Fiscal consolidations and inequality: A survey of the literature

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出版情報：経済論究. 169, pp.43-64, 2021-03-23. 九州大学大学院経済学会
バージョン：
権利関係：

Fiscal consolidations and inequality: A survey of the literature*

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Abstract: This paper surveys the literature on the effects of fiscal consolidations on inequality and highlights the contributions made by researchers. Several conclusions can be drawn. First, fiscal consolidations can harm income distribution (income inequality). Besides, this impact is greater when fiscal consolidations are driven by reductions in expenditures. Concerning the impact of tax-based fiscal consolidations, the literature is not consensual. Some studies find that tax-based fiscal consolidations reduce income inequality, while others find the opposite. Second, studies highlight that the composition and size of fiscal consolidations might affect the redistribution of income. Moreover, they point out that the initial economic conditions might impact income inequality through fiscal consolidation measures.

Keywords: Fiscal policy, fiscal consolidation, inequality

1. INTRODUCTION

The link between income distribution and fiscal policy has been examined over the past decades. And several studies have demonstrated the nexus between fiscal policy and income distribution (IMF, 2014; Tanzi and Chu, 1998; Tanzi and al., 1999; Bastagli and al., 2012). For instance, Musgrave (1959) asserts that fiscal policy is an instrument that efficiently affects aggregate demand, the distribution of income and wealth, and public goods provision (Muinelo-Gallo and Roca-Sagales, 2011, 2014). In line with this idea, the International Monetary Fund (IMF, 2014) indicates that fiscal policy's main objectives are to support macroeconomic stability, provide public goods, correct market failures, and redistribute income. Therefore, fiscal policies (tax and expenditure policies) through their redistributive function influence income distribution (Martinez-Vasquez et al., 2012).

During these last decades, income inequality has increased, emphasizing the role and the effects of fiscal policies in lessening inequalities (Muinelo-Gallo and Roca-Sagales, 2014; IMF, 2014). Also, it has been noted that an increase in inequality goes along with an increase in demanding redistribution (Muinelo-Gallo and Roca-Sagales, 2011; IMF, 2014). Regarding the literature, studies on the effects of

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* This paper is based on one chapter of my Ph.D. thesis.

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fiscal policies on income inequality have shown the beneficial effects of fiscal policies on reducing inequality (Woo et al., 2013). For example, it has been observed that fiscal policies have contributed to reducing income inequality in industrialized countries, while in developing countries, their effects have been less significant (Woo et al., 2013; IMF, 2014).

Since the financial crisis in 2007-2009, fiscal consolidation programs have been implemented by governments in many countries to restore fiscal sustainability. These fiscal adjustment programs aim to lessen public debt ratios by cutting back expenditures and/or increasing taxes. As a result, the question about preserving the redistributive function of fiscal policies arises concerns and generates interest in investigating the consequences of these measures. Consequently, numerous studies have been conducted on the effects of fiscal consolidations on income inequality. And most of them highlight the detrimental impact of fiscal consolidations on income inequality.

In this paper, we attempt to review the contributions on the effects of fiscal policies on inequality, and more precisely those on the effects of fiscal consolidations on inequality. To do so, we focus on the literature based on the analysis of the effects of fiscal consolidations on income inequality. These studies, which are mainly regression-based analysis and focus on cross-country or panel setup, first, shed light on how to identify and measure fiscal consolidations. And second, they underscore the implications of adjustments of fiscal policies on income inequality. However, before this empirical review of the relationship between fiscal consolidations and income inequality, we briefly present the contributions of the works on the link between fiscal policy and income distribution to emphasize the causal correlation of these variables and stress the distributional consequences of fiscal consolidations.

This paper is organized as follows. Section 2 presents the empirical findings of studies on the link between fiscal policy and income distribution. Section 3 describes, on the one hand, the measures used to quantify and assess fiscal consolidations. And on the other hand, it reviews the outcomes of the empirical literature on fiscal consolidations and income inequality. Finally, section 4 contains conclusions and remarks.

2. FISCAL POLICY AND INCOME REDISTRIBUTION

2.1 Overview of the literature on the redistributive effects of fiscal policies

Assessing the redistributive effects of fiscal policies has been widely examined during these decades. These incidence analyses of fiscal policies aim to measure the impacts of tax and expenditure policies on income distribution and income inequality. For instance, one of the prior works on the impact of tax policies on income distribution stems from the work of Meltzer and Richard (1981) who assume that when the mean income increases relative to the median income, a majority coalition of individuals with lower income tends to support higher taxes (direct and progressive taxes) (Martinez-Vazquez and al., 2012).

The tax incidence analysis can be defined as an analysis of the identification of the income groups who support the tax burdens. Three different techniques have been used by researchers to determine their distributional effects: the microsimulation analysis, computable general equilibrium models, and econometric estimation models[1] (Claus and al., 2012). First off, the microsimulation analysis relies on models that allocate tax burdens among different income groups based on conventional assumptions about shifting and final incidence[2] (Claus and al., 2012; Martinez-Vazquez and al., 2012). Second, the computable general equilibrium models which were pioneered by Harberger (1962) are used to determine the general equilibrium responses to taxes in the economy. And third, the econometric estimation models consist of multivariate econometric analyses assessing the effects of taxes on income distribution measured mainly by Gini coefficients (Claus and al., 2012). The major findings on the tax incidence studies suggest that, in general, tax systems tend to be more or less progressive (which means that they are likely to increase income equality) even though some taxes are regressive (such as payroll and social security taxes)(Claus and al., 2012).

As for the benefit incidence analysis, it aims to assess the benefits accumulated by individuals by using public goods and services. So as aforementioned, three different techniques are also used to conduct the estimation of the impact of expenditure policies: the benefit incidence approach, the behavioral approach and the econometric estimation models[3] (Claus and al., 2012). First, the benefit incidence approach consists of using the marginal costs of the provision of public goods and services as a measure for marginal benefits for the different groups of income. Second, the behavioral approach consists of estimating behavioral demands for the provision of public goods and services to derive the marginal willingness to pay based on the preferences of individuals. And finally, econometric estimation models are regression-based estimations used to assess the impact of expenditure policies on income distribution (Claus and al., 2012). The main findings of studies on the impacts of expenditure policies point out that expenditures on social welfare have an impact on income distribution. For instance, expenditures on education and health are found to be progressive and beneficial for the lower incomes[4].

2.2 Fiscal policy and inequality: Some evidence

This section exhibits some contributions[5] made by the literature on the relationship between fiscal policy and inequality. First, it is important to indicate that studies outcomes suggest that trends in income inequality are mostly caused by the changes in the level of progressivity of tax systems and

1）See Claus and al. (2012) for further explanations
2）See Claus and al. (2012) for further explanations
3）See Claus and al. (2012) for further explanations
4）See Claus and al. (2012); Martinez-Vazquez and al. (2012)
5）See appendix

expenditure policies (Caminada and Goudswaard, 2001; Bastagli and al., 2012; Chu and al., 2000; Woo and al., 2013; Salotti and Trecroci, 2015).

For instance, Joumard and al. (2012) demonstrate, in their study on the redistributive impacts of taxes and transfers on income distribution in Organisation for Economic Co-operation and Development (OECD) countries, that economies with a more uneven distribution of market income are more likely to redistribute. Besides, they show that cash transfers, especially family and housing benefits, contribute substantially to lessen the income gap. Their results also indicate that personal income tax is progressive, while consumption taxes are regressive (Salotti and Trecroci, 2015; Woo and al., 2013). Through their results, Paulus and al. (2009) emphasize that benefits and personal income taxes have substantial redistributive effects relative to social contributions (Salotti and Trecroci, 2015; Woo and al., 2013).

For developing countries, Gemmell and Morrissey (2005) argue that tax systems are regressive (Woo and al., 2013). Moreover, Chu and al. (2000) indicate that the redistributive effects of tax systems and expenditure policies are modest (Woo and al., 2013). And regarding Latin American countries, Cubero and Hollar (2010) highlight that income taxes are progressive, while value-added tax (VAT), sales taxes, and international trade taxes are regressive. As for social expenditures, they point out the fact that social security expenditures are regressive, while education and health expenditures are progressive. Nevertheless, all in all, social expenditures are significantly redistributive instruments compared to tax systems (Salotti and Trecroci, 2015; Woo and al., 2013).

These studies provide evidence of the redistributive effects of fiscal policy on income distribution. They highlight the great redistributive nature of expenditure policies (in particular social expenditures) and transfers compared to tax policies (Claus and al., 2012; Goni and al., 2008; Woo and al., 2013). In line with these conclusions, in their study on the effects of government expenditures and taxation on the household economic well-being in the United States of America (USA) in 1989 and 2000, Wolff and Zacharias (2007) show that transfers and public consumption are progressive, whereas taxation is regressive. Furthermore, they find that taxes tend to increase the inequality at the margin, while government expenditures decrease it.

Concerning the impact on reducing inequality, among others, Martinez-Vazquez and al. (2012) demonstrate that progressive personal income tax and corporate income tax reduce inequality, as well as, welfare, education, health, and housing expenditures (Woo and al., 2013; Duncan and Sabirianova Peter, 2008, 2016). On the contrary, they indicate that consumption taxes, excises, and customs duties foster inequality. Afonso and al. (2010) confirm the existing link between public expenditures (namely transfers, subsidies, and social expenditures) and income inequality. Besides, Muinelo Gallo and Roca-Sagales (2011) point out that government expenditures and direct taxes contribute to reducing inequality.

To sum up, the literature has shown the redistributive effects of fiscal policies and their important

role in affecting income distribution and reducing income inequality (IMF, 2014; Salotti and Trecroci, 2015; Martinez-Vazquez and al., 2012; Woo and al., 2013).

3. FISCAL CONSOLIDATIONS AND INCOME INEQUALITY

3.1 Concepts and measures of fiscal consolidations

The literature on the redistributive effects of fiscal policies supports the view that fiscal policy has a notable influence on income distribution and alleviating inequality through tax and expenditure policies (De Freitas, 2012; Salotti and Trecroci, 2015). Therefore, fiscal consolidation, which is defined as policies aiming at reducing government deficits and debt accumulation (OECD economic outlook: Sources and methods, OECD journal on budgeting, 2011), will hinder those redistributive effects on income distribution putting at risk lower incomes (IMF, 2014). In fact, according to the OECD journal on budgeting (2011), reducing deficits can be achieved through economic growth, and this, in turn, will lead to more revenues and fewer expenditures. And concretely, to tackle their deficits, governments have been implemented fiscal adjustments made of reductions of expenditures and increases in taxes.

Numerous studies have been focusing on the analysis of the impacts of fiscal consolidations. And, one of the main challenges was to measure fiscal consolidations. Based on these studies, three types of measurements can be distinguished. In fact, the literature on the effects of fiscal consolidations can be divided into two main categories: the studies on the impacts of fiscal consolidation on the economy (the level or the growth rate of aggregate income) (Agnello and Sousa, 2012, 2014) and those on the impacts of fiscal consolidation on income distribution (income inequality).

The first group of studies focuses on the identification of the nature of the fiscal policies: are governments in a period of loose or tight fiscal policies[6], and on the identification of the successful or unsuccessful fiscal adjustments. According to Alesina and Perotti (1995), loose fiscal policies are the result of sharp increases in government expenditures, whereas tight fiscal policies are the result of an increase in taxes[7]. To take into consideration the notion of adjustment and avoid any bias, they also define successful adjustments as adjustments based on a reduction in transfer programs and in government wages and employment, and unsuccessful adjustments as adjustments based on an increase in taxes.

After identifying these types of fiscal policies, it is important to measure them: namely by assessing the position of the government budget, and more precisely, the discretionary changes to capture the actions of the policymakers. This discretionary change (also called fiscal impulse) is defined as the difference between the actual budgetary position of a government and the level of the same measure

6) Other terms expansion and adjustment fiscal policies
7) See Alesina and Perotti (1995)

that would prevail if the effects of the economic cycles could be out by referring to a benchmark situation (Alesina and Perotti, 1995). Although the concept of a benchmark situation arises several issues[8], four widely used measures of the discretionary change (fiscal impulse) have been identified by Alesina and Perotti (1995)[9].

They state that the first measure is the change in the primary deficit as a share of GDP from the previous year (which is its benchmark year). The second measure that they identify stems from the work of Blanchard (1993). He designs a measure that estimates what government outlays and revenues would be in any given year if the unemployment rate had remained the same as in the previous year (Alesina and Perotti, 1995). By doing this, he tries to minimize the possible biases arising from the fact that both government expenses and revenues can be negatively and positively related to GDP. The third measure is the difference between the current primary deficit and the primary deficit that would have prevailed if expenditures in the previous year had grown with the potential GDP, and revenues had also grown with the actual GDP (Alesina and Perotti, 2005). This measure is mostly employed by OECD studies and can be referred to as the first difference of the cyclically adjusted budget balance, which is expressed as a share of GDP in period $(t-1)$. The distinctive features of this measure are, on the one hand, the notion of potential output, and on the other hand, the revenue and expenditure elasticities, although they can spark several concerns and questions about the reliability of these concepts. The last measure identified by Alesina and Perotti (1995) is similar to the third one, except that here the benchmark year is a reference year where the potential output is close to the actual output.

Based on these measures of the discretionary change (fiscal impulse), a fiscal stance can be defined as a given year where the discretionary change measure belongs to an interval and/or is characterized by a threshold[10] (with specific intervals and thresholds depending on whether it is a fiscal expansion or a fiscal adjustment) (Giavazzi and Pagano, 1990; Alesina and Perotti, 1995; Alesina and Ardagna, 1998, 2010). Overall, these measures have the advantage of being more or less simple to compute. However, they count several drawbacks on the selection of the benchmark year, the method of adjustment, and what parts of the budget should be considered and should be adjusted to (Alesina and Perotti, 1995).

The second group of studies also has resorted to measures of discretionary change in the fiscal policy to quantify fiscal consolidations such as the cyclically adjusted primary balance (CAPB), and to the concepts of expansionary and contractionary fiscal policies periods (or episodes) to assess the impacts of fiscal consolidations[11]. But, besides these measures, those studies also rely on a different

8）See Alesina and Perotti (1995) for further explanations
9）See Appendix
10）See Appendix for some examples of definitions
11）See Appendix for some examples of definitions

concept which uses a narrative and historical approach to identify fiscal consolidation actions undertaken by governments to reduce budget deficits (Ramey and Shapiro, 1999; Romer and Romer, 2010; Devries and al., 2011). The design of this new action-based measure is motivated by the fact that the frequently used measure, which is the CAPB suffers from measurements errors and/or selection biases, on the one hand, and on the other hand, these statistical concepts struggle to only capture the policymakers' intentions and actions to reduce budget deficits (Devries and al., 2011; Ball and al., 2013). According to Romer and Romer (2010), this action-based measure is relevant for assessing the effects of fiscal consolidations because it corresponds to a response to past decisions and economic conditions, and consequently, it will not be correlated with economic cycles (Devries and al., 2011).

In sum, to evaluate the effects of fiscal consolidations, it is necessary to define a specific and relevant measure able to efficiently capture the fiscal policies carried out to reduce budget deficits. In fact, findings and conclusions differ depending on the method used by researchers to measure fiscal consolidations (Agnello and Sousa, 2012, 2014).

3.2 Fiscal consolidations and inequality: Some evidence

This section presents the main findings on the analysis of the effects of fiscal consolidations on inequality. But, before the review of this literature, we briefly survey the studies conducted on the impacts of fiscal consolidations on the economy.

First, from a theoretical perspective, studies show that the expansionary effects of fiscal adjustments occur in both the demand and supply sides. Regarding the demand side, the literature supports the idea that a fiscal adjustment becomes expansionary when agents believe that contractionary fiscal policy prevents the need for future adjustments (Blanchard, 1990; Alesina and Ardagna, 2010; Agnello and Sousa, 2014). In fact, current increases in taxes and/or reductions in expenditures will be perceived as permanent, and it will subsequently induce a positive wealth effect, which in turn will increase current private consumption and aggregate demand (Alesina and Ardagna, 2010). If agents believe that the stabilization is credible, they will request lower premium bonds. So, private demand will increase as the real interest rate charged to consumers and firms diminishes with the decrease in the one paid on government bonds. Besides, this decrease in real interest rate drives to an increase in agents' wealth, consumption, and investment (Alesina and Ardagna, 2010; Agnello and Sousa, 2014).

As for the supply side, the literature suggests that expansionary effects of fiscal adjustments go through the labor market and the impact that tax increases and/or reductions in expenditures have on the individual labor supply in a neoclassical model on the one hand; and on the other hand, on the unions fallback in position in imperfectly competitive labor markets (Alesina and Ardagna, 1998, 2010; Alesina and al., 2002; Agnello and Sousa, 2014). So, these effects are more likely to increase

unemployment and lessen workers' income. Conversely, they contribute to increasing profits, investment, and competitiveness (Alesina and Ardagna, 2010).

Second, from an empirical perspective, Agnello and Sousa (2012) assert that the literature on the impacts of fiscal consolidations is not unanimous on their consequences on the level or growth rate of aggregate income. Giavazzi and Pagano (1990) have been one of the first to instigate analyses on the effects of fiscal consolidations. They claim that large fiscal consolidations (especially on the expenditure side) are more likely to have an expansionary impact on the economy through the non-Keynesian effects (Feldstein, 1982; Alesina and Perotti, 1997; Alesina and Ardagna, 1998, 2010; Agnello and Sousa, 2012, 2014).

Alesina and Perotti (1995) examine budget expansions and adjustments in OECD countries implemented over three decades. They bring out several conclusions. First, they highlight that fiscal expansions are the result of increases in expenditures, especially transfers programs, while fiscal adjustments are the result of increases in taxation. Second, they find that on the expenditure side, fiscal adjustments are predominantly implemented through reductions in public investments and subsidies without reducing transfers, whereas fiscal expansions are only implemented through increases in transfers and wage government consumption. On the revenue side, they show that fiscal adjustments are more likely to increase personal and corporate income taxation while fiscal expansions tend to lessen indirect taxes and corporate income taxes. Third, their results suggest that successful and unsuccessful fiscal adjustments rely on reductions in expenditures and increases in taxation respectively. Moreover, they point out that first successful adjustments crowd in investments and competitiveness; and second, they appear to be correlated with an increase in growth and employment when they are carried out through reductions in expenditures (especially social security and government wages and employment). As regards fiscal adjustments based on increases in taxation, the authors indicate that they do not contribute to reducing public debts.

In line with these conclusions, Alesina and Ardagna (2010) emphasize that reductions in taxation are more expansionary than increases in expenditures in the cases of fiscal stimuli. As for fiscal adjustments, reductions in expenditure are significantly effective relative to increases in taxation for restoring the public debts and promoting economic growth. Finally, they highlight that episodes made of reductions in expenditures are associated with economic expansions (Ardagna and Alesina, 1998; Miller and Russek, 2003; Agnello and Sousa, 2012, 2014). Using a narrative approach and a vector autoregressive model to estimate the effects of changes in the US federal tax legislation on real output, Romer and Romer (2010) confirm these conclusions (Alesina and Ardagna, 2010). Their results show that an increase in taxation of one percent increase of GDP lessens the real output by about three percent in the next three years (Alesina and Ardagna, 2010). Finally, Blanchard and Perotti (2002) highlight that positive tax shocks affect negatively real output, consumption, and investment (Alesina and Ardagna, 2010).

The literature on assessing the distributional effects of fiscal consolidations has been affected by the recent economic developments (such as the financial crisis of 2007-2009). And according to Salotti and Trecroci (2015), despite a large number of studies, the literature is mostly empirical; and it has been focusing for the most part on OECD and/or advanced countries (Azevedo and al., 2014). One of the main conclusions highlighted by these studies is that fiscal consolidations affect income inequality, and more importantly, their composition and size are of great importance (IMF, 2014). For instance, in their study which assesses the impact of fiscal consolidations on income distribution in a panel of 18 advanced countries from 1978 to 2009, Agnello and Sousa (2014) argue that income inequality increases during fiscal consolidations periods. Moreover, their results emphasize that fiscal consolidations characterized by tax hikes have an equalizing effect, whereas fiscal consolidations characterized by reductions in expenditures are deleterious for income distribution (Mulas-Granados, 2005). Regarding the size of fiscal consolidations (in percent of GDP), they find that it has an impact on income inequality. That is to say, the larger the size of fiscal consolidation is the more severe the impact on income inequality will be. Besides, they draw attention to the fact that a fiscal consolidation amounting to less than one percent of GDP will be more harmful to the households at the bottom of the income distribution.

These conclusions are confirmed by the works of Woo and al. (2013) and Ball and al. (2013). Regarding the work of Woo and al. (2013), it focuses on the analysis of the distributional consequences of fiscal consolidation and the role of fiscal policy by using a panel of advanced and emerging markets countries over the last three decades. They find that income inequality increases during fiscal adjustment periods. And, this deterioration of income inequality significantly goes up when fiscal consolidations are implemented through expenditures. Furthermore, they indicate that large fiscal consolidations are more harmful to income distribution. It is important to mention that they claim that the net effect of fiscal consolidations on inequality depends on the specific composition of measures implemented. As an example, social benefits reductions considerably increase inequality. Besides, tax-based fiscal consolidations that rely on indirect taxes or are coupled with expenditure reductions are detrimental to income inequality. The economic conditions also appear as a crucial factor to consider before and during fiscal consolidations.

Concerning the work of Ball and al. (2013), the authors investigate the distributional effects of fiscal consolidations in 17 OECD countries from 1978 to 2009. Their results confirm that fiscal consolidations episodes increase inequality. Moreover, they indicate that the negative effects are long-lasting and greater when fiscal consolidations are driven by reductions in expenditures. They also highlight the negative impact of fiscal consolidations on wage income shares and long-term unemployment. Finally, Agnello and Sousa (2011) demonstrate that fiscal adjustments lessen income inequality. In particular, they indicate that first, successful fiscal adjustments are significantly favorable for the redistribution of income, and second, expansionary fiscal consolidations that intend

to promote growth contribute to diminishing inequality.

Regarding the studies on developing countries, fiscal consolidations are also found to be prejudicial to income inequality in the short-term (IMF, 2014). On the other hand, in the long-term, fiscal consolidations might contribute to reducing inequality by lessening unemployment, inflation, and correcting macroeconomic imbalances (IMF, 2014; Easterly and Fisher, 2001; Agenor 2002; Albanesi, 2007). Finally, it is worth mentioning that in the case of developing countries, as the governments' expenditures are not progressive, the negative impacts of reducing expenditures are not observed (IMF, 2014). Fewer studies have been focusing on analyzing the effects of fiscal consolidations on inequality at a national or subnational level. As an example, Azevedo and al. (2014) investigate the effects of fiscal consolidations on income inequality in Brazil (at a subnational level) from 1995 to 2011. They find that fiscal consolidations do not affect income inequality; however, they significantly affect their measure of shared poverty (World Bank, 2013; Azevedo and al., 2014).

Overall, the literature emphasizes the fact that depending on their size, composition and initial economic conditions, fiscal consolidations do affect negatively income inequality.

4. CONCLUSIONS AND REMARKS

This paper surveys the literature on the effects of fiscal consolidations on inequality and highlights the contributions made by researchers. Several conclusions can be drawn from this literature. First, fiscal consolidations can harm income distribution (income inequality). And, based on the empirical results, this impact is greater when fiscal consolidations are driven by reductions in expenditures. Concerning the impact of tax-based fiscal consolidations, the literature is not consensual. Some studies find that tax-based fiscal consolidations reduce income inequality, while others find the opposite. Second, studies highlight that the composition and size of fiscal consolidations might affect the redistribution of income. Moreover, they point out the fact that the initial economic conditions might impact income inequality through fiscal consolidation measures.

On the other hand, based on this review of the literature, several remarks can be made. The first remarks concern inequality. First, the increase in inequality has been widely analyzed and as a result, the literature claims that this increase is caused by several factors such as globalization, skill-biased technological changes, increase in low-skilled workers, declining top marginal income tax rates, and so on[12] (IMF,2014; Salotti and Trecroci, 2015). Therefore, fully assess the impacts of fiscal consolidations on inequality can be an arduous process, although researchers resort to various techniques to mitigate this issue (e.g by controlling for some factors). Second, studies predominantly rely on the income inequality measured by the Gini coefficient for disposable income, even though

12) See IMF(2014); Salotti and Trecroci (2015) and Azevedo and al. (2014)

inequality can be measured on various levels, dimensions, and aspects (Martinez-Vazquez and al., 2012). For instance, according to IMF (2014), economic inequality is made of inequality of income, wealth, lifetime inequality, and inequality of opportunity. Besides, most of the studies use international databases, such as the standardized world income inequality database (SWIID), to select their inequality measure (Gini index for disposable income). However, the use of these databases can raise questions (Salotti and Trecroci, 2015). For instance, Atkinson and Brandolini (2001) discuss the use of these databases for OECD countries (Salotti and Trecroci, 2015). Woo and al. (2013) argue that these databases are limited for international comparisons because they lack observations[13] and/or they are based on different income definitions[14] and reference units. Thus to tackle this problem, researchers have been using several measures (alternative measures) of income inequality coming from different sources to ensure the significance and robustness of the results (Woo and al, 2013; Salotti and Trecoci, 2015; Azevedo and al., 2014; Ball and al., 2013).

The second remarks concern the identification of fiscal consolidations, or more precisely, how to measure fiscal consolidations. It is important to indicate that the standard statistical approach, which is the change in the cyclically adjusted primary balance, suffers from error measurements and struggles to fully and efficiently identify fiscal consolidations periods, as well as, to differentiate a fiscal consolidation carried out to reduce public debts from others (Ball and al., 2013; Agnello and Sousa, 2014; Devries and al., 2011). Concerning the narrative approach developed by Devries and al. (2011), although it is the most used approach in recent studies, Agnello and Sousa (2014) point out that this action-based measure does not consider political, institutional, or economic factors that might influence the adoption of fiscal consolidations measures.

To cope with these issues, some studies have been using several approaches (or alternative approaches[15]) to lessen the possible biases generated by either the cyclically adjusted primary balance or the narrative approach (Salotti and Trecroci, 2015; Woo and al., 2013). Also, studies have been using different econometric techniques to deal with econometric problems such as reverse causality, or endogeneity problems[16].

13) Few countries and years, see Woo and al. (2013)
14) Market income, disposable income and consumption expenditure, see Woo and al. (2013)
15) For instance, consolidations from Alesina and Ardagna (2010), Nickel and al. (2010) among others, see Perotti (2011), Alesina and Ardagna (2013) and Leigh, Daniel, et al. (2010)
16) Fixed and random effects for panel data; panel regression system (seemingly unrelated regression), dynamic panel regressions (GMM models, univariate autoregressive models) among others.

REFERENCES

Afonso, A., Schuknecht, L., & Tanzi, V., "Income distribution determinants and public spending efficiency," The Journal of Economic Inequality, Vol. 8, No. 3, 2010.

Agénor, P. R., "Business cycles, economic crises, and the poor," The Journal of Policy Reform, Vol. 5, No. 3, 2002.

Agnello, L., & Sousa, R. M., "Fiscal adjustments and income inequality: a first assessment," Applied Economics Letters, Vol. 19, No. 16, 2012.

Agnello, L., & Sousa, R. M., "How does fiscal consolidation impact on income inequality?," Review of Income and Wealth, Vol. 60, No. 4, 2014.

Albanesi, S., "Inflation and inequality," Journal of Monetary Economics, Vol. 54, No. 4, 2007.

Alesina, A., & Ardagna, S., "Tales of fiscal adjustment," Economic policy, Vol. 13, No. 27, 1998.

Alesina, A., & Ardagna, S., "Large changes in fiscal policy: taxes versus spending," Tax policy and the economy, Vol. 24, No. 1, 2010.

Alesina, A., & Ardagna, S., "The design of fiscal adjustments," Tax policy and the economy, Vol. 27, No. 1, 2013.

Alesina, A., Ardagna, S., Perotti, R., & Schiantarelli, F., "Fiscal policy, profits, and investment," American economic review, Vol. 92, No. 3, 2002.

Alesina, A., & Perotti, R., "Fiscal expansions and adjustments in OECD countries," Economic policy, Vol. 10, No. 21, 1995.

Alesina, A., & Perotti, R., "Fiscal adjustments in OECD countries: composition and macroeconomic effects," Staff Papers, Vol. 44, No. 2, 1997.

Alesina, A., Perotti, R., Tavares, J., Obstfeld, M., & Eichengreen, B., "The political economy of fiscal adjustments," Brookings Papers on Economic Activity, Vol. 1998, No. 1, 1998.

Alesina, A., Ardagna, S., Perotti, R., & Schiantarelli, F., "Fiscal policy, profits, and investment," American economic review, Vol. 92, No. 3, 2002.

Atkinson, A. B., & Brandolini, A., "Promise and pitfalls in the use of secondary data-sets: Income inequality in OECD countries as a case study," Journal of economic literature, Vol. 39, No. 3, 2001.

Azevedo, J. P., David, A. C., Bastos, F. R., & Pineda, E., "Fiscal adjustment and income inequality: sub-national evidence from Brazil," International Monetary Fund Working Papers, No. 14/85, 2014.

Ball, L. M., Furceri, D., Leigh, M. D., & Loungani, M. P, "The distributional effects of fiscal consolidation," International Monetary Fund, Working Paper No. 13/151, 2013.

Bastagli, F., Coady, D., & Gupta, S., "Income Inequality and Fiscal Policy," International Monetary Fund, Staff Discussion Note No. 12/08, 2012.

Blanchard, O. J., "Suggestions for a new set of fiscal indicators," OECD Economics Department Working Papers, OECD Publishing, Paris, No. 79, 1990.

Blanchard, O. J., "Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries: Comment," NBER Macroeconomics Annual, Vol. 5, 1990.

Blanchard, O., & Perotti, R., "An empirical characterization of the dynamic effects of changes in government spending and taxes on output," The Quarterly Journal of economics, Vol. 117, No. 4, 2002.

Caminada, K., & Goudswaard, K., "International trends in income inequality and social policy," International Tax and Public Finance, Vol. 8, No. 4, 2001.

Chu, M. K. Y., Davoodi, M. H. R., & Gupta, M. S., "Income distribution and tax and government social spending policies in developing countries," International Monetary Fund, Working Paper No. 00/62, 2000.

Claus, I., Martinez-Vazquez, J., & Vulovic, V., "Government fiscal policies and redistribution in Asian countries," International Center for Public Policy Working Paper Series, Andrew Young School of Policy Studies, Georgia State University, No. 1213, 2012.

Cubero, R., & Hollar, I. V., "Equity and fiscal policy: the income distribution effects of taxation and social spending in

Central America," International Monetary Fund, Working Paper No. 10/112, 2010.
De Freitas, J., "Inequality, the politics of redistribution and the tax mix," Public Choice, Vol. 151, No. 3-4, 2012.
De Mello, L., & Tiongson, E. R., "Income inequality and redistributive government spending," Public finance review, Vol. 34, No. 3, 2006.
Duncan, D., & Sabirianova Peter, K., "Tax progressivity and income inequality," Andrew Young School of Policy Studies Research Paper Series, No. 08-26, 2008.
Duncan, D., & Peter, K. S., "Unequal inequalities: Do progressive taxes reduce income inequality?" International Tax and Public Finance, Vol. 23, No. 4, 2016.
Easterly, W., & Fischer, S., "Inflation and the Poor," The World Bank, Policy Research working paper, No. 2334, 1999.
Feldstein, M., "Government deficits and aggregate demand," Journal of monetary economics, Vol. 9, No. 1, 1982.
Gemmell, N., & Morrissey, O., "Distribution and poverty impacts of tax structure reform in developing countries: how little we know," Development Policy Review, Vol. 23, No. 2, 2005.
Giavazzi, F., & Pagano, M., "Can severe fiscal contractions be expansionary? Tales of two small European countries," NBER macroeconomics annual, Vol. 5, 1990.
Giavazzi, F., & Pagano, M., "Non-Keynesian Effects of Fiscal Policy Changes: International Evidence and the Swedish Experience," NBER Working Paper, No. w5332, 1995.
Goñi, E., López, J. H., & Servén, L., "Fiscal redistribution and income inequality in Latin America," The World Bank Policy Research Working Paper, No. WPS 4487, 2008.
Guajardo, J., Leigh, D., & Pescatori, A., "Will it hurt? Macroeconomic effects of fiscal consolidation," International Monetary Fund World Economic Outlook, 2010.
Gupta, S., & Keen, M., "Fiscal policy and income inequality," International Monetary Fund Policy Paper, 2014.
Harberger, A. C., "The incidence of the corporation income tax," Journal of Political economy, Vol. 70, No. 3, 1962.
Joumard, I., Pisu, M., & Bloch, D., "Less income inequality and more growth–are they compatible? Part 3. Income redistribution via taxes and transfers across OECD countries," OECD Economics Department Working Papers, No. 926, 2012.
Martinez-Vazquez, J., Moreno-Dodson, B., & Vulovic, V., "The impact of tax and expenditure policies on income distribution: Evidence from a large panel of countries," Andrew Young School of Policy Studies Research Paper Series, No. 12-30, 2012.
McDermott, C. J., & Wescott, R. F., "An empirical analysis of fiscal adjustments," International Monetary Fund, Staff Papers, Vol. 43, No. 4, 1996.
Meltzer, A. H., & Richard, S. F., "A rational theory of the size of government," Journal of political Economy, Vol. 89, No. 5, 1981.
Miller, S. M., & Russek, F. S., "The relationship between large fiscal adjustments and short - term output growth under alternative fiscal policy regimes," Contemporary Economic Policy, Vol. 21, No. 1, 2003.
Muinelo-Gallo, L., & Roca-Sagalés, O., "Economic growth, inequality, and fiscal policies: a survey of the macroeconomics literature," Theories and Effects of Economic Growth, R.L. Bertrand (Ed.), Nova Science Publishers, Inc., 2011.
Muinelo-Gallo, L., & Roca-Sagalés, O., "Is the Fiscal Policy Increasing Income Inequality in Uruguay," Journal of Economics, Vol. 2, No. 3, 2014.
Mulas-Granados, C., "Fiscal adjustments and the short-term trade-off between economic growth and equality," Hacienda Pública Española, IEF, Vol. 172, No. 1, 2005.
Musgrave, R.A., The Theory of Public Finance, New York, McGraw-Hill, 1959.
Nickel, C., Rother, P., & Zimmermann, L., "Major public debt reductions: Lessons from the past, lessons for the future," European Central Bank Working Paper Series, No. 1241, 2010.
OECD, "Fiscal consolidation: targets, plans, and measures", OECD Journal on Budgeting, Vol. 11/2, 2011.
Paulus, Alari, et al., "The effects of taxes and benefits on income distribution in the enlarged EU," Institute for Social and

Economic Research, EUROMOD Working Papers No. EM8/09, 2009.
Perotti, R., "The austerity myth: Gain without Pain?," NBER Working Papers, No. 17571, 2011.
Pescatori, A., Leigh, M. D., Guajardo, J., & Devries, M. P., "A new action-based dataset of fiscal consolidation," International Monetary Fund Working Paper, No. 1/128.
Ramey, V. A., & Shapiro, M. D., "Costly capital reallocation and the effects of government spending," Carnegie-Rochester Conference Series on Public Policy, Vol. 48, No. 1, 1998.
Romer, C. D., & Romer, D. H., "The macroeconomic effects of tax changes: estimates based on a new measure of fiscal shocks," American Economic Review, Vol. 100, No. 3, 2010.
Salotti, S., & Trecroci, C., "Can fiscal policy mitigate income inequality and poverty?," SSRN Electronic Journal Working Paper, No. 2379441, 2015.
Samanta, S. K., & Cerf, G., "Income distribution and the effectiveness of fiscal policy: evidence from some transitional economies," Journal of Economics and Business, Vol. 1, 2009.
Tanzi, V., & Chu, K. Y., Income distribution and high-quality growth, Cambridge and London, MIT Press, 1998.
Tanzi, V., Chu, K. Y., & Gupta, S., Economic Policy and Equity, Washington, International Monetary Fund, 1999.
The OECD Economic Outlook: Sources and Methods.
The World Bank Group, World Bank Group Strategy, Washington, DC, World Bank, 2013.
Wang, C., Caminada, K., & Goudswaard, K., "Income redistribution in 20 countries over time," International Journal of Social Welfare, Vol. 23, No. 3, 2014.
Wolff, E. N., & Zacharias, A., "The distributional consequences of government spending and taxation in the US, 1989 and 2000," Review of income and wealth, Vol. 53, No. 4, 2007.
Woo, J., Bova, M. E., Kinda, M. T., & Zhang, M. Y. S., "Distributional consequences of fiscal consolidation and the role of fiscal policy: What do the data say?," International Monetary Fund Working paper, No. 13/195, 2013.

APPENDIX

Table 1: The empirical literature on fiscal policy and inequality[17)]

Authors	Sample	Inequality measure	Period	Findings
Afonso and al. (2010)	Advanced countries	Gini coefficient/ income share of the poorest 40%/ per capita income of the poorest quintile of the population	Different selected periods	There is a correlation between public expenditures (transfers, subsidies, and social expenditures) and income inequality. No significant results are found for the taxes. High public expenditures in education coupled with low property tax revenues and a high per capita GDP contribute to a good efficiency of public expenditures.

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17) Drawn from Woo and al. (2013)

Table 1: The empirical literature on fiscal policy and inequality[18] (continued)

Authors	Sample	Inequality measure	Period	Findings
Caminada and Goudswaard (2001)	OECD countries/ 101 countries	Different selected periods	Gini coefficients/ redistribution measures based on Kakwani (1986) and Ringen (1991)	An increase in income inequality is correlated with an increase in the expenditure ratio and the replacement rate. The changes in income inequality are correlated with changes in social policies. A large increase in inequality is followed by low expenditure ratio and replacement rate in the Netherlands. The rise in inequality of disposable household income is due to changes in social transfers, the unequal distribution of primary income, and the low progressivity of the tax system (Netherlands). Changes in social policies mainly social transfers lead to uneven income distribution.
Chu and al. (2000)	19 developing countries	Gini coefficients	1979s-1990s	Tax systems and expenditure policies are modest. Income tax, health, and education expenditures are progressive.
Cubero and Hollar (2010)	Central American countries	Lorenz and concentration curves Gini coefficients Kakwani and Reynolds-Smolensky indexes	1995-2008	Income taxes, education, and health expenditures are progressive. VAT, sales taxes, international trade taxes, and social security expenditures are regressive.
Duncan and Sabirianova (2016)	A large panel of countries (165 countries)	Gini coefficients based on disposable income and expenditure or consumption	1981-2005	Progressivity reduces income inequality (observed inequality), with a more pronounced effect in democratic countries. This effect is small and negative for actual inequality, especially in countries with a favorable environment for tax evasion. Changes in progressivity at the top of the tax schedule are more effective at lessening observed inequality.

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18) Drawn from Woo and al. (2013)

Table 1: The empirical literature on fiscal policy and inequality[19] (continued)

Authors	Sample	Inequality measure	Period	Findings
Gemmell and Morrissey (2005)	Six African countries	Lorenz and concentration curves	The 1960s-1990s	Tax systems are regressive, especially for low incomes.
Goni, Lopez, and Serven (2008)	Latin American countries and western European countries	Market and disposable income Gini coefficients	Different selected years	Expenditure policies have great potential for redistribution.
Joumard and al. (2012)	OECD countries	Net income and gross income Gini indices Poverty after and before taxes	Mid-1990s-late 2000s	A more uneven distribution of market income leads to more redistribution. Cash transfers such as family and housing benefits contribute substantially to lessen the income gap. Personal income tax, family, and housing benefits are progressive. Consumption, real estate taxes, and pension benefits are regressive.
Luiz de Mello and R. Tiongson (2003)	About 56 countries	Government financed redistributive transfers to individuals/households	1970-1997	More inequality is associated with less redistribution. The relationship between redistribution and inequality depends on the initial level of inequality. There is a negative relationship between income inequality and redistribution.
Martinez-Vazquez and al. (2012)	150 countries	Gini coefficient based on consumption expenditures	1970-2009	Progressive personal and corporate income taxes reduce income inequality. The effect of corporate income taxes reduced in globalized countries. General consumption taxes, excise taxes, and customs duties affect negatively the redistribution of income leading to an increase in inequality. Higher shares of GDP on social welfare, education, health, and housing public expenditures contribute to reducing inequality.

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19) Drawn from Woo and al. (2013)

Table 1: The empirical literature on fiscal policy and inequality[20] (continued)

Authors	Sample	Inequality measure	Period	Findings
Paulus and al. (2009)	19 European countries	Gini coefficients and deciles	the mid-2000s	Benefits, personal taxes, and social contributions have a positive impact on income redistribution. However, social contributions appear to have a less redistributive effect than benefits and personal taxes.
Salotti and Trecroci (2015)	OECD countries	Gini coefficient (disposable income)/ Percentage of the population living below 60% of the median-equivalised disposable income	1970-2010	Fiscal policy affects income distribution. Government final consumption expenditures reduce inequality. Education and social expenditures have equalizing effects. The bottom and the top tail of income distribution are affected by fiscal policies.
Samanta and Georg Cerf (2009)	10 transitional and developing countries	Log of real GDP/ real GDP/ Gini coefficient	1991-2003	More inequality diminishes the effectiveness of the fiscal policy. A more uneven distribution of income might generate higher levels of government expenditures.
Wang and al. (2014)	20 countries	Gini coefficients/ redistribution measures based on Kakwani (1986) and Ringen (1991)	Mid-1980s-mid-2000s	Offsetting effect of redistribution through direct taxes and transfers. Increases in benefits explained increases in redistribution. Redistributive effects are important than the tax effects (although they tends to reduce redistribution).
Wolff and Zacharias (2007)	United States of America	Pre- and post-fisc incomes (measures of economic well-being)	1989 and 2000	Public consumption and transfers are progressive. Taxes increase inequality. Government expenditures decrease inequality.

Source: Woo and al. (2013)

20) Drawn from Woo and al. (2013)

Table 2: The empirical literature on the effects of fiscal consolidations on the economy[21)]

Authors	Sample	Fiscal consolidation measure	Period	Findings
Alesina and Ardagna (1998)	OECD countries	Primary structural balance increases by at least 1.5% of GDP in two consecutive years	1960-1995	GDP growth rate increases during consolidations and decreases after (in the case of expansionary contractions). The composition and size are important. However, the size is less important.
Alesina, Ardagna, Perotti, and Schiantarelli (1999)	18 OECD countries	Primary structural balance increases by at least 2% of GDP in one year or 1.25% of GDP in two consecutive years	1960-1996	A reduction in government expenditures leads to an increase in investment after fiscal consolidations. (The same effects are observed for an increase in labor taxes and a reduction in government wages) The composition and initial conditions are important.
Alesina and Perotti (1997)	20 OECD countries	Primary structural balance increases by at least 1.5% of GDP in one year or 1.25% of GDP in two consecutive years	1960-1994	GDP growth rate increases during consolidations and decreases after (in the case of successful consolidations). The composition is important
Alesina, Perotti, and Tavares (1998)	19 OECD countries	Primary structural balance increases by 1.5% of GDP in one year	1960-1995	GDP growth rate increases during fiscal consolidations and after (in the case of successful consolidations). The composition and size are important. However, the size is less important.
Giavazzi and Pagano (1996)	19 OECD countries	Any period where the primary structural balance moved in a consistent direction; a large consolidation episode is defined by a cumulative 5% point of GDP change.	1970-1992	An increase in taxes coupled with reductions in transfers increases private consumption in the long-term.
McDermott and Wescott (1996)	20 OECD countries	Primary structural balance increases by at least 1.5% of GDP in two years.	1970-1995	GDP growth rate increases during consolidations and decreases after (in the case of successful consolidations). The size and composition are important. Reductions in expenditures (transfers and government wages) are conducive to successful fiscal consolidations.

Source: Mulas-Granados (2005)

21）Drawn from Mulas-Granados (2005)

Table 3: The empirical literature on the effects of fiscal consolidations on income inequality

Authors	Sample	Inequality measure	Fiscal consolidations measure	Period	Findings
Agnello and Sousa (2011)	18 OECD countries	Gross and net income Gini inequality indexes	Alesina and Ardagna (2010) approach Fiscal adjustments/ Successful and unsuccessful adjustments	1970–2010	Fiscal adjustments diminish income inequality. Successful fiscal adjustments contribute to a more equal redistribution of income. Expansionary fiscal consolidations contribute substantially to lessen income inequality. Fiscal consolidation aiming to promote medium-term growth contributes to reducing inequality.
Agnello and Sousa (2014)	18 industrialized countries	Gini inequality index (gross and net of taxes)	Devries and al. (2011) database	1978-2009	Income inequality increases during periods of fiscal consolidations. Fiscal adjustments driven by reductions in expenditures are more harmful to inequality. Fiscal adjustments driven by increases in taxes have an equalizing effect. The size and composition of fiscal consolidations are important.
Azevedo and al. (2014)	Brazilian states	Gini index based per capita after public and private transfers but before taxes/ the shared prosperity (The World Bank, 2013)	Cyclically adjusted primary balance as a share of state GDP	1995-2011	Fiscal consolidations do not affect income inequality. Fiscal consolidations do affect the measure of shared poverty.
Ball and al. (2013)	17 OECD countries	Gini coefficients for disposable income/ the shares of wage and profits in GDP	Devries and al. (2011)	1978-2009	Fiscal consolidations increase inequality. Fiscal consolidations reduce the wage income share and increase long-term unemployment. The effects of fiscal consolidations are greater when they are driven by reductions in expenditures.

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Table 3: The empirical literature on the effects of fiscal consolidations on income inequality (continued)

Authors	Sample	Inequality measure	Fiscal consolidations measure	Period	Findings
Salotti and Trecroci (2015)	22 advanced countries	Gini index based on disposable income/ Poverty measure (percentage of the population living below 60% of the median equivalised disposable income	Nickel and al. (2010) approach Devries and al. (2011)	1970-2010	Large fiscal consolidations and expansions do not affect significantly income distribution.
Woo and al. (2013)	17 OECD countries	Income inequality indicators/ dispos able income-based Gini coefficients	Devries and al. (2011)	1978-2009	Fiscal consolidations are more likely to increase inequality. Expenditure-based fiscal consolidations are more detrimental to inequality. Fiscal consolidations in crease unemployment which in turn increases inequality. The composition of fiscal consolidations is important.

Table 4: Fiscal impulse measures defined by Alesina and Perotti (1995)[22]

Fiscal measure	Definition
ΔPrimary	$(g_t-t_t)-(g_{t-1}-t_{t-1})$
The Blanchard measure	$(g_t(U_{t-1})-t_t)-(g_{t-1}-t_{t-1})$
The OECD measure	$[(G_t-T_t)-(G_{t-1}(1+\tilde{y}_t)-T_{t-1}(1+y_t))]/Y_{t-1}$
The International monetary fund measure	$[(G_t-T_t)-(G_0(1+\tilde{y}_t)-T_0(1+y_t))]/Y_{t-1}$

Source: Alesina and Perotti (1995)

g_t: represents the total current expenditure plus the gross capital accumulation minus interest payments as a share of GDP.

t_t: represents the total revenues as a share of GDP.

G_t: represents the total current expenditure plus the gross capital accumulation minus interest payments.

G_0: represents the value of G in a base year when the actual output is equal to the potential output.

T_t: represents the total revenues.

T_0: represents the revenues in a base year.

U_t: represents the unemployment rate

Y_{t-1}: represents the nominal GDP.

$\tilde{y}_t$: represents the rate growth of the nominal potential GDP.

y_t: represents the rate growth of the nominal GDP.

Examples of definitions on the fiscal stance measures

Ⅰ. Definition of the fiscal stance by Alesina and Perotti (1995)[23]

1. The fiscal stance is neutral if the fiscal measure ∈(−0.5%, 1.5%) (of GDP).
2. The fiscal stance is defined as a small (or loose) expansion if the fiscal measure ∈(0.5%, 1.5%) (of GDP).

   It is defined as a strong (or very loose) expansion if the fiscal measure ≥1.5% (of GDP).
3. The fiscal stance is defined as a small (or tight) adjustment if the fiscal measure ∈(−0.5%, −1.5%) (of GDP).

   It is defined as a strong (or very tight) adjustment if the fiscal measure ≤−1.5% (of GDP).

Ⅱ. Definition of successful adjustments by Alesina and Perotti (1995)[24]

Successful adjustment (in year t): the fiscal stance measure in year t should have the gross debt/GDP ratio in year t+3 is at least 5% points of GDP lower than in year t.

22) Drawn from Alesina and Perotti (1995), See Alesina and Perotti (1995) for further explanations
23) Drawn from Alesina and Perotti (1995), See Alesina and Perotti (1995) for further explanations
24) Drawn from Alesina and Perotti (1995), See Alesina and Perotti (1995) for further explanations

Ⅲ. Definition of periods (episodes) of fiscal adjustments and fiscal stimuli by Alesina and Ardagna (2010)[25)]

1. A period (episode) of fiscal adjustment (or stimulus) is characterized by a year in which the cyclically adjusted primary balance improves (or deteriorates) by at least 1.5%.

Ⅳ. Definition of expansionary fiscal adjustments and fiscal stimuli and successful adjustments by Alesina and Ardagna (2010)[26)]

1. An episode of fiscal adjustment (fiscal stimuli) is expansionary if the average growth rate of GDP in the first period of the episode and in the two years after is greater than the value of 75^{th} percentile of the same variable empirical density in all episodes of fiscal adjustments (fiscal stimuli).
2. A successful fiscal adjustment is a period in which the cumulative reduction of the debt/GDP ratio three years after the beginning of a fiscal adjustment is greater than 4.5% points.

25) Drawn from Alesina and Ardagna (2010), See Alesina and Ardagna (2010) for further explanations
26) Drawn from Alesina and Ardagna (2010), See Alesina and Ardagna (2010) for further explanations