# How does Fiscal Consolidation Impact on Income Inequality?

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**Abstract**

In this paper, we assess the impact of fiscal consolidation on income inequality. Using a panel of 18 industrialized countries from 1970 to 2010, we find that income inequality significantly rises both during periods of fiscal consolidation and in the aftermath of such adjustments. In addition, fiscal authority that is driven by spending cuts seems to be more detrimental for income distribution than in the case of tax hikes. We also show that the size of the fiscal consolidation program (in percentage of GDP) has an impact on income inequality. Moreover, when consolidation plans represent a small share of GDP, the income gap widens, suggesting that the burden associated with the effort affects disproportionately households at the bottom of the income distribution. Considering the linkages between banking crises and fiscal consolidation, we show that the impact on the income gap is amplified when fiscal adjustments take place after the resolution of such financial turmoils. Our results also provide support for the Kuznets relationship and corroborate the idea that trade can lead to a more unequal distribution of income.

Keywords: Fiscal consolidation, income inequality, Kuznets curve.
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*"Growing inequality is a "key test" for market economy."*

Mario Monti, 17 May 2009

## 1. Introduction

The most recent financial turmoil that emerged in 2008 led to a quick and aggressive response by monetary authorities with the aim of boosting the economy. However, its deepening and severity associated with the collapse and massive destruction of asset wealth made visible that large fiscal stimulus programs should be a key additional ingredient of the policy mix. As a result, fiscal authorities in many G20 countries implemented comprehensive support packages based on expenditure hikes which, combined with cyclical revenue losses, resulted in sharp increases in budget deficits.

More recently, the uncertainty regarding the economic path and the concerns about long-term (un)sustainability of public finances has supported in a relatively consensual way the view about the need to withdraw such stimulus and the emergence of the implementation of budgetary consolidation measures. This should, in turn, deliver a return to more "normal" fiscal stances and sustain the path of debt growth.

In this context, it is interesting to investigate the impact of fiscal consolidations on income inequality. In fact, while some literature has been devoted towards addressing the linkages between fiscal consolidation and economic growth, there is an important gap regarding our understanding of the effects of such fiscal programs on the distribution of income.

Will fiscal austerity measures increase inequality or contribute to a more even distribution of income? To which extent does such relationship depend on whether fiscal consolidation is led by spending cuts or tax hikes? Is it more likely to affect income inequality when undertaken during a severe financial crisis or afterwards?

These questions have gained a renewed momentum in recent times, especially, if one takes into account that, in order to deal with financial crises, governments have employed a broad range of policies, which reallocated wealth toward banks and debtors and away from taxpayers. We aim at providing the answers to the abovementioned questions in this work.

We find that during periods of fiscal consolidation, income inequality significantly rises. Moreover, fiscal adjustments that are led by spending cuts tend to have a more detrimental impact on income distribution than those driven by tax hikes.

Similarly, we show that the top 1% income share in total income increases after consolidation. As a result, post-consolidation periods are also associated with more inequality.

The empirical evidence also suggests that size of the fiscal consolidation program (in percentage of GDP) impinges negatively on the income distribution. The income gap also widens when consolidation plans represent a small share of GDP, which highlights that the burden associated with the effort affects disproportionately households at the bottom of the income distribution.

When we condition the effects of fiscal consolidation on the role played by banking crises, the empirical findings suggest that: (i) in the *absence* of crises episodes, fiscal austerity leads to a more unequal distribution of income; (ii) if fiscal consolidation is implemented *during* banking crises, the impact on inequality is negligible; and (iii) in the aftermath of a banking crisis, fiscal consolidation substantially rises income inequality. Therefore, the impact on the income gap is amplified when fiscal austerity takes place after the resolution of banking crises.

In addition, the evidence supports the Kuznets relationship, that is, while per capita GDP has a significantly positive effect on inequality, the square of per capita GDP has a negative impact. This gives support to the idea that the benefits of the early stages of economic development accrue only to a small share of the population, while further increases in per capita GDP eventually reduce inequality.

Finally, we show that the degree of openness of a country is positively related with income inequality. That is, despite the *indirect* negative effect of trade on income inequality (via boosting economic growth), its *direct* impact is positive. Therefore, although trade may be determinant in lowering poverty, it also leads to more disparity in the income distribution.

The rest of the paper is organized as following. Section 2 reviews the literature on fiscal consolidation. Section 3 presents the data and describes the methodological approach. Section 4 discusses the empirical results. Section 5 considers the size of the consolidation plan and the existence of threshold effects. Section 6 looks at the relationship between fiscal consolidation, banking crises and income inequality. Section 7 concludes.

## 2. Review of Literature

There is a relatively large number of works looking at the potential impact of fiscal consolidation on economic growth. Giavazzi and Pagano (1990) challenge the common wisdom about the existence of a positive fiscal multiplier. The authors argue that fiscal consolidation adjustments can have an expansionary impact on the economy via the so-called non-Keynesian effects (Feldstein, 1982). In the same line, Cour et al. (1996), Alesina and Ardagna (1998, 2010), Miller and Russek (2003) show that growth performance is improved after periods of drastic and decisive spending cuts. Interestingly, Heim (2010a, 2010b) shows that government deficits crowd out both private consumption and investment. However, while government spending deficits are associated with a complete crowding-out effect (i.e. no net stimulus impact), tax cut deficits result in net negative economic effects.

From a theoretical point of view, expansionary effects of fiscal adjustments can work via both the demand and the supply side. On the demand side, a fiscal adjustment may be expansionary if agents believe that the fiscal tightening eliminates the expectations about the need of further adjustments in the future (Blanchard, 1990). Similarly, increases in taxes and/or spending cuts that are perceived as permanent help supporting the belief that the stabilization is credible and avoids a default on government debt. As a result, a lower premium on government bonds may be requested and the associated (positive) wealth effect can boost private spending (Alesina and Ardagna, 2010). In addition, the strong negative relationship between government deficits and private spending can operate via credit shortages that are induced by public sector borrowing (Heim, 2010c). On the supply side, expansionary effects of fiscal adjustments work via the labor market and via the effect that tax increases and/or spending cuts have on the individual labor supply in a neoclassical model, and on the unions' fall-back position in imperfectly competitive labor markets (Alesina and Ardagna, 1998; Alesina et al., 2002).[1]

Regardless of their impact on GDP, another crucial issue from a policy perspective is whether cutting spending or raising taxes is more likely to result in a stable fiscal stance and subsequent economic growth when a fiscal consolidation is

[1] Interestingly, Hernandez de Cos and Moral-Benito (2011) suggest that this positive link may simply reflect that consolidation episodes are endongenous to GDP. Putting it differently, the likelihood of public finance consolidation can rise as the result of the expectation of an economic recovery, which is stronger during the trough of the cycle. When these biases are taken into account, the authors find that adjustments in the fiscal stance have a negative effect on GDP growth.

carried out. According to Alesina and Perotti (1995) and Alesina and Ardagna (2010), a fiscal consolidation is successful if the reduction in the debt-to-GDP ratio is sufficiently large and persistent. Alesina and Ardagna (2010) show that tax cuts are more expansionary than spending increases in the cases of a fiscal stimulus. In addition, spending cuts are much more effective than tax increases in stabilizing the debt and avoiding economic downturns. These results are partially attributable to a more substantial monetary stimulus following a fiscal adjustment that is spending-based rather than tax-based. In fact, central banks are less likely to loose monetary policy when revenue-driven measures (such as indirect tax hikes) that raise prices are already in place.

Tackling a more general question dealing with the effect of fiscal policy on the economy, Blanchard and Perotti (2002) find that positive government spending shocks increase output, consumption and decrease investment, while positive tax shocks have a negative effect on output, consumption and investment. Mountford and Uhlig (2009) also point to a negative effect on private investment associated to both taxes and spending increases, but spending increases do not generate an increase in consumption. Moreover, deficit-financed tax cuts are found to be the most effective way to stimulate the economy. Afonso and Sousa (2011) find that unexpected variation in fiscal policy can substantially increase the variability of housing and stock prices. Afonso and Sousa (2012) show that government spending shocks generally have a small effect on GDP and lead to important crowding-out effects. Using narrative approaches, Ramey (2008) challenges the positive effect of government spending shocks on private consumption. Romer and Romer (2010) also find that an increase in taxation has a small negative effect on GDP.

The literature presented so far has typically addressed the impact of fiscal adjustments on the *level* or the *growth rate* of *aggregate* income. However, the sharp increase in deficits and quick debt build up that have been recently observed in many developed countries - as a result of the fiscal response to the most recent financial turmoil - are now calling for a return to “normal” times via the implementation of fiscal austerity. This brings a new question into the scene: what is the impact of fiscal consolidation on income *distribution*?

Up to now, only a few studies have looked at the distributional effects of fiscal policy. Bertola (2010) argues that Europe’s Economic and Monetary Union (EMU) had a small (althout significantly positive) impact on income inequality, partially reflecting

the implementation of less generous social policies. In the same vein, Bouvet (2010) uses data for a set of European regions and finds that, while income inequality has decreased (mainly because of a fall in between-country inequality), the establishment of the convergence criteria widened the income gap in less advanced countries. Some research has also highlighted that fiscal consolidations: (i) run together with an increase in poverty and a rise in the income gap (Ford, 1998; Smeeding, 2000); and (ii) impact on the trade-off between economic growth and income inequality (Mulas-Granados, 2005).

Moreover, the discussion has been centred on how income inequality changes in the outcome of a banking crisis. From a theoretical point of view, financial crises can lead to bankruptcies and falls in asset prices, generate deep recessions and demand policy responses such as bailouts, but their effects on inequality are not clear (Atkinson and Morelli, 2011). From an empirical perspective, the 1929 crash was followed by a substantial correction in inequality, because wealth losses and financial reforms hit the top of income distribution.

In this context, Stiglitz (2009) suggests that the combination of stagnant real incomes and increased borrowing by low income households leads to an unsustainable path that makes default and financial crises more likely. Freeman (2010) finds that inequality increases dramatically before financial crises. More recently, Agnello and Sousa (2011) show that banking crises substantially impact on income distribution, rising inequality before the event eclodes and sharply declining it afterwards. The authors also suggest that a better access to credit provided by the banking sector leads to a more equal distribution of income, but the size of the government does not reduce inequality *per se*.

The recent financial crisis seems to have witnessed a slight fall in income gap, but there is no clear trend on how it will evolve in the future as it depends on the groups that are affected and where they are in terms of the income distribution. Notably and as pointed by Jenkins et al. (2011), in the case of the Great Recession, countries with a relatively strong welfare state did observe a more stable income distribution as a result of a greater automatic stabilisation. However, there is a growing sentiment that the coming fiscal austerity measures are somewhat unfair and, as the authors emphasize, they are likely to have a dramatic impact on inequality. For instance, Ball et al. (2011) estimate that a 1 percent of GDP of fiscal consolidation leads to a fall in inflation-adjusted wage income by 0.9 percent, while inflation-adjusted profit and rents are

reduced by 0.3 percent. Rather than judging about the merits of such policies, our paper tries to provide a comprehensive description of the effects of fiscal consolidation on income inequality.

## 3. Data and Methodological Approach

We use annual data for 18 industrialized countries and the sample period is 1970-2010.

Gini inequality index data comes from the Standardized World Income Inequality Database (SWIID). As highlighted by Nolan et al. (2009), this measurement of income and wage inequality improves comparability across different studies. More specifically, while accounting for the concept, definition of income and recipient unit, it captures different points in the distribution and measures income inequality levels and trends in a harmonised way. Similarly, as pointed by Solt (2009), it provides a greater cross-country and temporal coverage.

We focus on two different income definitions, i.e. gross or net of taxes. Therefore, significant gaps between inequality in gross and net income help explaining the differences in redistributive policies across countries. As shown in Figure 1, this might be particularly important for the advanced economies included in our sample, as the panel correlation between the gross and the net income inequality indexes is relatively low (0.37).

[ INSERT FIGURE 1 HERE ]

Data for per capita GDP and the degree of openness are provided by the World Development Indicators of the World Bank and the Penn World Table (PWT) Version 7.0, respectively.[2]

Finally, the IMF fiscal consolidation episodes are identified from the work of Devries et al. (2011), which is based on a narrative approach. As argued by the authors, the standard statistical approach focuses on variation in the cyclically adjusted primary budget balance (CAPB). However, this framework can lead to biased results for two main reasons. First, the CAPB may suffer from measurement error that can be correlated with economic developments. Second, it omits periods during which fiscal

[2] See Heston et al. (2011).

consolidation actions were followed by adverse shocks and offsetting discretionary measures. For these reasons, we use the narrative approach to identify episodes of fiscal consolidation. More specifically, rather than looking at fiscal *outcomes*, we follow Devries et al. (2011), who assess policy *actions* that are motivated by deficit reduction by examining accounts and records of what countries were intending to do at the time of publications (such as the *IMF Recent Economic Development*s reports, the *IMF Staff Reports* or the *OECD Economic Surveys*). Therefore, this procedure eliminates the endogeneity of the response of fiscal policy to the economy, as it captures policymakers' decisions.

As can be seen in Figure 2, fiscal adjustments typically involve substantial variation in income inequality measures. Moreover, there is a reasonably large number of countries for which fiscal consolidation programs were carried out with a significant increase in inequality. This is the case, for instance, of Finland, Italy, Spain and Sweden in the nineties, where aggressive austerity measures amounting up to 3-4 percent of GDP were implemented (OECD, 2008; Devries et al.,2011), or Germany, Japan and Portugal in the eighties, where fiscal consolidation totalled, approximately, 0.4-1.4 percent of GDP.

[ INSERT FIGURE 2 HERE ]

In order to explore the empirical relationship between gross and net income inequality measures and fiscal consolidation, we use a Seemingly-Unrelated-Regression (SUR) system under unbalanced panel data (BiØrn, 2004; Nguyen, 2009). A similar approach is used in a cross-sectional context by Barro (2008).

Compared to single equation methods, this technique has two main advantages. First, it allows to simultaneously analyze the dynamics of different (comparable) measures of income inequality and their '*seeming'* relationship at country level. Second, it achieves gains in terms of efficiency by estimating a system of equations rather than looking at each equation separately (Baltagi and Chang, 1994). This is particularly important in the context of an unbalanced panel data and constraints regarding the number of observations as is the case for inequality indexes.

We estimate a system of two equations for an unbalanced panel of $N$ countries, indexed by $i = 1, \ldots, N$, that is:

$$\begin{bmatrix} y_{net,it} \\ y_{gross,it} \end{bmatrix} = \begin{bmatrix} \mathrm{X}_{net,it} & 0 \\ 0 & \mathrm{X}_{gross,it} \end{bmatrix} \begin{bmatrix} \beta_{net} \\ \beta_{gross} \end{bmatrix} + \begin{bmatrix} \alpha_{net,i} \\ \alpha_{gross,i} \end{bmatrix} + \begin{bmatrix} u_{net,it} \\ u_{gross,it} \end{bmatrix} \qquad (1)$$

where each equation has its own dependent variable (i.e., either the net income Gini inequality index, $y_{net}$, or the gross income Gini inequality index, $y_{gross}$) and a (potentially) different set of exogenous explanatory variables, $X$. $\alpha_i$ and $u_{it}$ denote, for each equation, the country-specific effects and the disturbance terms, respectively.

Following Barro (2008), $X$ includes a core set of variables that have been found strongly related with income inequality, namely, the log of per-capita GDP and its squared term (which is used to test the Kuznets relationship) and the trade openness. In addition, we consider a variety of dummy variables capturing fiscal consolidation episodes, $D_x$, and aimed at assessing the relationship between income inequality and fiscal adjustments.

We account for the *timing* of the potential redistributive effects of the adopted austerity measures by using two dummy variables labelled as $D_c$ and $D_{pc}$. Based on Devries et al. (2011), the first one takes the value one during periods of fiscal consolidation and zero otherwise. The second one takes the value of one over the two years after the implementation of austerity measures and zero otherwise. Moreover, we analyze the *contribution* of spending versus tax-driven consolidation programs by constructing two alternative dummy variables, $D_{cs}$ and $D_{cr}$: following Devries et al. (2011), $D_{cs}$ takes the value of one if the adopted austerity measure is driven by a spending cut and zero otherwise; $D_{cr}$ takes the value of one if the adopted austerity measure is driven by an increase in taxation and zero otherwise.

We remark that the abovementioned dummy variables enter only the net income inequality equation. In fact, the set of consolidation measures consists of discretionary changes in taxes (increases) and government spending (cuts), which are designed to reduce the budget deficit. Therefore, one can only infer about the effects of fiscal consolidation on income inequality after deducting direct taxes and social security contributions from gross income (i.e., by looking at the net income figures). More formally, this implies that we restrict the coefficients associated to the dummy variables, $D_x$, in the vector $\beta_{gross}$ to be equal to zero.

## 4. Empirical Findings

Table 1 provides a summary of the results using the net and gross SWIID Gini Index as the measure of income inequality. Column 1 focuses on the IMF consolidation periods, Column 3 looks at IMF tax driven and spending driven consolidation episodes, and Column 5 addresses IMF consolidation and post-consolidation periods.

Our findings show that income inequality increases during periods of fiscal consolidation (as one can see in Column 1). Moreover, the evidence suggests that fiscal adjustments that are driven by the revenue side do not help reducing the income gap. Interestingly, when fiscal consolidation is achieved via spending cuts, income inequality seems to widen even more (see Column 3). In fact, the coefficient associated with spending-driven consolidation episodes (0.046) is almost three times larger than the one linked with tax-driven fiscal adjustment programs (0.017). These results are close in spirit with the argument by Ball et al. (2001) that fiscal consolidation reduces the wage share in total income. The authors suggest that, while the effect on wage income is persistent, the fall in capital and property income is short-lived. This can be explained by the fact that fiscal austerity plans typically call for a fall in public sector wages or lead to an increase in unemployment (in particular, long-term unemployment) via the decrease in government consumption or the cut in government investment. As a result, although spending cuts can be more effective (than tax increases) at promoting a stabilization of the debt and boosting economic growth in the medium-term (as Alesina and Ardagna (2010) argue), they are also more likely to lead to an increase in the inequality of income distribution (as pointed by Mulas-Granados (2005) regarding the European case).

We also find that income inequality significantly increases after consolidation periods. As shown in Column 5, the distribution of income becomes more uneven after the fiscal adjustment, as the coefficient associated with the post-consolidation period is statistically significant and positive (0.014).

Additionally and in line with Barro (2008), our results also point to the usual Kuznets relationship i.e. an inverse U-shape curve between income inequality and per capita GDP. In fact, while the coefficient associated with per capita GDP is significant and always exhibits a positive sign, the estimates for the impact of per capita GDP squared are negative in magnitude. As a result, for low levels of income, a rise in per capita GDP increases income inequality. However, for sufficiently high levels of

income, one observes the opposite relationship: a boost in per capita GDP reduces inequality. This result actually holds for both definitions of income inequality.

Also in accordance with the findings of Barro (2008), we show that an increase in the degree of openness of a country leads to more divergence in the distribution of income and, thereby, trade seems to be an important source of inequality. In this context, Agnello and Sousa (2009) also find that public deficit volatility is magnified in countries with a high degree of openness.

[ INSERT TABLE 1 HERE ]

As robustness check, in Table 2, we consider the top 1%, 5% and 10% income shares as measures of inequality. Such data has been compiled by Atkinson and Piketty (2010) and covers a large number of OECD countries. The results are broadly in line with those presented in Table 1, in particular, when we consider the impact of fiscal consolidation on the top 1% income share. Column 1 shows that consolidation periods are typically linked to a rise in income inequality: the coefficient associated with consolidation periods is statistically significant and positive (0.058). Moreover, fiscal adjustments that are led by spending cuts tend to widen the income gap by more than those driven by rises in taxation, as shown in Column 4. In addition, the top 1% income share in total income rises after consolidation, i.e. post-consolidation periods are associated with more inequality (as can be seen in Column 7).

As before, we find evidence supporting the Kuznets relationship. In fact, while there is a significantly positive effect on inequality from the log of per capita GDP, the square of the log of per capita GDP has a negative impact on inequality, a result that is in line with the work of Barro (2008). As argued by the author, at the early stages of economic development (which include the adoption of new technologies and shifts from agriculture to industry and services), an increase in per capita GDP raises inequality because the benefits accrue to a small share of the population. However, as the new methods of production become widespread, this relation flattens at sufficiently high per capita GDP, and the benefits are shared more evenly. As a result, further increases in per capita GDP reduce inequality.

Finally, more open economies seem to be characterized by higher levels of income inequality, as the coefficients associated with the degree of openness are positive and statistically significant for a broad range of regressions. Note that while the

*direct* effect of openness on income inequality is positive, the fact that trade boosts economic growth means that there is also an *indirect* effect on inequality. This is embedded in a higher level of per capita GDP, which reduces income inequality over time in most countries. As a result, enhanced trade can lower poverty even if income inequality rises (Barro, 2008).

[ INSERT TABLE 2 HERE ]

**5. Does the Size of Fiscal Consolidation Matter?**

In this section, we extend the previous analysis by considering the characteristics of the consolidation plan in terms of its size and the existence of threshold effects in the relationship between income inequality and the size of consolidation.

We start by distinguishing between tax- and spending-based measures with sizes (in percentage of GDP) that are higher or lower than their corresponding sample averages over the period of the analysis (Table 3).

Next, we replace the fiscal consolidation dummy variables with the size (in percentage of GDP) of each adopted consolidation measure, as reported by Devries et al. (2011). Then, benchmark models (1) are estimated.

The results are reported in columns (1) -(2) of Table 4. Overall, they confirm that the higher the size of the consolidation packages is, the stronger the impact on income inequality is. Additionally, we find that inequality is mainly driven by the size of spending cuts. In fact, during consolidation periods, the size of tax rises is on average, smaller than the size of spending cuts. This, in turn, can be associated with the theoretical view that austerity measures that mainly rely on government consumption (especially, the wage bill) and/or social transfer cuts have a high probability of generating strong economic growth and reducing the debt ratio. In contrast, consolidation programs that are exclusively based on tax-hikes are expected to fail, as suggested by Alesina and Perotti (1995).

We also test for the presence of threshold effects in the relationship among inequality and the size of consolidation. A summary of the results can be found in Columns (3)-(5) of Table 4. Interestingly, Column 3 shows that consolidation plans that amount to less than 1% of GDP have a more detrimental impact on income inequality than austerity measures that are bigger in size (i.e. that represent more than 1% of GDP)

(0.048 versus 0.009, respectively). This suggests that the burden of the consolidation program is shared unevenly when the size of the plan in relatively small, affecting more negatively the households at the bottom of the income distribution. Only when the size of the program is reasonably large, does the evidence support that rich households are requested to participate more strongly in the consolidation effort and, as a result, the impact on inequality is smaller.

This result holds even when we consider the composition effects (Columns 4 and 5). In fact, when fiscal consolidation involves either tax rises above 0.57% of GDP or spending cuts above 0.77% of GDP, the impact on inequality is smaller.

## 6. Fiscal Consolidation and Banking Crises

A number of authors analyzed the link between income inequality, household debt leverage and financial crises, and emphasized the role of credit demand (Rajan, 2010; Reich, 2010) or credit supply (Fitoussi and Saraceno, 2010; Levitin and Wachter, 2010) in explaining the high debt levels of households at the bottom of income distribution. For this reason, Hubbard (2010) argues that policymakers appear to be responsible for the latest crises.

Similarly, Moss (2009) investigates whether huge income gaps create "wrong" incentives that increase the vulnerability of the financial system. Blair (2010) shows that, because asset bubbles typically lead to higher returns, the banking system has the potential to generate highly leveraged systems and increase inequality.

From an historical perspective, banking crises typically preceded or coincided with sovereign debt crises (Reinhart and Rogoff, 2011). Some reasons for this pattern can be associated with the contingent liability argument, whereby the government steps in and takes on massive debts from the private banks, which ultimately undermines its own solvency (Diaz-Alejandro, 1985; Velasco, 1987). Another potential explanation lies on the "twin crisis" story, where banking crises occur before currency crashes and these may, in turn, lead to the insolvency of sovereign borrowers who hold large amounts of foreign-currency denominated liabilities (Kaminsky and Reinhart, 1999).

Whatever the theoretical ground underlying the temporal sequence between banking crises and sovereign debt crises is, the need to restore fiscal sustainability afterwards forces governments to reduce their budget deficits via the implementation of fiscal consolidation programs. As a result, we investigate the impact of such fiscal

adjustments undertaken during and after the occurrence of financial crises as identified by Laeven and Valencia (2010) and Reinhart and Rogoff (2011).

More specifically, we assess the conditional *dependence* of the redistributive effects on the occurrence of financial crises. To that end, the consolidation dummy variable, $D_c$, as defined in Section 3 is interacted with the series dating banking crisis as provided by Laeven and Valencia (2010) and Reinhart and Rogoff (2011). We also construct a dummy variable that takes the value of one if the fiscal consolidation measures are adopted immediately after the end of banking crises.

Table 5 provides a summary of the findings. The empirical evidence provides some interesting results. First, when fiscal consolidation is implemented during banking crises, the impact on inequality is not statistically significant. Second, in the absence of crises episodes, fiscal austerity leads to a more unequal distribution of income: the coefficients associated with consolidation programs during no banking crises are statistically significant and positive for both the identification based on the work of Laeven and Valencia (2010) – i.e. 0.019 – and the research by Reinhart and Rogoff (2011) – i.e. 0.033. Third, in the aftermath of a banking crisis, fiscal consolidation has a strongly positive impact on income inequality. That is, compared to the benchmark case of no banking crises, the impact on the income gap is magnified when austerity plans are implemented after the resolution of banking crises.

[ INSERT TABLE 5 HERE ]

## 7. Conclusions

After the substantial reduction in public deficits during the nineties and early 2000s, the fiscal stance of many OECD countries has strongly deteriorated. Similarly, while until early 2010 policymakers questioned whether tax cuts or spending increases were a better recipe for boosting the economy, the subsequent developments in government bond markets signalled doubts about the long-term sustainability of the debt path and led to the implementation of fiscal austerity.

In this paper, we look at fiscal consolidation via the lenses on its impact on income inequality. We find that the income gap indeed increases during periods of fiscal adjustment. Moreover, the empirical evidence suggests that when fiscal austerity is driven by the spending side rather than the revenue side, inequality rises more.

In addition, we show that the distribution of income becomes more uneven not only *during* the fiscal consolidation period, but also *after* the adjustment is put into place.

We also find that fiscal consolidation is more detrimental for income inequality when the size of spending cuts (in percentage of GDP) is large.

However, when consolidation plans amount to a small share of the GDP, the burden associated with the effort seems to affect disproportionately the households at the bottom of the income distribution.

Conditioning the impact of fiscal consolidation on the occurrence of a banking crisis, we find that income becomes much more unequally distributed in the post-crisis period. However, even in the absence of crises episodes, we do observe a rise in inequality associated with the implementation of fiscal consolidation.

Finally, we confirm the existence of a nonlinear inverse-U relationship between inequality and growth and also show that the higher the degree of openness of is, the higher the level of inequality will be. As a result, although trade can help countries to achieve long-term economic prosperity, it also seems to lead to a rise in income inequality.

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## List of Tables

**Table 1**. Income inequality and fiscal consolidation
(Evidence from the SWIID net and gross Gini Index).

| Explanatory variable | Dependent Variable Gini Index (SWIID) | | | | | |
|---|---|---|---|---|---|---|
| | Net | Gross | Net | Gross | Net | Gross |
| log (per capita GDP) | 0.118*** | 0.165*** | 0.149*** | 0.202*** | 0.106*** | 0.144*** |
| | [0.013] | [0.014] | [0.013] | [0.014] | [0.013] | [0.014] |
| log (per capita GDP) squared | -0.005*** | -0.006*** | -0.007*** | -0.007*** | -0.005*** | -0.005*** |
| | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| Consolidation periods ($D_c$) | 0.026*** | | | | 0.026*** | |
| | [0.003] | | | | [0.003] | |
| Tax driven consolidation episodes ($D_{cr}$) | | | 0.017*** | | | |
| | | | [0.005] | | | |
| Spending driven consolidation episodes ($D_{cs}$) | | | 0.046*** | | | |
| | | | [0.004] | | | |
| Post-consolidation period ($D_{pc}$) | | | | | 0.014*** | |
| | | | | | [0.004] | |
| Openness | 0.038*** | 0.028*** | 0.052*** | 0.022** | 0.025*** | 0.031*** |
| | [0.009] | [0.010] | [0.009] | [0.010] | [0.009] | [0.010] |
| Observations | 626 | 626 | 626 | 626 | 626 | 626 |
| Number of countries | 18 | 18 | 18 | 18 | 18 | 18 |
| Tests: | | | | | | |
| Ho: $D_{cr}=D_{cs}$ | | | 23.98 | | | |
| | | | (0.00)*** | | | |
| Ho: $D_c=D_{pc}$ | | | | | 5.79 | |
| | | | | | (0.02)** | |

Note: Dependent variables are Gini coefficients. Coefficients are estimated by seemingly-unrelated regression technique in a panel framework (BiØrn, 2004). Standard errors of coefficients are in square brackets, p-values in parenthesis.

**Table 2**. Income inequality and fiscal consolidation
(Evidence from the top income shares).

| Explanatory variable | Dependent Variable Top Income shares | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1% | 5% | 10% | 1% | 5% | 10% | 1% | 5% | 10% |
| log (per capita GDP) | 0.892*** | 0.843*** | 0.444*** | 0.911*** | 0.860*** | 0.472*** | 0.800*** | 0.883*** | 0.513*** |
| | [0.116] | [0.194] | [0.126] | [0.117] | [0.193] | [0.127] | [0.121] | [0.188] | [0.132] |
| log (per capita GDP) squared | -0.054*** | -0.051*** | -0.030*** | -0.055*** | -0.052*** | -0.032*** | -0.050*** | -0.053*** | -0.034*** |
| | [0.006] | [0.011] | [0.007] | [0.006] | [0.011] | [0.007] | [0.007] | [0.010] | [0.007] |
| Consolidation periods ($D_c$) | 0.058*** | | | | | | 0.108*** | | |
| | [0.002] | | | | | | [0.003] | | |
| Tax driven consolidation ($D_{cr}$) | | | | 0.046*** | | | | | |
| | | | | [0.004] | | | | | |
| Spend driven consolidation ($D_{cs}$) | | | | 0.065*** | | | | | |
| | | | | [0.002] | | | | | |
| Post-consolidation period ($D_{pc}$) | | | | | | | 0.181*** | | |
| | | | | | | | [0.003] | | |
| Openness | 0.238*** | 0.163*** | -0.016 | 0.237*** | 0.173*** | -0.01 | 0.294*** | 0.210*** | 0.086*** |
| | [0.013] | [0.034] | [0.019] | [0.013] | [0.035] | [0.019] | [0.016] | [0.044] | [0.023] |
| Observations | 338 | 338 | 338 | 338 | 338 | 338 | 338 | 338 | 338 |
| Number of countries | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| Tests: | | | | | | | | | |
| Ho: $D_{cr} = D_{cs}$ | | | | 21.77 | | | | | |
| | | | | (0.00)*** | | | | | |
| Ho: $D_c = D_{pc}$ | | | | | | | 422.4 | | |
| | | | | | | | (0.00)*** | | |

Note: Dependent variables are top income shares. Coefficients are estimated by seemingly-unrelated regression technique in a panel framework (BiØrn, 2004). Standard errors of coefficients are in square brackets, p-values in parenthesis.

**Table 3**. Consolidation size.

| Variable | # episodes | Average (%GDP) | Min (%GDP) | Max (%GDP) |
|---|---|---|---|---|
| Consolidation size>0.99%GDP | 68 | 1.87 | 0.99 | 4.74 |
| Consolidation size<0.99%GDP | 97 | 0.48 | 0.03 | 0.98 |
| Tax-based >0.57%GDP | 41 | 1.17 | 0.60 | 2.54 |
| Tax-based <0.57%GDP | 86 | 0.29 | 0.00 | 0.56 |
| Spending cut-based>0.77%GDP | 50 | 1.47 | 0.80 | 3.71 |
| Spending cut-based<0.77%GDP | 90 | 0.37 | 0.00 | 0.76 |

**Table 4**. Income inequality and fiscal consolidation (Size effects).

| Explanatory variable | Dependent Variable<br>Net Income Gini Index (SWIID) | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| log (per capita GDP) | 0.117*** | 0.156*** | 0.122*** | 0.132*** | 0.139*** |
| | [0.013] | [0.013] | [0.013] | [0.013] | [0.013] |
| log (per capita GDP) squared | -0.005*** | -0.007*** | -0.006*** | -0.006*** | -0.007*** |
| | [0.001] | [0.004] | [0.001] | [0.001] | [0.001] |
| Consolidation size %GDP | 0.014*** | - | | | |
| | [0.002] | - | | | |
| Tax-based size %GDP | | 0.005 | | | |
| | | [0.004] | | | |
| Spending cut-based %GDP | | 0.023*** | | | |
| | | [0.003] | | | |
| Consolidation size>0.99%GDP | | | 0.009*** | | |
| | | | [0.002] | | |
| Consolidation size<0.99%GDP | | | 0.048*** | | |
| | | | [0.008] | | |
| Tax-based >0.57%GDP | | | | -0.006 | |
| | | | | [0.004] | |
| Tax-based <0.57%GDP | | | | 0.080*** | |
| | | | | [0.014] | |
| Spending cut-based>0.77%GDP | | | | | 0.018*** |
| | | | | | [0.003] |
| Spending cut-based<0.77%GDP | | | | | 0.064*** |
| | | | | | [0.011] |
| Openness | 0.040*** | 0.038*** | 0.027*** | 0.029*** | 0.044*** |
| | [0.009] | [0.009] | [0.010] | [0.009] | [0.009] |
| Observations | 626 | 626 | 626 | 626 | 626 |
| Number of countries | 18 | 18 | 18 | 18 | 18 |
| Tests: | | | | | |
| Ho: *Above=Below* | | | 23.0 | 36.8 | 18.3 |
| | | | (0.00)*** | (0.00)*** | (0.00)*** |

Note: For sake of space, we report estimates of equation with Net income Gini index as dependent variable. Standard errors of coefficients are in square brackets, p-values in parenthesis.

**Table 5**. Income inequality and fiscal consolidation
(Evidence for banking crises episodes).

| | Banking crises Identification | | | |
|---|---|---|---|---|
| | Reinhart and Rogoff (2011) | | Laeven and Valencia (2010) | |
| | Net | Gross | Net | Gross |
| log (per capita GDP) | 0.114*** | 0.164*** | 0.148*** | 0.179*** |
| | [0.013] | [0.014] | [0.013] | [0.014] |
| log (per capita GDP) squared | -0.005*** | -0.006*** | -0.007*** | -0.006*** |
| | [0.001] | [0.001] | [0.001] | [0.001] |
| Consolidation (IMF) during banking crises | -0.003 | | 0.008 | |
| | [0.008] | | [0.011] | |
| Consolidation (IMF) after banking crises (A) | 0.035*** | | 0.104*** | |
| | [0.006] | | [0.012] | |
| Consolidation (IMF) during no banking crises (B) | 0.019*** | | 0.033*** | |
| | [0.004] | | [0.004] | |
| Openness | 0.037*** | 0.026*** | 0.031*** | 0.032*** |
| | [0.009] | [0.010] | [0.009] | [0.010] |
| Number of consolidation episodes: | | | | |
| During banking crises | 84 | | 11 | |
| After banking crises | 64 | | 29 | |
| During no financial crises | 25 | | 133 | |
| | | | | |
| Observations | 626 | | 626 | |
| Number of countries | 18 | | 18 | |
| | | | | |
| Tests: | | | | |
| Ho: A=B | 5.22 | | 34.52 | |
| | (0.00)** | | (0.00)*** | |

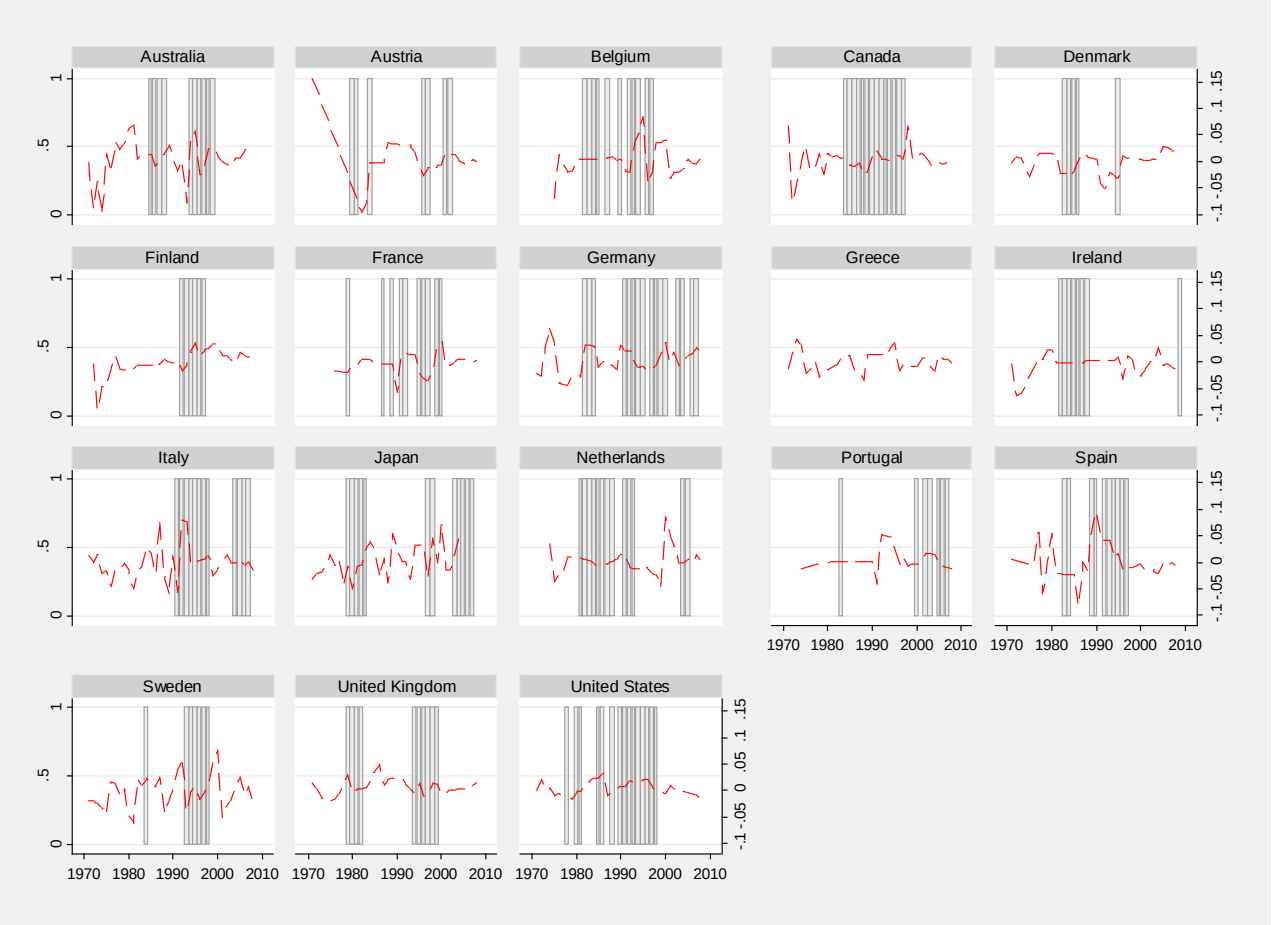
Note: Dependent variables are Gini coefficients. Coefficients are estimated by seemingly-unrelated regression technique in a panel framework (Biorn, 2004). Standard errors of coefficients are in square brackets, p-values in parenthesis.

## List of Figures

**Figure 1**. Gross and net income Gini Indexes.

Note: The blue line denotes the gross income inequality index, while the red line corresponds to the net income inequality index. Both series are expressed in log terms. The correlation between gross and net income inequality is relatively low (0.37). This is not surprising for advanced countries where, in contrast with developing countries, differences in redistributive policies are much more relevant at explaining differences in net inequality.

**Figure 2**. IMF consolidation episodes and net income Gini Index.




Note: The red line denotes the annual change in the net income Gini Index (on the right axis), while the shaded regions correspond to the IMF fiscal consolidation episodes (on the left axis).