscal position.[10] Second, they aim at driving down overall wages and prices to improve competitiveness, ultimately supporting private investments. Nevertheless, this strategy overlooks the fact that public sector workers are rather concentrated in the middle part of the income distribution, wherein people are expected to have a relatively high propensity to consume, hence a reduction in either public sector wages or the workforce bears some inevitable negative effects on

[10] See, for instance, European Commission: Public finances in EMU 2010, European Economy 4, 2010, p. 171.

private consumption, which in turn would undermine fiscal consolidation efforts.[11] The latter argument supports the findings in the fiscal consolidation plans literature (AFG), where the negative impact of CB plans on private consumption increases after the second year.

To sum up, these impulse responses suggest that hours worked is a crucial indicator to understand the effect of fiscal consolidation on the economy. The rationale behind the importance of hours worked is quite straightforward: households and firms determine their consumption and investment decisions looking at their disposable incomes and net profits, respectively, and fiscal interventions constitute a shock to their resources, forcing some of them to adjust. Furthermore, from the responses of hours worked we can uncover the mechanisms underlying the response of GDP, consumption, investment and of confidence indicators of firms and consumers found in Alesina et al. 2017 (AFG henceforth). In the TRB plans scenario, the new preferences, higher labour supply to offset lower disposable incomes (inevitable for liquidity-constrained households) and a virtually accommodating labour demand, operate in attenuating the drop in private consumption, hence in economic growth. This result can also explain the negative reaction of consumer confidence found in AFG for the TRB plans scenario: consumers are the ones that pay the price of fiscal adjustments. This is a crucial takeaway given that a consolidation that is perceived as being fundamentally unfair is difficult to maintain. Conversely, the neutral reaction of investment confidence is motivated by the fact that firms are not particularly affected by a reduction in transfers, but rather that they might perceive the non-negative reaction of GDP to TRB as a positive signal, suggesting that the implemented austerity measures are somehow successful.[12] Thus, reducing excessive uncertainty for the productive sector will avoid negative consequences for the level of investments. The opposite is true for the TB plans scenario. On the one hand, households face a reduction in their disposable income, and employed individuals that are liquidity-constrained might want to work additional hours. On the other hand, firms are likely to compensate for lower net profits by reducing their costs (mainly investments and employment), hence they do not allow an increase in hours worked. This creates frictions in the labour market, with negative repercussions for private consumption, investments and, more generally, for economic growth (coherently with AFG).

[11] A simple solution for avoiding the negative repercussions on aggregate private consumption can be to concentrate public cuts among the highly paid employees and exempting the low-paid employees.

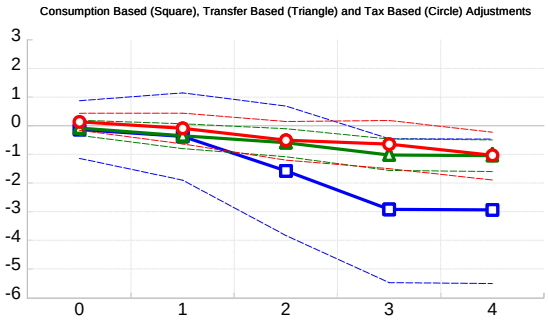
[12] With this term I mean that this kind of fiscal intervention is able to serve its purpose (reducing spending, hence the budget deficit-to-GDP ratio) without excessively damaging the economic activity, as in the case of TB plans.

Figure 1: Impulse Response Functions

(a) Employment Rate


(b) Hours Worked per Employee


(c) Real Wage




*Note.* Cumulative multipliers from the introduction of multi-year plans whose total size is normalised to be one percent of GDP. The identification of fiscal austerity measures is done by using the narrative measure on fiscal consolidation plans. The dashed lines represent two standard errors bands.

Figure 2 reports the impulse responses for the unemployment rate (2a) and, to keep track of its denominator, the labour force participation rate (2c). Moreover, to shed light on the impact of austerity measures on young people, I include the youth unemployment rate (2b) and the youth labour force participation rate (2d). The importance of vulnerabilities in the labour market for the youth population is a major issue in the most advanced economies under analysis. In general, the postponement of financial and social independence by young people indicates a delayed transition to adulthood, with all the consequences for the economy, such as lost tax revenues, higher cost of social safety nets as well as more unemployment benefits and lost productivity.

Figure 2a shows similar responses across the various types of plans, albeit with different magnitude. The response to cuts in transfers has a milder effect with respect to cuts in spending and tax hikes, confirming the peculiar role of TRB plans. The productive sector is mostly untouched by this type of fiscal instrument; hence companies are not likely to lay off many workers as in the case of CB and TB plans. Spending cuts continue to be the costliest throughout the horizon of the simulation, again signalling

that there might be spillovers from the public to the private labour market sector. Figure 2b indicates that the impact of all types of plans on the youth unemployment rate is considerably more adverse, with the highest multiplier of the unemployment rate being roughly the lower bound for multipliers of the youth unemployment rate. Overall, part of the difference between the unemployment rate and the youth unemployment rate can be explained by the dynamics of the denominator.

From Figures 2c and 2d we immediately notice that the responses of the labour participation rate involve less severe multipliers with respect to the youth counterpart. Starting from Figure 2c, the reaction to CB plans shows that the multiplier for the participation rate is higher, in absolute value, than in the case of TB plans, and this is probably due to the large drop in real wages for these plans. The rationale for TB and TRB plans is closely related to the reaction of hours worked: a cut in social benefits, in addition to causing individuals in low-income households to work additional hours, can eventually force a small part of the inactive population that saw a cut in their transfer income to actively start seeking employment. After tax hikes we observe a temporary positive and statistically significant reaction of the participation rate; however, these people realise that firms face lower net profits and are not prone to creating new vacancies, hence the participation rate gradually goes into negative territory.

Figure 2d illustrates that the youth labour force participation rate negatively reacts from cuts in transfers, with the reason being that these social benefits do not have as their main target the youth. As a matter of fact, young and middle age individuals typically transfer more than they receive in the form of care-giving to the elderly, while in old age, especially advanced old age, the flow of transfers generally reverses. Taking into consideration the documented drop in consumer confidence following TRB plans (See AFG), it might be that some young workers, facing increasing uncertainty about their future, might decide, subject to their financial possibility, to drop out of the labour force, returning to school, investing in new skills and hoping for better labour conditions in the future.

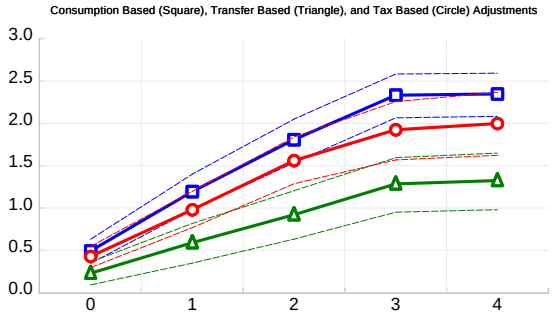
The main message delivered by the last impulse responses is that the youth part of the population is more exposed to fiscal consolidation measures. These results show a critical scenario in which policy-makers are called into action. The gravity of conditions for the youth part of the population is not only linked to the level and the duration of unemployment, but also increasingly to the declining quality of jobs available to them. The youth that do not acquire significant skills are left with a lower quantity and quality of jobs, which thus reduce their prospects for the future. If no significant policy shifts are put in place, the damage developed during the fiscal consolidation period will not take the form of transitory developments but rather they will become a structural trend. As a consequence, besides the well-known social costs,[13] there are acute economic consequences associated with high and persistent youth unem-

[13]For instance, higher incidence of unhappiness, higher crime rates, higher inequality and higher political and social tensions.

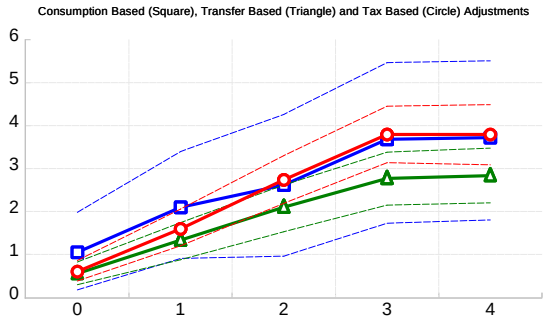
ployment: higher fiscal costs in terms of foregone output, lower tax revenues for the future and, sooner or later, higher public spending to support them. On those grounds, the issue acquires a critical new dimension.

Figure 2: Impulse Response Functions

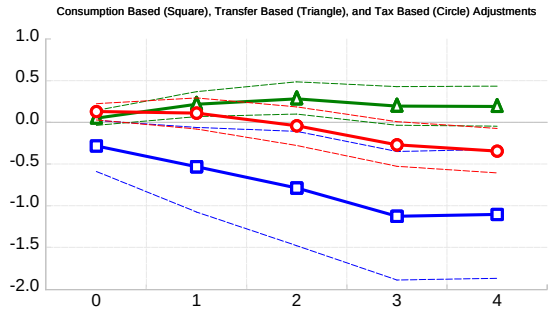
(a) Unemployment Rate



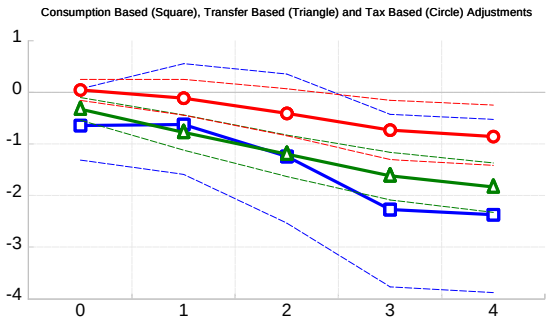

(b) Youth Unemployment Rate




(c) Labour Force Participation Rate




(d) Youth Labour Force Participation Rate




*Note.* Cumulative multipliers from the introduction of multi-year plans whose total size is normalised to be one percent of GDP. The identification of austerity measures is done by using the narrative measure on fiscal consolidation plans. The dashed lines represent two standard errors bands.

## 4.2 The Effect on Income Inequality

The assessment of austerity measures on income inequality builds on a the empirical literature on the determinants of income inequality, which finds that GDP per capita, trade-openness, and technological change are the main determinants of cross-country variations in income inequality.[14]

Figure 3 shows that CB and TB plans follow similar dynamics, raising income inequality, with a peak for the former in the first year after a plan is introduced, whereas the latter, continuing with an upward trajectory, peaks in the third year. Fiscal interventions that reduce spending have a stronger short-run impact, whereas increases in taxes raise income inequality more gradually, but persistently, peaking in

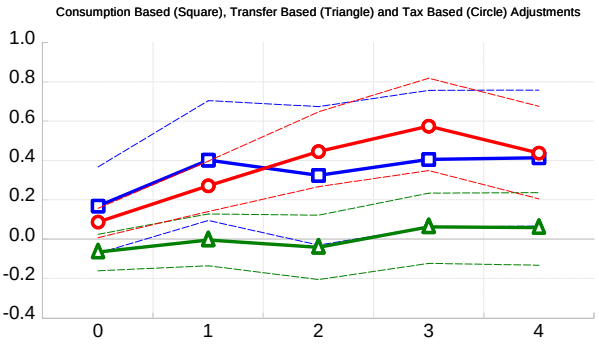
[14] I include these controls in the econometric model. Notice that I had to exclude the variable "change in the average years of schooling" due to too many missing values, making the series unsuitable for the simulation exercise employed.

the third year when it starts to decline, matching the CB multiplier in the fourth year. This result, together with the evidence provided by the literature[15] are easily interpreted by examining the response of hours worked. In the case of tax hikes, we observe a reduction in hours worked, albeit small, eventually due to a contracting labour demand, regardless of the reaction of labour supply (expected to rise), suggesting a worsening in income distribution. As a result, consistently with a drop in private consumption and a gradual reduction of consumer confidence (see AFG), income inequality goes up and strengthens over time, peaking in the third year after the plan is introduced. On the other hand, given the drastic drop in the employment rate caused by a cut in public employment, influencing the private sector as well, there is an inevitable immediate increase in income inequality, with an effect that reaches its peak in the first year after the plan is introduced, and that strengthens over the horizon of the impulse response.

When fiscal adjustments are based on transfer cuts, the result shows that the impact on the coefficient for disposable income is not statistically different from zero throughout the horizon of the impulse response, alluding to the fact that this policy intervention does not worsen the Gini index. In interpreting this response, together with labour market conditions but also with the macroeconomic effects found in the literature, we might be tempted to suggest that cuts in transfers are the best strategy for the implementation of austerity measures. However, given that transfers target the most financially vulnerable parts of the population, cuts in transfers would mean to let the poorest pay the cost of restoring fiscal sustainability. Although, as highlighted by the IMF (Fiscal Monitor, 2012), given that a consolidation that is perceived as being fundamentally unfair will be difficult to maintain, reducing social benefits should not be considered a sustainable fiscal adjustment measure. In addition, these kinds of fiscal interventions imply that individuals, who are part of a liquidity-constrained household, would need to make an additional effort in the labour market, working more hours (if possible) to compensate for the lost benefits. This, in turn, does not imply a worsening in the income inequality index, but the lower leisure of these workers could have long-term implications on their well-being, eventually damaging other dimensions of inequality that are more difficult to quantify (see Appendix B for additional considerations). In sum, we should recognise the influence of social conditions on economic and political stability. Therefore, when designing austerity interventions, policymakers should include socioeconomic conditions in an implicit government loss function.

[15] AFG state that TB plans are more recessionary than CB and TRB plans.

Figure 3: Impulse Response Functions - Gini index




*Note.* Cumulative multipliers for the percentage change in the Gini index of disposable income from the introduction of multi-year plans whose total size is normalised to be one percent of GDP. The identification of austerity measures is done by using the narrative measure on fiscal consolidation plans. The dashed lines represent two standard errors bands.

# 5 Concluding Remarks

This paper explores the impact of fiscal consolidation plans on labour market dynamics and income conditions of households. In doing so, the investigation sheds light on the reaction of two economic agents, firms and individuals, and finds evidence of a mechanism that can mitigate the dimension of the economic contraction following fiscal adjustments, i.e. a larger labour supply with an accommodating labour demand, as in the case of cuts in transfers.

Previous findings show that government spending cuts and cuts in transfers are much less recessionary than tax hikes; however, not much can be said about the forces behind macroeconomic fluctuations. This study contributes to the existing literature by filling this gap to the extent that I can assess the economic implications of austerity measures, providing crucial implications for the way we think about such policies. In doing so, this paper offers the necessary knowledge for evaluating these policies but also for designing sustainable, hence successful, fiscal interventions.

The main findings can be summarised as follows. First, given that the youth are more vulnerable to austerity measures, when designing these interventions it is crucial to pay special attention to the young population in order to avoid severe long-term social and economic consequences. Second, while at first glance cuts in transfers seem to be the best way to deal with fiscal adjustments, the new evidence of this paper suggests that these policies can have serious economic and social repercussions, jeopardising the success of fiscal consolidation and undermining long-term growth. Third, cuts in spending, with their negative consequences for workers and positive spillovers for private firms, can endanger the capabilities of the current and future labour forces. Finally, tax hikes, which negatively impact both households and firms, trigger frictions in labour markets that generate more recessionary effects and, as well as for spending cuts, worsen the income conditions of households.

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# Appendices

## Appendix A - Data Sources and Information

**Unemployment rate**: OECD Economic Outlook No 106 - November 2019;

**Youth Unemployment rate**: World Development Indicators - (% of total labour force ages 15-24);

**Employment rate**: OECD Economic Outlook No 106 - November 2019;

**Nominal total wages:** OECD Economic Outlook No 106 - November 2019;

**Real total wages:** Own calculation (Nominal total wages divided by the GDP deflator).

**Hours worked per employee**: OECD Economic Outlook No 106 - November 2019;

**Average hours worked per person employed**: Our World in Data - The OECD Productivity Database (the OECD Annual National Accounts, the OECD Employment Outlook and national sources);

**Labour Force Participation Rate:** OECD Economic Outlook No 106 - November 2019;

**Youth Labour Force Participation Rate:** World Development Indicators;

**Total Factor Productivity**: AMECO - total economy (ZVGDF) (Index);

**Real GDP** (gdpv): Gross Domestic Product, volume, market prices. OECD Economic Outlook n. 97 for all countries except Ireland (IMF WEO April 2015);

**Nominal GDP** (gdp): Gross Domestic Product, value, market prices. OECD Economic Outlook n. 97 for all countries except Ireland (IMF WEO April 2015);

**Final Domestic Expenditures**, volume (fddv): OECD Economic Outlook n.97;

**Net Exports**: Own calculation (gdpv - fddv);

**Population**, thousands persons (pop): OECD Historical population data and projections (1950-2050);

**Real per capita GDP growth and Real total wages**: own calculation, constructed as follows:

- **GDP deflator**

$$pgdp_{i,t} = \frac{gdp_{i,t}}{gdpv_{i,t}}$$

- **Real per capita GDP growth**

$$\Delta y_{i,t} = 100 * \left[ log\left(\frac{gdpv_{i,t}}{gdpv_{i,t-1}}\right) - log\left(\frac{pop_{i,t}}{pop_{i,t-1}}\right)\right]$$

# Appendix B - The leisure-quality of life relation

To recognise the relevance of leisure it is worthwhile to compare societies such as those in the U.S. and in the European countries, especially the Scandinavian countries. In this respect, Alesina et al. (2006) try to identify the justification for a higher return to leisure for Europeans than Americans. Despite the difficulty in answering this question, the message that we should understand is that societies such as those in the Scandinavian countries, which have a higher return to leisure, turn out to be at the top rankings for the happiest countries in the world, whereas the U.S., the world's largest economy since 1871 (in terms of GDP), with a much smaller return to leisure, appears to rank far from the top.[16] It is unquestionable that there are many dynamics underneath this association; however, the establishment of a link (between-country comparison) between lower working hours and societies with a higher level of happiness, or with social cohesion,[17] should not come as a surprise. At a country level (within-country comparison) the leisure-happiness association is intuitively stronger in the most financially vulnerable part of the population for the following obvious reason. Most of these people are liquidity-constrained agents, therefore, with a reduction in their disposable income (e.g. due to the reduction in social benefits or higher taxes) they will be forced to work more and, given that it is more likely that they perform low-skilled jobs, working more hours does not provide them with higher job satisfaction, but rather the opposite. In this respect, the OECD highlights that a more effective skill use is connected with higher job satisfaction and employee well-being. For this reason, the concept of skills use has sometimes been closely associated with that of job quality, with the spillover effect on life satisfaction, more generally, and with better health (OECD, 2016). In sum, an increase in working hours for the most financially vulnerable part of the population could be associated with a lower life satisfaction.

[16] See the World Happiness Report.

[17] Social cohesion is generally viewed as a positive concept. The OECD describes a cohesive society as one that "works towards the well-being of all its members."

# Appendix C - The classification of tax, spending and transfers

The final version of the fiscal consolidation plans dataset includes the following aggregation: government spending and investments, transfers and taxes.

**Government Spending and Investments** Government consumption includes current expenditures for goods and services, public sector salaries and other employee compensation, the corresponding social insurance contributions, the managing cost of State-provided services such as education (public schools and universities, but also training for unemployed workers) and healthcare. Public investment includes all expenditures made by the government with the expectation of a positive return. The category includes government gross fixed capital formation expenditures (e.g. land improvement, plants, purchases of machinery and equipment, construction of roads and railways.) In other words, we classify as government consumption and investment everything that is not a direct resource transfer to citizens or corporations. Ideally, one would want to separate government consumption from government investment and check if the two multipliers differ. Their organisation into plans prevents this since there are very few plans that consist mostly of shifts in government investment.

**Transfers** Transfers are every payment made by the government to private entities. The main economic feature of a transfers is that it does not affect the marginal rate of substitution between consumption and leisure. We include among transfers subsidies, grants, and other social benefits. For instance, transfers include all non-repayable payments on current accounts to private and public enterprises, social security, social assistance benefits, and social benefits distributed in cash and in kind.

**Direct and Indirect Taxes** We define direct every tax imposed on a person or a property that does not involve a transaction. We include in this component income, profits, capital gains and property taxes. We classify as direct all taxes levied on the actual or presumptive net income of individuals, on the profits of corporations and enterprises, on capital gains, whether realised or not, on land, securities, and other assets plus all taxes on individual and corporate properties. We also include in the category income tax credits and tax deductions. Indirect taxes are those imposed on certain transactions involving the purchase of goods or services. Examples include VAT, sales tax, selective excise duties on goods, stamp duty, service tax, registration duty, transaction tax, turnover selective taxes on services, taxes on the use of goods or property, taxes on the extraction and production of minerals and profits of fiscal monopolies. This category also accounts for VAT exemptions.

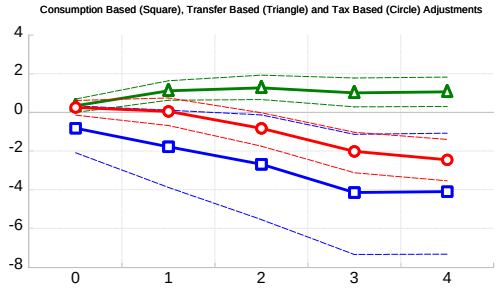
# Appendix D - Hours Worked, Additional Control

Figure 4a and 4b show the impulse responses for total hours worked and hours worked per employee, respectively. We observe similar dynamics for TRB plans but different responses, in terms of magnitude, for CB and TB plans. Note that the response of total hours worked after the introduction of CB and TB plans is due to the role of total employment. In fact, I obtain total hours worked by multiplying hours worked per employee by total employment. Consequently, I end up with total hours that has a strong correlation (0.9974) with total employment, while hours worked per employee with only a mild correlation (0.2783). In addition, given the impulse responses of the employment rate (Figure 1a), we immediately notice that the response of total hours worked is influenced by this component. Hence, the reason why I decided to exclude the response of total hours worked is that the different response is explained by the reaction of employment, whereas hours worked per employee can provide additional information, hence the decision to include that specific variable in the baseline analysis.

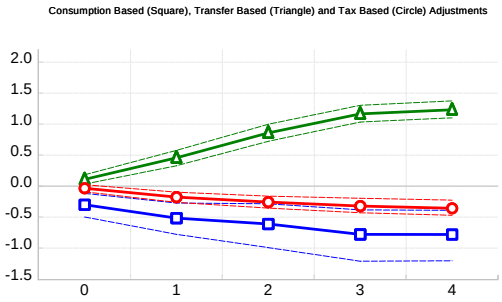
Given the crucial role played by hours worked per employee in explaining labour market responses to fiscal consolidation plans, I included an additional robustness check. This has been done by using a different dataset for hours worked per employee. The alternative source (https://ourworldindata.org) filled the missing data for Germany and Portugal, but not for Austria. Figure 4c shows that this additional evidence confirms the same dynamics for all the types of plans analysed, emphasising the role that TRB plans have in raising hours worked per employee after a plan is introduced, suggesting that the multiplier might be higher. However, the choice for using the OECD Economic Outlook dataset was made to maintain a certain consistency over all the variables employed. In this way, by using Figure 4b, I adopt a more prudent approach, given that it offers the same interpretation of Figure 4c but with smaller multipliers.

Figure 4: Impulse Response Functions

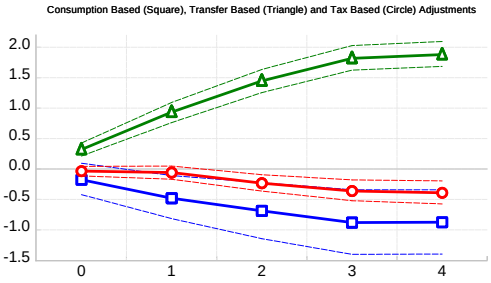
(a) Total Hours Worked




(b) Hours Worked per Employee




(c) Average Hours Worked per Person Employed




*Note.* Cumulative multipliers from the introduction of multi-year plans whose total size is normalised to be one percent of GDP. The identification of austerity measures is done by using the narrative measure on fiscal consolidation plans. The dashed lines represent two standard errors bands.