

# Redistribution and stabilization of income per capita of households by regions

## PRELIMINARY DRAFT

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## Executive summary

*The effects of redistribution and stabilization of income produced by the existing complex systems of taxes and transfers are difficult to assess. However, the observable redistribution and stabilization of per capita income of households by regions is quite similar to what would result from applying a negative linear income tax, with a constant marginal tax rate and a fixed transfer per capita, under the same aggregate resource constraint, i.e. yielding the same net (positive or negative) tax revenue as the actual system. This paper relies on this finding to describe the effects of the actual system through the properties of the linear tax. The redistribution effect of this tax reduces inequality in primary incomes (wages, operating surplus and other market incomes) in a constant proportion in each period, as if optimizing locally a social welfare function depending negatively on income inequality measured by the coefficient of variation. The stabilizing effect smooths out fluctuations in disposable income (which equals primary income after taxes and social contributions have been paid and social benefits and other transfers have been received) with respect to changes in primary income along time. By estimating the parameters of this equivalent linear income tax for each year, the redistributive and stabilizing effects can be calculated and compared with the actual changes in inequality, as measured through the coefficients of variation of primary and disposable incomes, and with the observed fluctuations through time of primary and disposable incomes. By separating discretionary changes (those associated to the changes in the parameters of the linear tax for a given income level) from automatic effects (those associated to changes in the income level for a given linear tax) we can assess the stance of fiscal policies implemented through the tax and transfers systems. This work presents the analysis of these issues for the United States, The United Kingdom, Germany, France, Italy and Spain, based on the official estimates of the income accounts of households by regions. The final section offers the main conclusions.*

*The existing systems of taxes and transfers provide effective redistribution and stabilization of per capita disposable incomes of households by regions, without apparently affecting the sources of inequality and fluctuation of the respective economies. For the period 2000-2012 on average, redistributive effects are found to be stronger in France (48%) and Germany (43%) than in the US and the UK (around 25%), and in Italy and Spain (around 18%). Redistribution effects, which operate primarily through the transfer part of the system, have developed in divergent directions in the different countries. The size and structure of automatic stabilizing effects is close to the size and structure of the redistributive effects. Discretionary changes have strengthened automatic stabilization effects in the US and the UK (substantially) and in Spain (slightly), have been neutral in Germany, and have weakened them in France (substantially) and Italy (marginally). Transfers have been very expansionary on average over the period, determining both the orientation and the stabilising impact of discretionary changes. Income taxes, and social security contributions in the European countries, have struggled both to finance the expansion of transfers and to modulate its impact on disposable income growth.*

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# 1 Introduction

**The academic literature, diversified and complex, dealing with redistributive and stabilising effects of fiscal policies is very rich, both in theoretical and empirical approaches.** A subset of the empirical literature uses macroeconometric models, estimated and/or calibrated, and frequently based on microdata, to simulate scenarios of alternative policies and perform counterfactual experiments<sup>1</sup>. The use of models is indeed essential to evaluate ex ante the potential effects of policies, but not to identify and describe ex post the outcome of past policies. This paper is related to another subset of the literature, which uses econometric techniques to estimate the redistributive and stabilising effects from the available data on the income per capita of average or “representative” individuals by countries or regions<sup>2</sup>. The available studies and estimates in this branch, which is rather theoretically agnostic and data driven, differ widely in the definitions of variables, in the databases used as sources, in the periods and regions considered and in the measures of inequality and methods used in the estimations<sup>3</sup>.

**The usual approach in this empirical literature** since the papers by Mélitz y Zumer (1998, 2002) is to estimate both effects with panel data, exploiting the cross section dimension of the panel to identify the redistributive effect and the time series dimension, with the variables expressed in rates of change, to identify the stabilising effects. The existing literature, beyond justifying intuitively the definition of the redistributive and

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<sup>1</sup> On redistribution effects, see for example Olivier Bargain, Tim Callan, Karina Doorley and Claire Keane: “Changes in Income Distribution and the Role of Tax-benefit Policy During the Great Recession: An International Perspective”. EUROMOD Working Paper No. EM 21/13, December 2013 [https://www.iser.essex.ac.uk/euromod/publications?a=Olivier+Bargain&action=euromod\\_search&controller=publications](https://www.iser.essex.ac.uk/euromod/publications?a=Olivier+Bargain&action=euromod_search&controller=publications). Concerning stabilisation effects, see for example Dolls, Mathias, Clemens Fuest, Jan Kock, Andreas Peichl, Nils Wehrhöfer and Christian Wittneben (2015), *Automatic Stabilizers in the Eurozone: Analysis of their Effectiveness at the Member State and Euro Area Level and in International Comparison*, Mannheim. [Download](#)

<sup>2</sup> As we will deal always with these individuals, we will often drop for brevity reasons the adjectives “regional” and “per capita” when referring to incomes, taxes, etc. and their redistribution and stabilisation.

<sup>3</sup> A recent contribution in this area with estimates for Australia, Canada and the US, including a useful review of the literature can be found in Poghosyan, Senhadji and Cottarelli (2015). Two good pieces of work for Spain, where the reader can also find the references to the most relevant literature, are Capó (2008) and Lago-Peñas, Prada y Vaquero (2013).

stabilising effects of per capita income of households estimated econometrically with sophisticated methods, does not offer a formal framework of analysis and interpretation. The results found in international studies are very diverse<sup>4</sup>, and the interpretation of the estimates, of their differences and of their determinants, is not straightforward. Even for the same country, the estimates of both effects differ both in size, with the estimates of stabilising effects being generally smaller and much more uncertain than those of the redistributive one, and in the relative contributions of the different redistributive operations that link primary and disposable incomes. Differences across countries are also puzzling, with the same redistributive operation having contrary signs in different countries.

**The objective of this paper is to facilitate a simple measurement and interpretation of the observable effects.** Concerning the method, the value which the present analysis intends to add is, rather than providing new estimates, facilitating their understanding by representing the complex system of the existing taxes and transfers as a negative linear income tax. Such an approach allows simplifying both the methods of estimation and the interpretation of the results. The comparison of the effects observed in reality or estimated with simple linear regressions with those that would produce an equivalent linear tax (ELT in what follows, which has the same aggregate values of primary income and the various redistributive operations, resulting in the same aggregate value of disposable income) contributes to understand the relationship between those effects and the relative influence of their determining factors. Concerning the empirical basis of the analysis, the income accounts of households by regions in the European Union, as well as the personal income by states for the US, have been available for some time<sup>5</sup>. These accounts provide solid statistical information, with homogeneous definitions in national accounts terms in Europe, estimated with common procedures and, therefore, sufficiently comparable. This work relies on this information and its estimates confirm in

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<sup>4</sup> See, for example, the review of the literature contained in Arachi, Ferrario and Zanardi (2006). <http://ecomod.net/sites/default/files/document-conference/ecomod2007-rum/162.pdf>

<sup>5</sup> A short description for the European countries can be obtained in <http://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-13-001>. For the US, the methodology of the conceptual framework, the data sources, and the statistical methods used by the Regional Income Division of the Bureau of Economic Analysis (BEA) to estimate personal income and employment for states can be found in <http://www.bea.gov/regional/pdf/spi2014.pdf>.

broad terms those previously obtained in other studies for Spain. In this paper, we analyse the redistribution and stabilisation of per capita primary income of households by regions in the period 2000-2012 relying on the information of the regional income accounts of households provided by the national institutes of statistics of the US (Bureau of Economic Analysis), the UK (Office for National Statistics), Germany (DESTATIS), France (INSEE), Italy (ISTAT) and Spain (INE) for these years. In the European System of Accounts, these accounts are the allocation of primary incomes to compensation of employees, gross operating surplus and property incomes, whose balance is the primary income of households, and the secondary distribution of income, whose balance is the disposable income of households. Disposable income equals primary income plus social benefits other than in kind, less income taxes, less social security contributions and less other (net) transfers paid.

**The existing system of taxes and transfers can be represented with enough accuracy by an equivalent linear income tax**, whose parameters are estimated through simple linear regressions on the observed data. By replacing the actual system by an ELT, we can define the theoretical redistributive and automatic stabilising effects in a precise way. The redistributive effect is the ratio of the minimum guaranteed income (MGI in what follows, which is the intercept with the vertical axis of the estimated regression line of disposable incomes per capita with respect to primary or market incomes per capita) over the average disposable income. The automatic stabilisation effect is the ratio of the MGI to the average primary or market income. The definition of the redistributive effect of a linear tax has a univocally determined measure of inequality associated, which is the coefficient of variation of the income distribution. This association allows to check whether the theoretical and the observed redistribution effects are similar. The definition of the automatic stabilisation effect allows to check the deviations of observed effects from the automatic ones and assess the stance of discretionary policies.

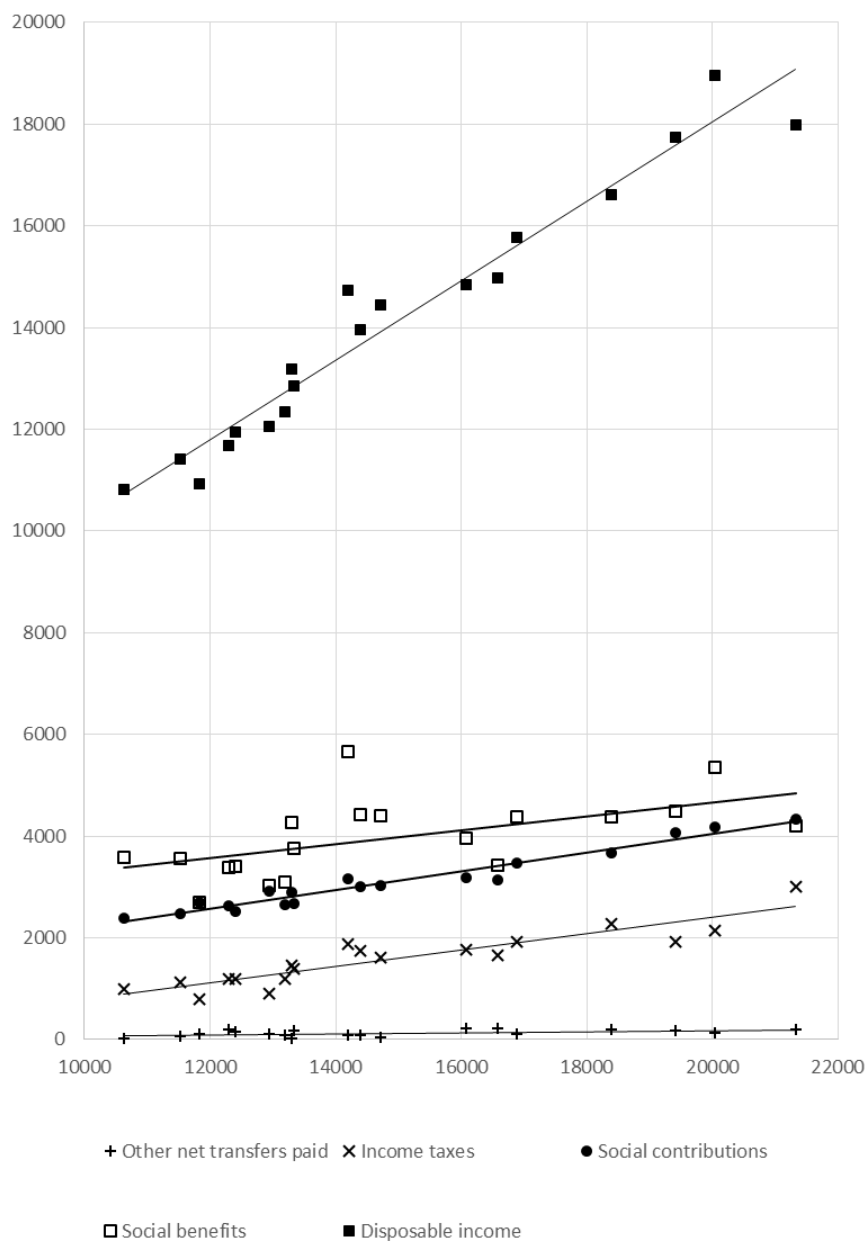
**The estimate of the ELT for Spain in 2012 is presented in chart 1, as an illustration.** On the horizontal axis appear the values of primary income per capita of the different Spanish regions, and on the vertical one the values per capita of the redistributive operations referred to 2012, as well as the regression lines fitted to each of these four operations. Each point represents the value of one variable in one of the seventeen regions plus two autonomous cities in Spain (in the vertical axis), as a function of the

primary income per capita of households in that region or town (in the horizontal axis). All absolute values considered in this work are expressed in current dollars, pounds or euros per capita. For example, in the far right of the chart can be seen that households resident in the Autonomous Region of Madrid had, in per capita terms and in the year 2012, a level of primary income of 21330 euros, received as social benefits 4198 euros, and paid as income taxes 3017 euros, as social contributions 4337 euros, and as other net transfers 194 euros, so that its disposable income was 17980 euros. The parameters estimated in these linear regressions (i.e., the intersection with the vertical axis and the slope of the line) define the structure of the ELT, and preserve the same accounting relationship linking the original variables in national accounts. As a consequence, this approach also facilitates an exact decomposition of the effect estimated on disposable income (the balance of the distribution account) into the contributions of the different operations (uses and resources) recorded in that account. The better the fit of these regressions the closer the effects observed in reality to those calculated from the parameters of the ELT identified in the estimations. As stressed by Atkinson (2011), “in considering fairness, we want to consider groups as well as individuals. Are the fruits of growth being distributed fairly between men and women, or between ethnic groups in the population, or between North and South?”<sup>6</sup> We examine the differences across regions within the same jurisdiction, with the same system of taxes and transfers. In doing that through the estimation of an ELT, it is also possible to identify the automatic stabilising properties implicit in the structure of the system of taxes and transfers and apply this estimations to the analysis of the aggregate working of the system in time from a macroeconomic point of view.

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<sup>6</sup> Recommendation 2 of the Stiglitz Commission on the measurement of economic performance and social progress stated that “while it is informative to track the performance of economies as a whole, trends in citizens’ material living standards are better followed through measures of household income and consumption”. Atkinson (2012, p. 51), quoting this recommendation, concludes that “we urgently need to make a reality of this recommendation, accelerating the steps already being taken, and to make it the starting point for macro-economic analysis”.

# 1. SPAIN EQUIVALENT LINEAR INCOME TAX 2012



**We will not consider the effects of changes in fiscal policy on the generation of primary income.** In the tradition of this branch of the literature, our analysis is also theoretically agnostic and not model-based. The existing tax and transfers systems have certainly important effects on the decisions of individuals to work, consume, invest, etc., as individual incentives depend on the structure of the system (regulations of taxes and benefits, etc.), which is relatively stable. We are interested in identifying the redistributive



and stabilising effects of this structure year after year on the incomes of “representative” individuals, defined as average individuals in the different regions of the country, as a stable mechanism with predictable results. We want to know whether disposable incomes per capita of households by regions are more or less equally distributed than their primary incomes in each year, and whether the former fluctuate more or less widely than the latter as time goes by. We do not consider the effects of changes in the parameters defining the structure of the system on the decisions of individuals and on key economic variables (the “multipliers” of fiscal policy, over which there is much uncertainty<sup>7</sup>). The changes in the estimated parameters of the ELT are left unexplained. We call “discretionary” the changes in disposable income produced by the changes in the parameters, keeping constant primary income, and “automatic” the changes in disposable income produced by the changes in primary income levels, keeping constant the parameters of the ELT. Therefore, the term “discretionary” should not be understood as “independent” or “exogenous” because it reflects policy decisions as well as reactions of all individuals to them and to the other changes in the economic environment. While the debate on the stabilising role of fiscal policy is focused on the effectiveness of automatic stabilisation and the impact of discretionary measures on output<sup>8</sup>, the approach taken here puts the emphasis on the identification and measurement of the redistribution and automatic stabilising effects of the structure of taxes and transfers on per capita disposable income of households by regions, taking as given primary income per capita. These operations are only a subset of fiscal policy decisions affecting redistribution and stabilisation. We leave out of the analysis, in particular, indirect taxes and benefits in kind, which have important effects on the redistribution and stabilisation effects of fiscal policy<sup>9</sup>.

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<sup>7</sup> See, for example, Thomas Warmedinger, Cristina Checherita-Westphal and Pablo Hernández de Cos (2015).

<sup>8</sup> See, for example, the discussion in Veld, Jan in ‘t, Larch, M., and Vandeweyer M. (2010).

<sup>9</sup> In Spain, for example, the redistributive impact of transfers in kind (health, education and social services provided free by the government to all individuals) is as important as the effect of all other redistribution operations taken together, although transfers in kind do not contribute much to the stabilisation of the adjusted income resulting from adding transfers in kind to disposable income.

**The costs associated to redistribution and stabilisation policies will not be discussed here.** The redistributive structure of the existing systems of taxes and transfers affects economic incentives and has some efficiency costs in terms of output losses. Active discretionary policies of income support in downturns have some deferred costs in terms of budget deficits and mounting debt levels. When considering redistribution and stabilisation of per capita income of households by regions, the structure of the tax and transfer system, as captured by the ELT, alleviate every year the regional differences in disposable and adjusted incomes with respect to those observed in primary incomes, but do not change much the disparities in market incomes observed year after year. The disparities are reduced but not corrected by the system. Similarly, the fluctuations in disposable incomes are attenuated with respect to the fluctuations of primary incomes by the structure of the system automatically, and also, at times, by discretionary policy measures. However, neither the structure of the system nor the active policies to manage it seem to do much in preventing or smoothing the fluctuations of output and market incomes themselves. The experience of the working of the tax and transfer systems in the period covered by the analysis, which includes years of hardship and turmoil like those of the Great Recession, without parallel since the years of the Great Depression is still under discussion. As we will see, when assessed through the simplified approach of the estimated ELT and their changes, the recent experience suggests that the redistributive and automatic stabilising effects of the system on regional incomes per capita of households are powerful and predictable. In contrast, the consequences of discretionary policies, if aimed at steering aggregate output fluctuations through household behaviour, and not just to alleviate their consequences on household disposable incomes, seem to have been of doubtful success.

**The content of this paper is as follows.** The definition and measurement of the redistributive and stabilising effects of a linear income tax and the relationship between both are presented in section 2. This section also presents a way to define the automatic and discretionary components of the stabilising effects and an associated characterization of the stance of fiscal policy, which will be used in the empirical analysis contained in section 3. In that section, we estimate the parameters of an ELT for each year and country. As a consequence, it is possible, first, to separate the redistributive effect from the stabilising effect; second, to differentiate the automatic and discretionary components of the stabilising effect; and third, to characterise the stance of fiscal policy

year by year in the different countries. The redistributive effect is determined each year by the parameters of the ELT for that year. The changes in the estimated parameters for two consecutive years allow to link the rates of change of primary and disposable incomes through the interaction, on one hand, of the stabilising (or destabilising) discretionary changes introduced in that structure for the second year, and on the other, of the automatic stabilisers embedded in the structure of the ELT in the second year. The main conclusions are summarised in the last section.

## 2 The redistributive and stabilising effects

### 2.1 The redistributive effect

**A negative linear income tax is the simplest theoretical mechanism to formalise the redistributive and stabilising effects.** A negative linear income tax is a combination of a proportional tax on the primary or market income of each individual and a fixed transfer (“a minimum income” or MGI) to each individual. Below a certain threshold of primary income the amount transferred is bigger than the proportional tax and the net result is a negative tax or positive transfer for the individuals whose primary income is below that threshold. The redistributive effect of this tax consists in reducing by a constant the distance to the mean of each individual’s share in disposable income with respect to what is his share in primary income. In this way, the shares of all individuals in disposable income are closer to equality than their shares in primary income by the same constant.

**The linear income tax is formally defined by:**

$$T(y_i) = \tau \cdot y_i - I \quad [1]$$

In this expression,  $y_i$  is the primary income of individual  $i$ , and  $T$  is the tax function, where  $\tau > 0$  is the constant marginal tax rate and  $I > 0$  is a constant transfer per capita (the MGI). Hence, from [1], we define disposable income of individual  $i$ ,  $d_i$  as:

$d_i = y_i - T(y_i) = (1 - \tau) \cdot y_i + I$ , and we derive:

$$\frac{d_i - d_m}{d_m} = (1 - \tau) \cdot \frac{y_i - y_m}{y_m} \cdot \frac{y_m}{d_m} = \frac{1 - \tau}{1 - t_m} \cdot \frac{y_i - y_m}{y_m} = \eta \cdot \frac{y_i - y_m}{y_m} \quad [2]$$

Where the sub-index  $m$  refers to the average of the distributions and  $t_m$  is the average tax rate:  $t_m = \frac{T(y_m)}{y_m} = \left[ \tau - \left( \frac{I}{y_m} \right) \right]$ . Equation [2] shows that the distance of any individuals’ disposable income to the mean income, as a proportion of the mean of disposable income, is a constant  $\eta$  of the distance of the individual primary income to the mean of primary income. This constant  $\eta = \frac{1 - \tau}{1 - t_m}$  is the residual tax progressivity, or elasticity of disposable income with respect to initial income, measured at the mean of

the distribution of primary income<sup>10</sup>. Therefore, the dispersion of disposable incomes around their mean is a linear contraction (for  $\eta < 1$ ) of the dispersion of gross incomes around their mean. This type of redistribution is specific of a linear tax, which is the only redistributive mechanism that produces a net tax revenue and a redistributive effect not dependent on the distribution of primary income, but only on the parameters of the tax function and on the mean of the distribution<sup>11</sup>.

**The redistributive effect of a linear tax is measured by  $1 - \eta$ , and the associated index of inequality is the coefficient of variation.** One of the most frequently used indices to measure income inequality is the coefficient of variation (CV in what follows), which is defined as the ratio of the standard deviation to the mean of the income distribution. For a variable  $x_i$  the coefficient of variation  $CV(x_i)$  is defined by

$$CV(x_i) = \frac{1}{x_m} \left[ \frac{1}{N} \sum_{i=1}^N (x_i - x_m)^2 \right]^{1/2}$$

From equation [2] it follows that:

$$CV(d_i) = \eta \cdot CV(y_i).$$

Hence, in the redistribution of income operated through a linear tax, the CV of disposable income is a fraction (for  $\eta < 1$ ) of the CV of primary income, and the redistributive effect can be measured by one minus this fraction:

$$1 - \left[ \frac{CV(d_i)}{CV(y_i)} \right].$$

**The type of redistribution of a linear tax maximizes a social welfare function which depends on income equality.** The fact that the distributions of primary and disposable incomes are related “as if” the redistribution had been produced by the operation of a linear tax allows to deduce what is the form of the social welfare function “implicit” in the observed redistribution of income. To illustrate the meaning of the redistributive effect

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<sup>10</sup> See Marín, J. (1985): Algunos índices de progresividad de la imposición estatal sobre la renta en España y otros países de la OCDE. Documento de trabajo 8529. Banco de España. Servicio de Estudios.

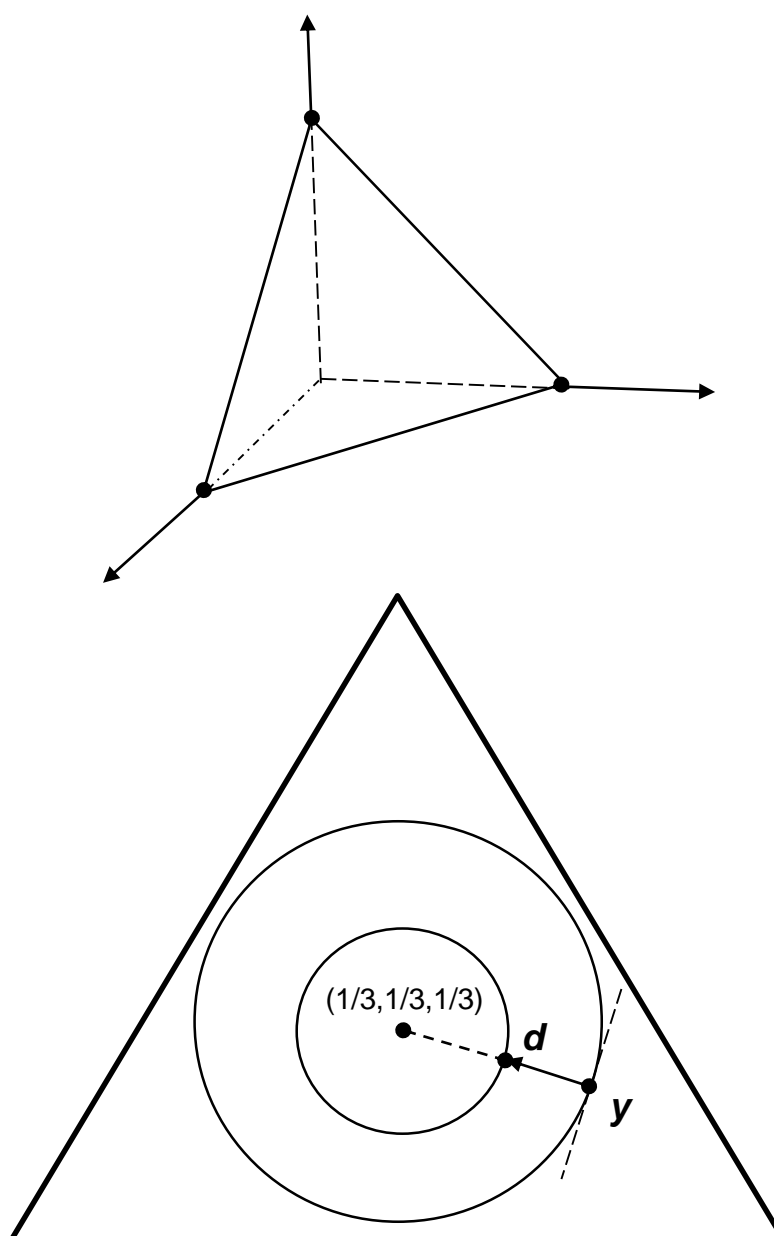
<sup>11</sup> A formal proof of this proposition can be found in Marín, José (1989): Dos propiedades del impuesto lineal, *Investigaciones Económicas* vol. XIII, nº 1, 1989, pp. 3-14. <http://193.146.141.99/investigacion/revistas/paperArchive/Ene1989/v13i1a1.pdf>

produced by the linear tax and its measurement by the CV, it is useful to analyse the case of three individuals (A, B, C). Figure 1 shows in the upper part a simplex in  $R^3$ , that is, a triangle in the three-dimensional space with its vertices at point one of each of the three axes. Each point in this triangle represents a distribution of income between the three individuals. The vertices represent distributions in which one individual gets all income. The centre of the simplex is the equal distribution (1/3, 1/3, 1/3). Along each angle bisector the individuals placed in the other two angles have the same income share, lines that are parallel to any of the sides represent the same share in income of the individual placed in the angle opposite to that side, etc. Starting from an initial distribution of primary income (point  $y$ ), the linear tax produces a redistribution such that the distribution of disposable income (point  $d$ ) is closer to the centre of the simplex by a constant ( $\eta < 1$ ) along a straight line joining point  $y$  with the centre, as entailed by equation [2]. The distance from each point to the centre is captured by the CV. All points on the same circle have the same CV. The linear tax brings the point representing the distribution of primary income to a point representing the distribution of disposable income, which is on a circle closer to the centre, following the shortest path towards the centre. This redistribution maximizes a social welfare function depending on the inequality in income distribution, whose indifference surfaces produce concentric circles when intersecting with the three-dimensional simplex in the case we are considering in this example. Circles that have a larger radius have a larger CV and a lower welfare index because of higher inequality associated to the respective indifference surface. The welfare function that is implicitly maximized can have as its argument any monotonously decreasing transformation of income inequality measured by the CV<sup>12</sup>.

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<sup>12</sup> A formal proof of this proposition can be found in Blackorby, Ch. and Donaldson, D. (1978): "Measures of relative equality and their meaning in terms of social welfare", *Journal of Economic Theory*, núm. 18, págs. 59-80. [http://darp.lse.ac.uk/papersdb/Blackorby-Donaldson\\_\(JET78\).pdf](http://darp.lse.ac.uk/papersdb/Blackorby-Donaldson_(JET78).pdf).

Figure 1. Redistribution with a linear tax



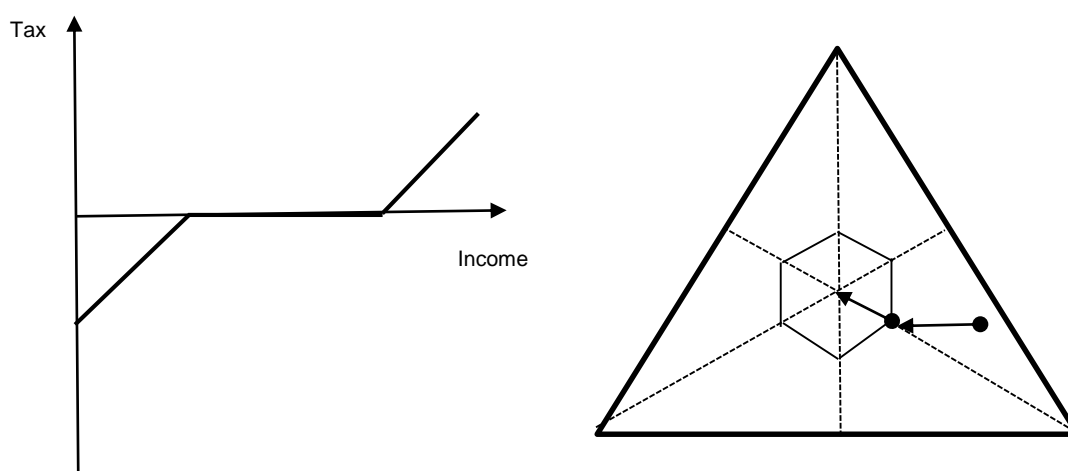
**There is, therefore, a one-to-one association between the linear tax as a redistribution mechanism and the CV as a measure of inequality.** The type of redistribution operated by a linear tax minimizes locally inequality measured by the CV, and the minimisation of inequality measured by the CV requires the type of redistribution

generated by the linear tax. Since the observed data can be satisfactorily approached by a linear tax, as shown in the example of chart 1 for Spain in 2012, the redistributive effect calculated on the basis of the parameters estimated for the ELT can be compared with the observable effect, measured through the CVs of the distributions of primary and disposable incomes.

**Other redistribution mechanisms are associated with different measures of inequality and implicit welfare functions.** Two redistribution criteria and inequality indices widely discussed in the theoretical and empirical literature are those associated with the names of Gini and Rawls. As mentioned by Atkinson (2012), distributional weights are implicit in the use of summary measures of inequality, such as the Gini coefficient. Amartya Sen (1976) showed that if weights based on a person's rank in the distribution of income are given, so that a person who is  $F$  per cent of the way from the bottom receives a weight of  $2(100-F)/100$ , the distributional impact should be measured by the Gini coefficient. The corresponding mechanisms of redistribution can be illustrated schematically in figure 2 for the case of three individuals, as in figure 1.

**The Gini index has associated a welfare function whose indifference curves are hexagons**, as shown in figure 2a, and the redistributive mechanism that minimises the index redistributes from the wealthiest to the poorest, leaving the middle unchanged.

Figure 2a. Gini redistribution



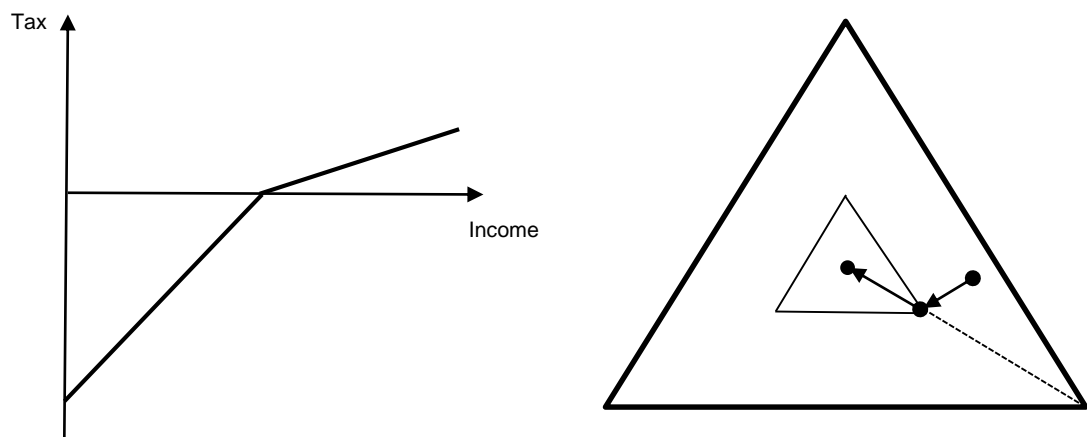
The gini index, as the CV, have been rightly criticised because some redistributions that would shift some income from the poorest individual to one in the middle would be



assessed by both indices as reducing income inequality. The index associated to the name of Rawls does not have this ugly property.

**In the Rawls criterion, inequality is measured by the position of the poorest individual**, the derived indifference curves are triangles, as represented in figure 2b. The redistributive mechanism gives only transfers to the poorest, taxing the rest of individuals proportionally to their incomes. In contrast with the linear tax, the redistributive effects of these two mechanisms depend on the distribution of primary income.

Figure 2b. Rawls redistribution



## 2.2 The stabilising effect

**The stabilising effect of any income tax  $T(Y)$  depends on the tax progressivity.** The tax is progressive, proportional or regressive if the marginal tax rate is respectively higher, equal or lower than the average tax rate. An alternative definition, in terms of the tax elasticity, which is the ratio of the marginal to the average rate, is whether the elasticity is bigger, equal or smaller, respectively, than one.

An indirect way to look at the stabilising effects of fiscal policy in practice is to use a related measure of how each variable, as percentage of output, responds to changes in income. For example, in the case of the linear income tax [2], the aggregate tax function is  $T(Y) = \tau \cdot Y - I$  and the tax elasticity is  $\varepsilon = \tau / t$ , so that:

$$\frac{d(T/Y)}{dY} = \left[ \frac{dT}{dY} - \frac{T}{Y} \right] \cdot \frac{1}{Y} = (\varepsilon - 1) \cdot \frac{T}{Y} \cdot \frac{1}{Y} \rightarrow \frac{\Delta\left(\frac{T}{Y}\right)}{\frac{\Delta Y}{Y}} = (\varepsilon - 1) \cdot \frac{T}{Y} \quad [3]$$

The stabilising or destabilising effect of the income tax is defined by the last expression, which is called its semielasticity, and is equal to its elasticity minus one times the weight of tax collection in income (which is the average tax rate). It shows by how much changes the ratio  $T/Y$  when  $Y$  changes by one per cent. The positive (stabilising) or negative (destabilising) sign of this effect thus depends on the tax elasticity being higher or lower, respectively, than one, so that the ratio of tax collection to income  $\Delta(T/Y)$  moves in the same or the opposite direction, respectively, of the growth rate of income ( $\Delta Y/Y$ ). This is a simple way to present the automatic stabilising effects of the income tax, which has also the advantage of preserving additivity. For example, the stabilising effect of the linear income tax [1] can be interpreted as the sum of a neutral effect from the proportional part of the tax ( $\tau \cdot y$ ), with elasticity equal to one, plus the stabilising effect of the constant transfer or negative part of the tax ( $-l$ ), with elasticity equal to zero.

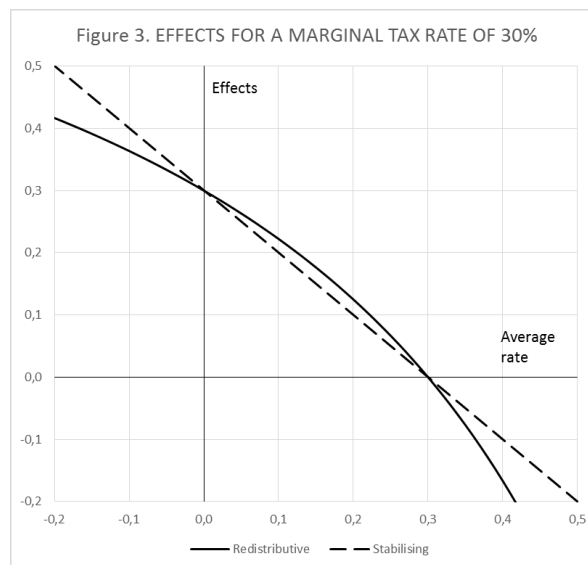
### 2.3 The link between redistributive and stabilising effects

**Redistributive and stabilising effects of the linear income tax are closely related:**

$$\text{Redistributive effect} = (1 - \eta) = \frac{\tau - t_m}{1 - t_m} = \frac{l}{d_m} \quad [4]$$

$$\text{Stabilising effect} = (\varepsilon - 1) \cdot \frac{T}{Y} = \tau - t_m = \frac{l}{y_m} \quad [5]$$

Figure 3 plots both effects for a marginal tax rate of 30% ( $\tau = 0.3$ ) as a function of the average tax rate. Both effects are positive and not far away for  $0 < t_m < \tau$ , but they increasingly diverge for  $t_m < 0$ , and also when both effects are negative (for  $t_m > \tau$ ), due to the non-linearity of the redistributive effect as a function of  $t_m$ .



**The link between redistributive and stabilising effects in a linear tax is not easy to find in empirical estimations**, due to changes in regulations of taxes and transfers and discretionary decisions taken every year. The estimation of the parameters of an ELT for each year facilitates the analysis of this link and our understanding of the stance of discretionary changes in each year. In the distribution of income account, in addition to income taxes in a strict sense, there are other redistributive operations (social benefits and contributions, and other net current transfers paid) which determine disposable income. The accounting identity which defines disposable income is

$$D(Y) = Y + B(Y) - T(Y) - C(Y) - O(Y),$$

where  $Y$  is primary or market income,  $B$  is social benefits,  $T$  is income taxes,  $C$  is social contributions, and  $O$  are the other net transfers paid. We will run regressions of each of these variables against disposable income. As shown in chart 1, the ELT estimates are simple regressions of each variable on primary income. Thus, if the constants and the slopes of the regression lines on primary income are represented by  $[I(B), \tau(B)]$  for social benefits,  $[I(T), \tau(T)]$  for income taxes,  $[I(C), \tau(C)]$  for social contributions, and  $[I(O), \tau(O)]$  for other net transfers paid, then the constant and the slope of the regression of disposable income on primary income ( $I, \tau$ ) will be equal to:

$$I = [I(B) - I(T) - I(C) - I(O)], \text{ and}$$

$$\tau = 1 + [\tau(B) - \tau(T) - \tau(C) - \tau(O)].$$

**The size of the effects depends on both the level and progressivity with respect to primary income of the different distributive operations in the existing system of taxes and transfers.** The constant estimated in each regression depends on policy variables such as minimum pensions and unemployment subsidies, minimum level of contributions, minimum exempt income or the size of lump sum tax allowances and credits. The progressivity of the system also depends on policy variables like the relative weights in the system of contributive and universal social benefits, the decline of transfers with earned income in means-tested benefits, the progression of tax rates, allowances and credits with the level of income, the existence of maximum levels for pensions and contributions, etc. However, the estimated parameters of the ELT also depend on decisions of individuals on tax compliance, on claiming benefits, on labour supply, consumption, etc. We estimate the parameters of the ELT that define its redistributive and stabilising effects through simple regressions, and then propose an

operational distinction between the effects of automatic stabilisers built in the structure of the ELT estimated for each year, on one hand, and the annual discretionary changes in this structure that define the stance of discretionary changes, on the other. As already mentioned, such distinction should not be interpreted in a causal way, and “discretionary” (in the precise sense defined later) does not mean “exogenous”. While this distinction is clear in a theoretical model, there is no meaningful distinction between exogenous and endogenous variables in the absence of a model explaining the policy decisions and the reactions of individuals. Any analysis based on past data include the responses of all economic agents to the economic environment and to the decisions of other agents, and the empirical analysis faces a difficult endogeneity problem to identify exogenous policy decisions<sup>13</sup>.

## **2.4 Automatic and discretionary effects and the stance of fiscal policy**

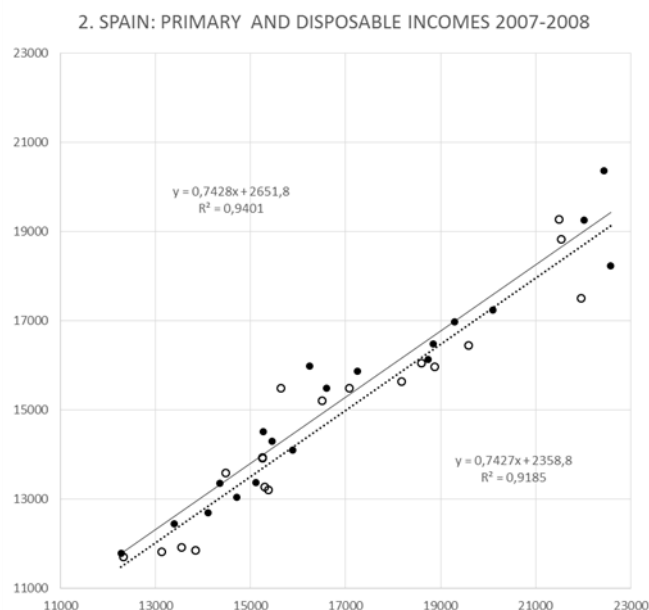
**The role, size and composition of automatic stabilisers is still controversial.** The classical defence of activist fiscal policies was presented in the Economic Report of the President of January 1962 (p. 71): “If the forces causing a downturn in economic activity are weak and transient, the automatic stabilizers cushion the severity of the decline and give the basic recuperative powers in the private economy a better opportunity to produce a prompt and full recovery. But if the forces causing the downturn are strong and persistent, the built-in stabilizers may not suffice to prevent a large and prolonged recession. Furthermore, they are blindly symmetrical in their effects. When economic activity quickens after a slump, the rise in Federal revenues begins immediately and slows the recovery in employment and incomes. For these reasons, the task of economic stabilization cannot be left entirely too built-in stabilizers. Discretionary budget policy, e.g., changes in tax rates or expenditure programs, is indispensable—sometimes to reinforce, sometimes to offset, the effects of the stabilizers”. Fifty years later, a review of the literature on automatic stabilisation (Veld, J., Larch, M., and Vandeweyer, M., 2012,

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<sup>13</sup> According to Fatás and Mihov (2011), “the literature has struggled with the issue of endogeneity and there is no consensus on how to completely avoid the problem”. Although we will not rely on an explicit model of the economy, we will talk loosely, with a licence of language, of discretionary policies (or measures) and of automatic changes (or effects) when referring to the empirical estimates based on this distinction, as if the first were autonomous policy decisions and the second the reaction of the economy. A simple theoretical model of the linear income tax and the analysis of its effects can be found in Marin (2014).

p. 3) argued that: “In spite of a relatively large and seasoned body of literature on automatic stabilisers, both the policy and the academic debate reveal a persisting lack of clarity about what automatic fiscal stabilisers actually are and how to assess their effectiveness with respect to output smoothing. Except for the notional understanding that automatic stabilisers involve budgetary arrangements that help smooth output without the explicit intervention of a country's fiscal authority, views still very much diverge about which elements or components of the Budget actually provide the bulk of automatic stabilisation over the cycle”. In the same vein, Fatás and Mihov (2011, p. 3) recognise that “the lack of focus on and understanding of automatic stabilisers is a weakness in current thinking about fiscal policy”. The analysis of these issues through the interposition of an ELT may improve our understanding.

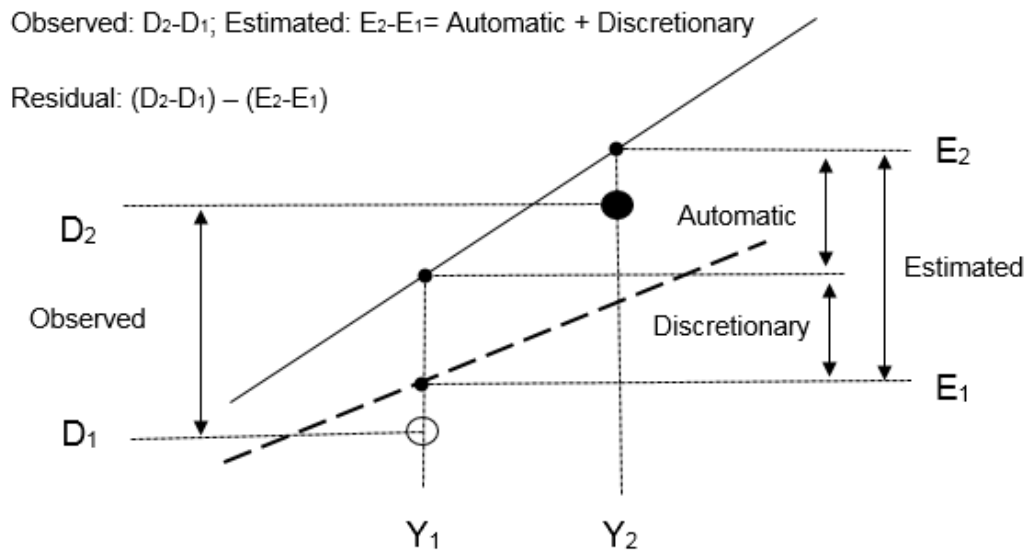
**To motivate the distinction of automatic and discretionary effects it is useful to consider the discretionary adjustment introduced in Spain in response to the crisis in 2007.** In chart 2 we present the regression lines of disposable incomes, in euros per capita in the horizontal axis, over primary incomes, in euros per capita in the vertical axis, in 2007 (the discontinuous one) and 2008 (the continuous one). The data of 2007 are represented by empty points and those of 2008 by full points. The year 2008 still witnessed an increase in primary incomes and, therefore, the full points are generally to the right of the empty ones. At the same time, the fiscal policy stance was strongly expansionary.



**In 2007 there was an important reform of the personal income tax, whose main effects were felt in the following year.** The reform eliminated most tax allowances for personal expenses and reduced significantly tax rates, and in 2008 additional tax credits were granted, with an overall impact reflected in a decline of 2.5% in income taxes. This decline, compounded by an increase of 10.2% in social benefits, contributed to boost disposable income growth up to 4.8% in 2008, from 4% in 2007, while primary income grew just 2.7% in the same year, half the rate of expansion of the previous one. In chart 2, there is a parallel shift by 12.4% in the regression line of 2008 with the line estimated for 2007, as shown by the increase in the implicitly MGI given by the intersection of the regression lines with the vertical axis. All the full points are above and to the right of the empty ones, showing a shift of each point from its position in 2007 in a north-east direction.

**The estimates of an ELT for each year facilitates a distinction between automatic effects and discretionary changes.** Figure 4 reproduces schematically two observations of primary and disposable incomes, like those shown in chart 2, one for an initial year ( $Y_1, D_1$ ) as an empty point and another one ( $Y_2, D_2$ ) as a full point for the following year, as well as the two regression lines corresponding to the estimates of the ELT in year 1 (the discontinuous line) and year 2 (the continuous one). The estimated points on the regression lines would then be ( $Y_1, E_1$ ) and ( $Y_2, E_2$ ). It is possible to decompose the observed change in disposable income ( $D_2 - D_1$ ) into two estimated changes and a residual. The discretionary change in disposable income is calculated for the primary income of year 1, with the changes in the estimated parameters of the ELT from year 1 to year 2. A positive discretionary change is represented in figure 4, which shifts the regression line upwards, like the one observed in chart 2 for Spain in the year 2008 from the year 2007. The automatic change is calculated with the parameters of the ELT in year 2 as the change in disposable income induced by the observed change in primary income from year 1 to year 2.

**Figure 4. Observed and estimated changes in disposable income, and automatic and discretionary changes**



Observed change:  $D_2 - D_1$

Estimated change:  $E_2(Y_2) - E_1(Y_1) = I_2 + (1 - \tau_2) \cdot Y_2 - [I_1 + (1 - \tau_1) \cdot Y_1]$

Discretionary change:  $E_2(Y_1) - E_1(Y_1) = (I_2 - I_1) - (\tau_2 - \tau_1) \cdot Y_1$

Automatic change:  $E_2(Y_2) - E_2(Y_1) = (1 - \tau_2) \cdot (Y_2 - Y_1)$

**The total effect depends on the change in the ratio ( $D/Y$ ) from the initial point ( $Y_1, D_1$ ) to the final one ( $Y_2, D_2$ ).** This is the outcome of the combination of changes in disposable income produced by changes in the estimated parameters of the ELT, taking as given the primary income level in year 1 (discretionary change), and changes induced by primary income changes through the parameters of the ELT in year 2 (automatic change). When the elasticity of disposable income with respect to primary income is less than one, as usually happens, the automatic change tends to reduce this ratio as primary income increases, while the discretionary change usually goes in the other direction. If the final ratio is lower than the initial one, the automatic change is smaller than the discretionary change and the outcome is a stabilising total effect because the ratio declines as primary income increases. But if this ratio rises, the total change will be destabilising because disposable income increases more than primary income. The

contributions of the automatic and discretionary changes to the observed change in disposable income can be easily calculated:

$$\frac{D_2 - D_1}{D_1} = \frac{E_2(Y_2) - E_1(Y_1)}{D_1} + \varepsilon = \frac{I_2 - I_1}{D_1} - (\tau_2 - \tau_1) \cdot \frac{Y_1}{D_1} + \frac{1}{D_1} \cdot [(1 - \tau_2) \cdot (Y_2 - Y_1)] + \varepsilon \quad [6]$$

The observed rate of change in disposable income is then decomposed into the contributions of the discretionary and automatic changes plus a residual.

**The automatic stabilisation effect on disposable income is defined by  $\tau_2 \cdot \frac{Y_2 - Y_1}{Y_1}$ .**

With this definition, the contribution of the automatic change in [6] to the rate of growth of disposable income is, therefore, the contribution of primary income  $\frac{Y_2 - Y_1}{Y_1} \cdot \frac{Y_1}{D_1}$  minus the contribution of the automatic stabilisation effect  $\tau_2 \cdot \frac{Y_2 - Y_1}{Y_1} \cdot \frac{Y_1}{D_1}$ . The marginal and average tax rates ( $\tau, t$ ) in the previous definitions and formulas are composite rates of income taxes plus social contributions, plus other net transfers paid, minus social benefits. The same formula [6] can be applied to decompose the observed rates of change of the different redistributive operations into automatic and discretionary changes and a residual from errors in the different estimations. The definitions of the stabilising effect [3] and the automatic stabilisation effect [6] preserve the additivity of the different redistributive operations that mediate between primary and disposable income. In consequence, the automatic stabilisation effects of the redistributive operations are defined by the respective slopes times the rate of change of primary income, and, therefore, their contributions to the automatic stabilisation of disposable income are given by their automatic stabilisation effect (in square brackets) times the weight of each operation in disposable income (in curly brackets):

- Social benefits =  $\left[ \tau(B) \cdot \frac{Y_2 - Y_1}{Y_1} \right] \cdot \left\{ \frac{Y_1}{B_1} \cdot \frac{B_1}{D_1} \right\}$
- Income taxes =  $-\left[ \tau(T) \cdot \frac{Y_2 - Y_1}{Y_1} \right] \cdot \left\{ \frac{Y_1}{T_1} \cdot \frac{T_1}{D_1} \right\}$
- Social contributions =  $-\left[ \tau(C) \cdot \frac{Y_2 - Y_1}{Y_1} \right] \cdot \left\{ \frac{Y_1}{C_1} \cdot \frac{C_1}{D_1} \right\}$
- Other net current transfers paid =  $-\left[ \tau(O) \cdot \frac{Y_2 - Y_1}{Y_1} \right] \cdot \left\{ \frac{Y_1}{O_1} \cdot \frac{O_1}{D_1} \right\}$

**Automatic stabilisers are always operational.** They cannot be turned off because they are embedded in the structure of the system, here represented by the parameters



estimated of the ELT. The automatic component of the change in disposable income results from the increase in primary income, with the structure of the ELT estimated in the second year, and graphically is shown as a move along the regression line of year 2. When primary income grows, as it happens most years, the automatic effect compensates, at least partially, the expansionary effect of the discretionary change on the ratio  $D/Y$ . However, if primary income falls, as it happened in Spain in 2009, the automatic effect reinforces the expansionary impact of the discretionary change on the ratio  $D/Y$ .

**The analysis of the fiscal policy stance is based on the relationship between changes in primary and disposable incomes.** The overall stance will be expansionary if fiscal policy (here understood in a limited way, as the set of redistributive operations transforming primary income into disposable income) contributes to a higher growth (or a lower decline) in disposable income than in primary income, and restrictive otherwise. The cyclical characterization of the stance depends on whether it is expansionary or restrictive when the rate of growth of primary income is higher or lower than the average rate of growth of the period analysed. If the stance is restrictive when primary income rises faster than the average of the period, or expansionary when the rate of growth of primary income falls below the average of the period, this policy will be characterised as countercyclical. Symmetrically, when primary income growth falls below the average and the stance is restrictive, or if primary incomes grow quicker than the average of the period and the stance is expansive, we will call these policies procyclical.

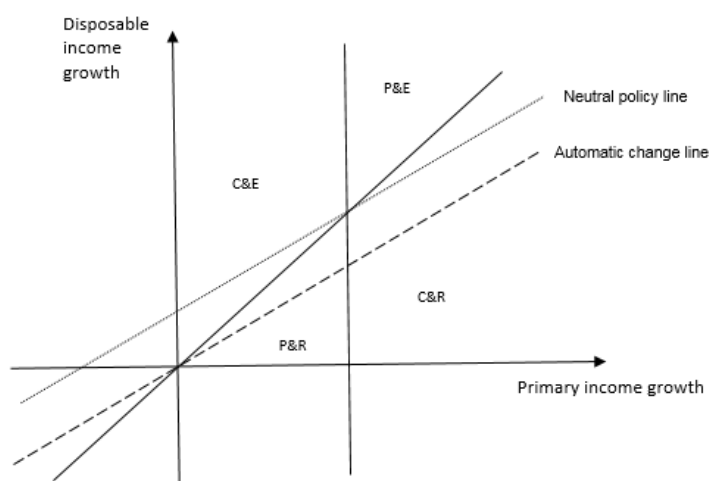
**Discretionary changes are normally expansionary.** Existing taxes and benefits have structures defined by parameters, some of which should be adjusted every year: tax allowances and credits, benefits revaluation, brackets defining taxes and contributions bases, etc. Hence, while the automatic effects depend on the structure of the system, such structure is fine-tuned every year, producing a “discretionary marginal change of automatic stabilisers”. Most of the discretionary changes have to do with upwards adjustments in the nominal values of key parameters of the system to expected nominal income growth rather than in reforms of the structure of the rates. The impact shown in figure 4 is, therefore, expansionary because it increases disposable income with respect to the level of primary income observed in year 1.

**Discretionary policies can be neutral or activist.** In the simple structure of the linear tax, if the system is sustainable and its redistributive structure satisfactory, a neutral forward-looking management of discretionary fiscal policy would change the MGI (i.e., the intersection of the regression line with the vertical axis) at the same rate as expected primary income (e.g. resulting from potential productivity growth times the inflation objective), producing a parallel shift in the regression line. If the change in primary income is exactly what was expected, the discretionary change will be offset exactly by the automatic change, so that the ratio  $D/Y$  remains constant. If there is a lower (higher) than expected value of primary income, automatic stabilisers would also do their job and the ratio  $D/Y$  would rise (decline). Governments can, however, consider that the expected value of primary income is too low (very often) or too high (rarely) and try to cushion the anticipated blow (in a recession), or exuberance (in a bubble), on disposable income with an activist policy stance (expansionary or restrictive), so that the discretionary change is bigger or smaller than the expected automatic effect. In ordinary circumstances of mild fluctuations, this fine-tuning will still leave the discretionary and automatic stabilisers operating in contrary directions. This was the case in Spain in 2008, as we have seen in chart 2, when primary income, though decelerating, was still growing at 2.7%, and a strong fiscal expansion was implemented to arrest the ongoing recessionary trends, making the MGI estimated in the ELT for that year grow at an astonishing 12.4% rate. However, in more extreme situations, like those of the Great Recession of 2009, discretionary policies reinforce automatic stabilisers working in the same direction.

**Before proceeding to the analysis of the fiscal policy stance it is necessary to fix some conventions.** A diagram (Figure 5) representing changes in primary incomes in the horizontal axis, and changes in disposable incomes in the vertical axis, can help fixing unequivocal conventions for the analysis of the fiscal stance, as well as of the overall stabilising effects and their decomposition into automatic and discretionary changes. The continuous line of unitary elasticity in figure 5 sets the boundary to characterize as expansionary fiscal policies corresponding to points that are above it, because disposable incomes grow more or decline less than primary incomes, or restrictive in the case of points below that line. Thus, the crossing of this line of unitary elasticity with a vertical line over the average rate of growth of primary income during the period considered define four regions in the plane which allow a classification of the fiscal

policy stance. Following the direction of clock hands, the stance of fiscal policy is considered procyclical and expansionary (P&E) for points in the upper right region, countercyclical and restrictive (C&R) for points in the lower right region, procyclical and restrictive (P&R) for points in the lower left region, and last, countercyclical and expansionary (C&E) in the upper left region. Notice that these conventions are applicable to characterise the observed effects on both disposable income and the redistributive operations that boost it, like social benefits. The opposite conventions apply to characterise redistributive operations, like taxes or social contributions, which reduce disposable income, so that the labels in the regions of the plane to assess the impact of these latter operations are inverted: the North-East is countercyclical and restrictive, The South-East procyclical and expansionary, etc.

Figure 5. Fiscal policy effects (Rates of change)



**The stabilising effects, automatic and discretionary, depend on the elasticity of disposable income with respect to primary income.** The points observed every year representing the rates of change of disposable income and primary income are scattered through the four regions defined in the plane, and the slope of the regression line fitted to these points summarizes the stabilising (slope lower than one) or destabilising (slope higher than one) character of fiscal policies in the period considered. In figure 5, two additional lines have been included, representing hypothetical regression lines: one defining the automatic change and the other the outcome of a neutral fiscal policy. The dashed line, with slope lower than one, has been included to represent the automatic changes that are induced by the change in primary incomes. This line is fitted to the

points of the automatic changes calculated for each year from the parameters of the estimated ELT, as defined in [6]. The vertical distance between the automatic change line and the 45° line is the automatic stabilisation effect on disposable income. The vertical distance from each observed point to the automatic change line measures the impact of discretionary changes in that year. A point placed between the unitary elasticity and the dashed lines represented in figure 5 indicates a discretionary effect countervailing only partially the automatic effect. A slope of the fitted regression line lower (higher) than the slope of the automatic changes line indicates a higher (lower) overall stabilisation effect than the automatic effect and, therefore, a stabilising (destabilising) influence of discretionary changes on disposable income. These characterisations are applicable to both disposable income and the redistributive operations that boost it, whereas the opposite ones characterise the redistributive operations that reduce disposable income and have stabilising effects on disposable income if their elasticities are higher than one.

**A neutral discretionary policy would produce a regression line for disposable income with the slope of the automatic changes line and anchored at the point in which the vertical line crosses the line of unitary elasticity.** This neutral policy is represented in figure 5 by the dotted line, which is a parallel upward shift of the automatic change line. Firstly, a neutral discretionary policy means that the average rate of growth of disposable income is equal to the average rate of growth of primary income during the period of analysis. When the regression line fitted to the observed data intersects the vertical line at a point above (below) the line of unitary elasticity, fiscal policies have been expansionary (contractionary) for the period as a whole. Secondly, a neutral discretionary policy would also preserve the elasticity of automatic changes, without reinforcing or weakening them, thus producing a regression line of observed rates of change of disposable income on observed rates of change of primary incomes with the same slope estimated for the automatic stabilisers effects, as defined before.

## 3 Empirical evidence

### 3.1 Introduction

**The redistributive and stabilising effects estimated here refer only to the operations of income taxes, social contributions and benefits.** These operations are the main structural mechanism to redistribute market or primary income and generate a more equally distributed and more stable disposable income, but they are not the only ones. It is useful to stress upfront some limitations of the data basis of the analysis, in order to qualify the interpretation of the conclusions. Although the variables analysed are broadly comparable across countries, there are some differences in their statistical definitions. For example, disposable income includes in the US interest and transfers to be paid by persons, which are netted out in the European definition, and in kind benefits received, which are not computed as disposable income according to the European System of Accounts, but recorded in the concept of “adjusted disposable income”. INSEE does not provide the estimates of regional primary income, but only of its main components, excluding the social contributions in charge of the employer (which do not affect the estimates of disposable incomes), so that we have had to impute them by regions in order to homogenise the figures of primary incomes with the information provided by the other countries. There may be also differences in the institutional arrangements affecting other operations, notably indirect taxes and transfers in kind, which are excluded of the analysis but have an important redistributive and stabilising potential of adjusted income (which is obtained adding these transfers to disposable income) and of real consumption possibilities of individuals. Thus, for example, a country can collect more revenue as indirect taxes, reducing primary incomes, and use the proceeds to finance lump sum cash benefits for children, boosting disposable income, or free health care benefits, thus increasing adjusted disposable income. In addition, the results may be sensitive to differences in the level of aggregation of the data, particularly in years with strong changes in income. For example, in Spain, at the level of disaggregation of 52 provinces and autonomous cities (instead of 19 areas), and in Germany, at the level of some 430 municipalities (instead of 16 länder), the highest discrepancies in redistributive and stabilising effects are observed in the crisis year of

2009<sup>14</sup>. In the case of the UK, the differences in the regional distribution of primary incomes per capita are quite important when using the aggregation at the level of NUTS1 (nine regions) or NUTS2 (40 regions). The CVs at the more aggregate level are between 8 and 12 percentage points lower than at the more disaggregate level, although the estimated and observed redistributive effects are very close at each level separately, showing a difference of less than 2 percentage points and 0.9 on average. In the case of the UK, we have chosen the most disaggregated data as a basis. In the other countries, the choice is relatively easier, given their administrative structure: the states in the US, the länder in Germany and the autonomous regions in France, Italy and Spain. Comparisons involving the levels of the variables in different countries have to be assessed carefully. The size of the redistribution operated between primary and disposable incomes of average individuals representative of regions in the different countries should not support conclusions on relative inequality of individuals between regions or countries.

**The existing systems of taxes and transfers intervene year after year a sizeable part of output.** Some rough figures can give the order of magnitude of the redistribution and potential stabilisation involved in these systems. Primary incomes of the household sector in the six countries considered here, represent almost three quarters of GDP. Income taxes, including social contributions in Europe, detract between twenty five and thirty percentage points of GDP in the biggest European countries, more than twenty in Spain and ten percentage points of GDP in the US. But then, current transfers in the US and social benefits in cash in the European countries restore personal disposable income to 75% of GDP in the US, while households disposable income remains between 60% and 65% of GDP in the European countries, where taking also into account benefits in kind (mainly health, education and social services), households adjusted disposable income represents also between 73% and 79% of GDP. All in all, tax and transfers systems redistribute close to 15% of output in the US, more than 20% in Spain, and close to 30% in the other European countries.

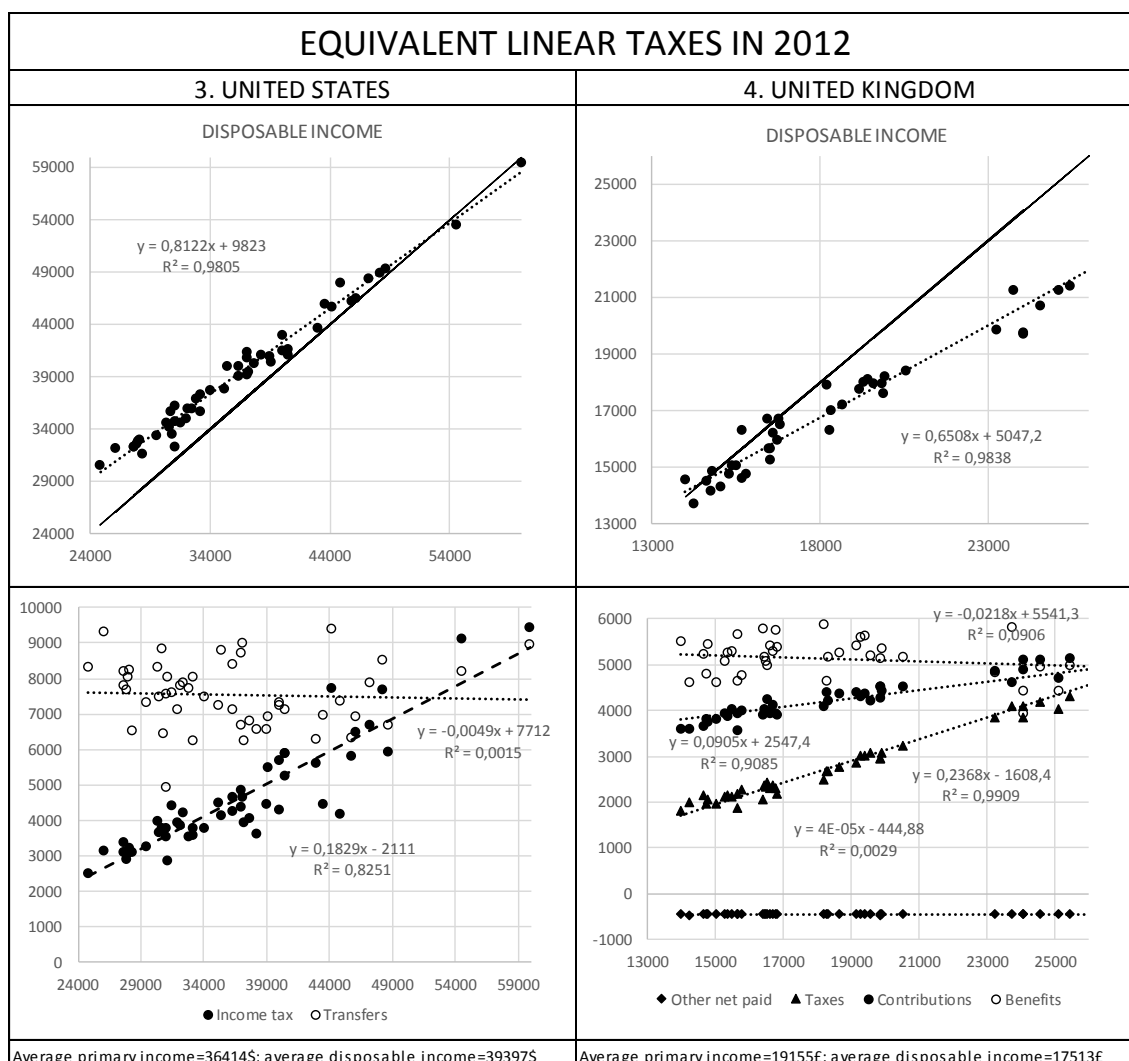
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<sup>14</sup> In that exercise, the redistributive and stabilising effects estimated in Spain with more disaggregated data are 3.6 and 2.6 percentage points lower, respectively, than those estimated with aggregated data. In Germany the effects are also 4.6 and 5.2 percentage points lower, respectively, when estimated at the level of the municipalities than when estimated for the länder.

### 3.2 The equivalent linear taxes in 2012

The ELT estimated for the US in 2012 implies a redistributive effect of 24.9% and an automatic stabilising effect of 27%. In chart 3, which is similar to chart 1 for Spain, per capita disposable income, taxes and transfers in 2012 are presented in the vertical axis as a function of market income per capita of the 50 states, measured in the horizontal axis. All figures are expressed in current US dollars. Mississippi had the lowest primary income (24784\$) and Columbia (59982\$) the highest one. In terms of disposable income per capita, the first state had 30584\$ and the second 59529\$, so that the range of the distribution of disposable incomes was almost one fifth smaller than the range of the distribution of market incomes. All the states, except the two richest ones (Columbia and Connecticut) get a higher disposable income than their primary income, as shown in the chart by the position of all the points, save the two highest ones, above the continuous line of 45°. The average primary income per capita of the fifty states in 2012 was 36415\$ and their average disposable income per capita was 8.2% higher (39397\$). The adjusted regression lines show the key parameters estimated for the ELT in 2012. The MGI of the ELT, which is the intersection with the vertical axis of the regression line estimated for disposable income in the upper part of chart 3, was 9823\$, and therefore, the estimated redistributive effect was 24.9% ( $=9823/39397$ ) and the estimated stabilising effect was 27% ( $=9823/36415$ ). The regression line of disposable incomes over primary incomes is a very good fit ( $R^2=0.98$ ), although the fit of the components of the ELT are poorer. As shown in the lower part of chart 3, the ELT is the combination of a progressive income tax, characterised by a negative lump sum tax credit per capita of 2111\$ and a marginal tax rate of 18.29%, with an average transfer of 7712\$, which does not depend on market income (slope equal to -0.5% and  $R^2=0$ ). The MGI is the sum of the tax credit and the average transfer, and the slope of the regression line of disposable income equals one plus the slope of the regression line for the income tax and minus the slope of the regression for personal transfers. Although the redistributive and stabilising effects have not remained constant through time, as we will examine later, the structure of the ELT and the relative positions of all the states (i.e., the residuals of the fitted regressions) show great stability, indicating that there are structural features that determine the highly persistent dispersion of the income taxes paid and the personal transfers received per capita by each state.





The ELT estimated for the UK in 2012 implies a redistributive effect of 28.8% and an automatic stabilising effect of 26.3%. The equivalent linear tax estimated for 2012 is represented in chart 4, where primary income per capita is in the horizontal axis and the four redistributive operations leading to disposable income per capita are in the vertical axis. All figures are expressed in current pounds. The smallest primary income per capita (13990£) is found in West Wales and The Valleys and the biggest (50956£) in Inner London – West, which is an outlier not included in the chart to facilitate its reading (the second in the top is Outer London – South, with half the primary income per capita of the first one). The corresponding disposable incomes are 14556£ for West Wales and The Valleys and 38532£ for Inner London – West, which implies a reduction of one third in the range of dispersion. Of the four redistributive operations represented in the lower part of the chart, the less significant is the net current transfer paid, which is practically



a uniform amount of 445£ received by all areas. Income taxes are progressive, with a tax credit of 1608£ and a marginal rate of 23.7%, while social security contributions are more important quantitatively and more regressive than income taxes, with a fixed contribution of 2547£ and a marginal rate slightly above 9%. Finally, social security benefits are the most relevant redistributive operation, although highly dispersed ( $R^2=0.09$ ). They are slightly declining (less than 2.2%) with the level of primary income, and contribute 5541£ to the implicit MGI estimated in the ELT. In the upper part of the chart, most disposable income points are below the continuous line of 45 degrees, in contrast with what we saw in the US. This is because the concept of personal disposable income is defined more comprehensively in the US than in the European countries, being closer to the concept of adjusted disposable income in the European System of Accounts, which is between ten and fifteen points of GDP bigger than disposable income. The estimated MGI in the UK was 5047£ in 2012, which for an average disposable income per capita in the sample of 17513£ gives a ratio of 28.8% (the redistributive effect), and for an average primary income in the sample of 19155£ gives a ratio of 26.3% (the automatic stabilising effect). The redistribution effect is higher in the UK than in the US, but the automatic stabilisation is very similar and the fit of the regression line is equally good ( $R^2=0.98$ ).

**The ELT estimated for 2012 in the four countries of the euro area can be analysed jointly<sup>15</sup>.** As shown in the panel of charts 4, the data for the 16 German länder are represented by square symbols and the fitted regression line is continuous and thick; for the 22 French regions by triangles and the regression line is the continuous thin line<sup>16</sup>; for the 21 Italian regions we use empty circles and regression lines are represented with points; and for the 19 autonomous regions and cities in Spain the symbols are full circles and the lines are dashed. It should be noted that, apart from Ile-de-France, the dispersion of primary income per capita is much higher in Italy, where it presents a bi-modal

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<sup>15</sup> As mentioned before, the INSEE does not provide an estimate by regions of social contributions in charge of employers. To make possible a joint analysis, we have allocated the national figure of these contributions (Cotisations sociales à la charge des employeurs) to regions proportionally to the figures of wages and salaries (Salaires et traitements bruts) estimated by the INSEE.

<sup>16</sup> In France, the Ile-de-France (Paris) region is an upper “outlier”. If the region is excluded from the sample, the qualitative features of the results obtained are the same, but quantitatively somewhat weaker. The only characteristic feature which is not robust is the progressivity of social contributions, which turn to be slightly regressive for the set of the remaining regions.

distribution, than in the other three countries. The table at the bottom of panel 4 summarises the estimates of the redistributive and stabilising effects and their composition in the four countries. These estimates are very similar to those of previous years and, therefore, the qualitative structural features observed in this year with common information for the four countries are the same as in previous exercises.

**Income taxes are progressive in the four countries, as evidenced by the negative constants in the regressions.** Their contributions to the redistribution and stabilisation of disposable incomes are given by the ratios of these constants to the averages in the sample of disposable income (redistributive contribution) and primary income (stabilising contribution), which are reported at the bottom of the panel. The contributions are between five and seven percentage points in Germany, France and Spain, and around two percentage points in Italy. Marginal rates are almost 18.5% in Germany, France, and Italy, and smaller in Spain (16%), but average rates are the highest in Italy (16.5%), compared with France (12.9%), Germany (12.1%), and Spain (10.6%). Therefore, the income tax elasticities are smaller in Italy (1.12) than in France (1.44), Germany and Spain (both 1.5). All regressions show correlation coefficients above 0.9, except in Spain (0.8).

**Social contributions, instead, are slightly progressive in France and Italy, but regressive in Germany and Spain.** As a consequence, the redistributive and automatic stabilisation impact of social contributions are negative in Germany and Spain, of the order of 9 and 2.5 percentage points, respectively, so that they tend to make more unequal the distribution and more pronounced the fluctuations of disposable income in comparison with primary income, in contrast with the positive contributions they make in France (around four percentage points) and marginally in Italy (one percentage point). The high correlation coefficients (above 0.9) indicate that these effects are very systematic. The weight in revenue of social contributions is almost 30% in Germany, being also high in Italy and Spain, where they collect close to 21% of primary income, but not in France, where they provide only 9.1% of primary income.

**The composition of the redistributive and automatic stabilisation effects is dominated by social benefits in the four countries.** The high weight of social benefits with respect to primary income (around 27% in Spain and Germany, 29.4% in Italy and 33% in France) is the determinant of their redistributive effect. Furthermore, in Germany

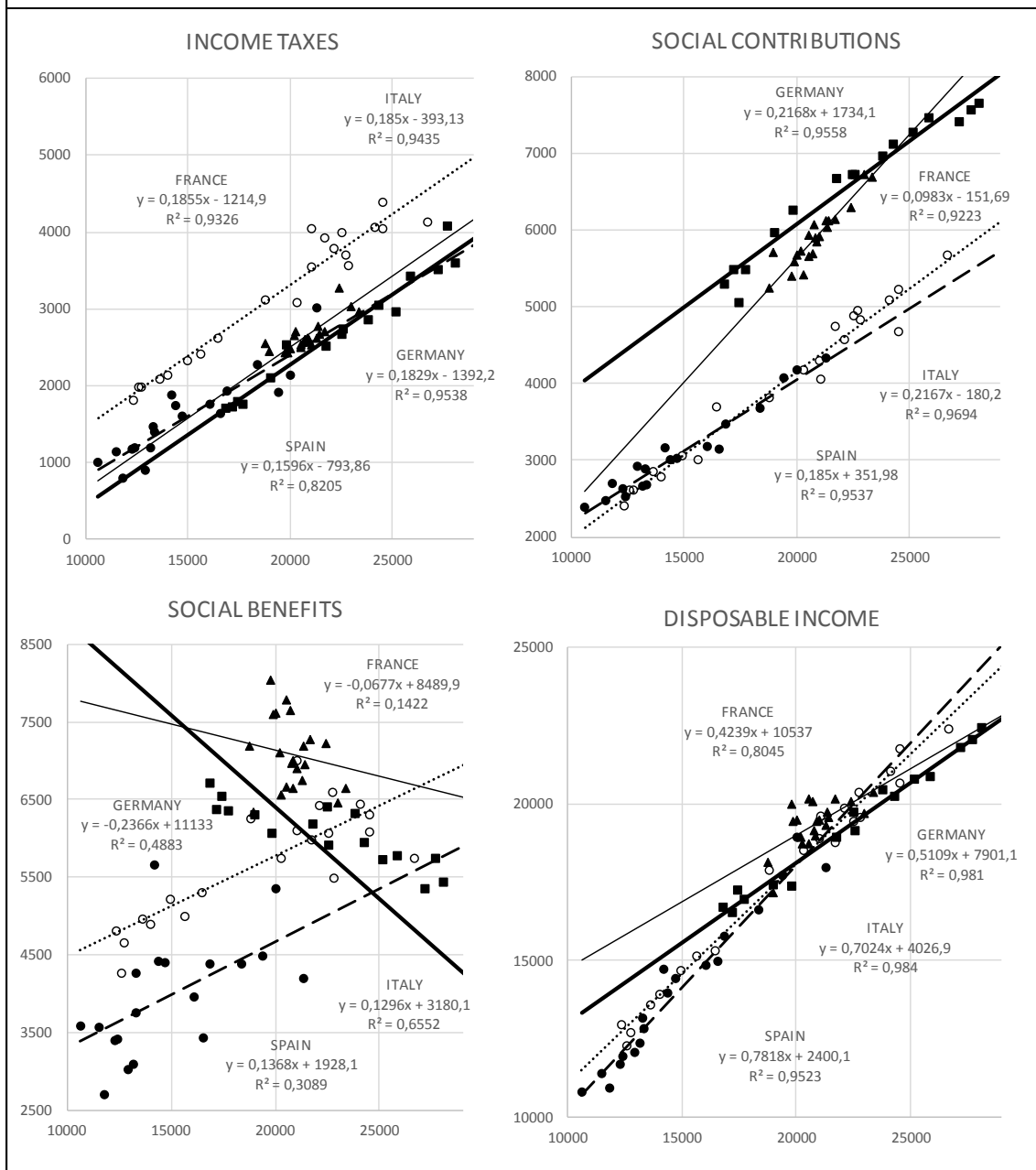
and France social benefits tend to decline with the level of primary income<sup>17</sup>, making much more powerful their contributions to the redistributive and automatic stabilisation effects, as the MGI “insures” around 40% of primary income in both countries. These effects are much smaller in Italy and Spain, despite the equal or higher weight of social benefits in income than in Germany, because the high proportion of contributory pensions within the total of social benefits implies that social benefits grow with income. However, the relatively low value of the correlation coefficient in these countries, particularly in France, indicates that other elements in addition to primary income, like the average age of the population or the unemployment rate have considerable influence in determining the distribution of social benefits by regions.

**The estimated redistributive and automatic stabilisation effects in 2012 are notably higher in France than in the other countries.** As shown in panel 4, the slope of the regression line of disposable income with respect to primary income is flatter in France than in Germany. A higher primary income of one euro increases disposable income by 42 cent in France and 51 cent in Germany, or what is the same, the marginal tax rate is 49% in Germany and 58% in France. From a different perspective, the interpretation of the stabilising effect as insurance (ratio of MGI to average primary income) suggests that France, with an average primary income of 21366 euros “insures” an MGI of 10537 euros (the constant estimated in the regression line), whereas Germany, with an average primary income of 22314 euros (4.4% higher than the French one), only guarantees an MGI of 7901 euros, which is 25% lower than the French one. On the other hand, the budgetary impact of this high value of automatic stabilisers in France, which comes mainly from social spending, has the potential to create substantial budgetary imbalances if operating fully in cyclical recessions.

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<sup>17</sup> This feature appears in France only after the structural break of 2006.

## 5. ELEMENTS OF THE EQUIVALENT LINEAR TAXES IN 2012



## COMPOSITION OF THE EFFECTS IN 2012

	GERMANY		FRANCE		ITALY		SPAIN	
	Redistributive	Stabilising	Redistributive	Stabilising	Redistributive	Stabilising	Redistributive	Stabilising
Taxes	7,2	6,2	6,2	5,7	2,2	2,1	5,6	5,3
Contributions	-9,0	-7,8	4,3	3,9	1,0	0,9	-2,5	-2,4
Benefits	41,6	36,0	43,3	39,7	18,1	16,5	13,7	12,9
Other transfers	1,1	1,0	0,0	0,0	1,6	1,3	0,2	0,2
Disposable income	40,9	35,4	53,8	49,3	22,9	20,9	17,1	16,1
Memorandum items	Disposable	Primary	Disposable	Primary	Disposable	Primary	Disposable	Primary
Average incomes	19301	22314	19593	21366	17589	19308	14063	14918

**In Italy and Spain, the size of the redistributive and automatic stabilising effects are much smaller.** They are more significant in Italy, where its size has tended to increase from less than 15% in the first years of the century to more than 20% in 2012, than in Spain, where it has declined between four and five points in the same period. Both the origin and the explanation of the contrasting trends in the two countries are found in the different weight and dynamics of social benefits. It is precisely the persistent increase of the weight of social benefits, together with a decreasing slope of their regression line with respect to primary income in Italy and an increasing slope in Spain what has raised the redistributive effect in Italy and reduced it in Spain. As a result, the minimum amount of social benefits per capita estimated in the ELT (i.e., the intersection of the regression line with the vertical axis) in 2012 was 1928 euros in Spain and 3180 euros (65% more) in Italy. The relative influence of the other redistributive operations (income taxes, social contributions and other transfers) has been less prominent, and the structural differences already mentioned in income taxes (more progressive in Spain than in Italy) and social contributions (marginally regressive in Spain and broadly neutral in Italy), as well as the miscellaneous transfers, have played minor roles. The correlation coefficients are above 0.95 in Germany, Italy and Spain, as in the UK and the US), but significantly lower in France (0.8) due to the dispersion of social benefits.

### **3.3 Redistributive effects**

**The redistributive effects of the tax and transfers system are very different, both in size and composition, in different countries.** Although they have not remained constant, their changes during the period studied here have been gradual and smooth, with a steady increase in the UK and Italy, while remaining almost flat in the US and France (except for the structural break in 2006), and declining somewhat in Germany and more markedly in Spain. Concerning the size, Table 1 reports the redistribution effects between primary and disposable income per capita of households by regions, estimated as the ratio of the MGI to the average disposable income, together with the observed redistribution effects, measured by 1 minus the ratio of the CV of disposable income over the CV of primary income, and their discrepancies. It is to be noted that the differences are below one percentage point in the US, the UK, Germany and Italy in all years, but they are more important in Spain (2.1 on average) and France (3.9 on average). Concerning the composition, the structure of the system, as reflected in the structure of the ELT presented before for the year 2012, has also shown a steady

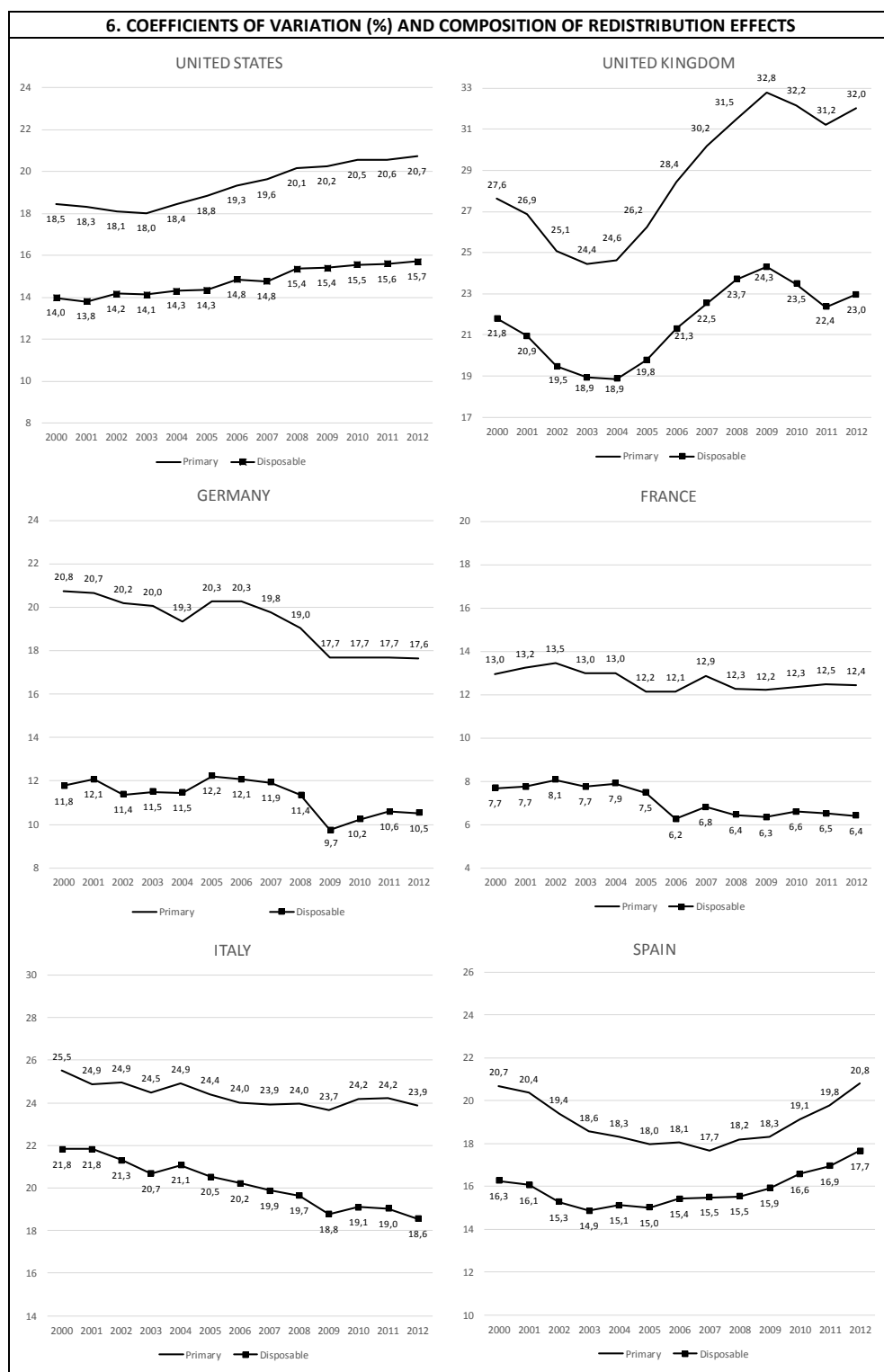
evolution with smooth changes (barring the structural break already mentioned in France).

<b>TABLE 1. REDISTRIBUTION EFFECTS</b>													
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Estimated redistribution effects (%)</b>													
United States	25,3	25,4	22,5	22,3	23,1	24,6	23,9	25,4	24,6	24,7	25,1	25,0	24,9
United Kingdom	21,6	22,6	23,2	23,1	23,9	25,1	25,6	25,9	25,1	26,3	27,5	29,0	28,8
Germany	44,0	42,4	44,3	43,3	41,6	40,4	41,1	40,3	41,0	45,5	42,7	40,5	40,9
France	44,0	44,2	42,6	43,1	42,1	42,5	53,6	50,9	52,7	52,1	50,7	53,7	53,8
Italy	15,1	13,0	15,2	16,4	16,1	16,5	16,5	17,6	18,6	21,1	21,6	21,9	22,9
Spain	22,4	22,3	22,6	21,7	19,4	18,9	17,8	16,0	17,3	15,2	15,3	15,9	17,1
<b>Observed redistribution effects (%)</b>													
United States	24,3	24,7	21,7	21,5	22,4	23,8	23,2	24,7	23,7	23,9	24,3	24,2	24,2
United Kingdom	21,1	22,0	22,4	22,5	23,3	24,6	25,1	25,4	24,6	25,9	27,0	28,4	28,2
Germany	43,3	41,6	43,6	42,6	40,8	39,6	40,4	39,6	40,3	44,9	42,2	40,1	40,4
France	40,7	41,5	40,1	40,3	39,3	38,6	48,5	47,1	47,5	48,1	46,6	47,9	48,5
Italy	14,4	12,3	14,5	15,6	15,4	15,8	15,8	16,9	18,0	20,6	21,0	21,3	22,3
Spain	21,4	21,1	21,2	19,9	17,3	16,4	14,7	12,3	14,7	13,1	13,4	14,2	15,0
<b>Estimated minus observed (Percentage points)</b>													
United States	1,0	0,8	0,8	0,8	0,7	0,8	0,7	0,7	0,8	0,7	0,8	0,8	0,7
United Kingdom	0,5	0,6	0,8	0,6	0,5	0,5	0,6	0,5	0,4	0,4	0,5	0,6	0,6
Germany	0,7	0,8	0,7	0,7	0,8	0,8	0,7	0,7	0,7	0,6	0,5	0,5	0,6
France	3,3	2,7	2,5	2,8	2,7	3,9	5,1	3,8	5,2	4,0	4,1	5,9	5,3
Italy	0,6	0,7	0,7	0,8	0,7	0,7	0,7	0,7	0,7	0,5	0,6	0,6	0,6
Spain	1,0	1,2	1,4	1,7	2,1	2,5	3,2	3,6	2,6	2,1	1,8	1,7	2,1

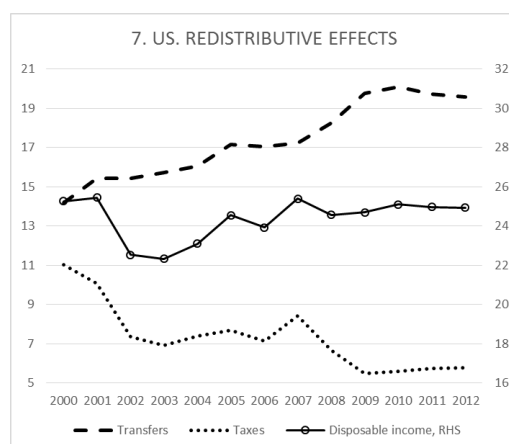
**The distribution of primary income per capita of households by regions has not remained constant.** The panel of charts 6 presents the evolution of the CVs of primary and disposable incomes and the gap between the two lines in each chart shows the evolution of the redistributive capacity of each system. The experience of each country is different<sup>18</sup>. In the US and the UK, inequality has tended to increase, while redistribution effects have remained stable in the US and increased substantially in the UK. In Germany and Italy inequality has diminished, while in France has been practically flat. In Spain, inequality has first declined, in the years before the crisis of 2007, and then returned to the previous level. The relative contributions of the different redistributive

<sup>18</sup> See Jenkins, S.P., Andrea Brandolini, John Micklewright, and Brian Nolan (2011) for an analysis of the effects of the Great Recession on the distribution of household income from a different perspective. Among their findings for the countries considered here they mention that inequality and relative poverty rates in most countries were not trending upwards or downwards over the immediately preceding period to the recession; that the impact of recessions on income inequality is not clear cut, and depends precisely on who is affected by it and where they are located in the distribution in the first place; and that the household sector in aggregate was protected from the impact of the downturn by additional support of governments through the tax and benefit system (largely concentrated on households in the bottom half of the distribution).

operations to the overall effects on disposable income have also developed differently in the different countries, as shown in the charts 7 to 12 below.

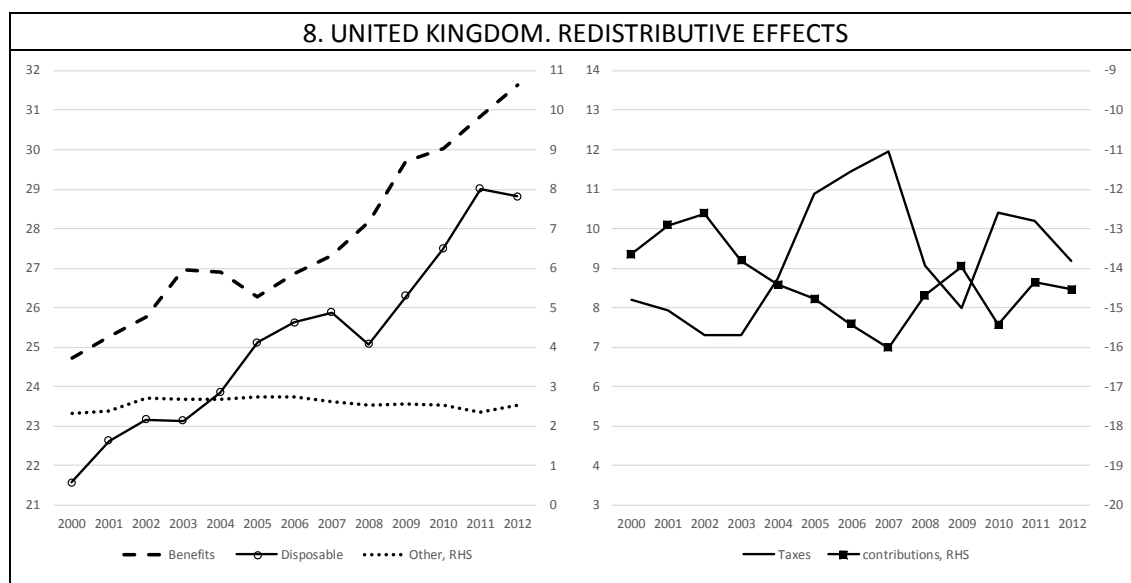


**In the US, the regional inequality in the distribution of primary incomes has increased.** After a slight decline of half a percentage point in the first three years of the century, the CV of primary income has gone steadily up by 2.7 percentage points. This trends have been also largely reflected in the regional distribution of disposable income because the overall redistributive effect of the tax and transfers system has remained very stable around an average of 24.4%. At the same time, the composition of this effect has changed substantially, with the contribution of personal income transfers increasing from 14.2% to 19.6%, and the contribution of income taxes declining from 11.1% to 5.4% in two steps derived from the tax cuts of G. W. Bush (2002 and 2008) and Obama (2009), as shown in chart 7.

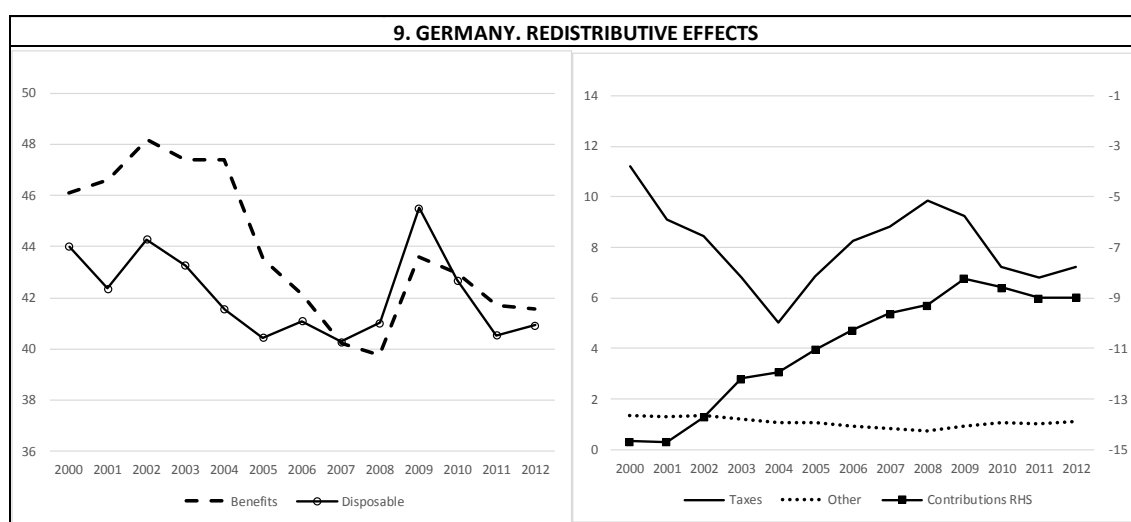


**In the UK there have been contrasting developments in the distribution of primary incomes by regions.** As shown in the chart on the upper left part of panel 6, there are three different phases in the period analysed. There was first a decline of more than three percentage points in the CV, down to a minimum of 24.4% in 2003, and then an upswing of 8.4 percentage points in the following six years. Between 2009 and 2012, the CV of primary incomes has stabilised around 32%. However, the inequality in the regional distribution of disposable income has barely increased by 1.2 percentage points, because the redistributive effects of the system have increased remarkably during this period. This increase in the redistributive effect estimated in the UK is entirely attributable to social benefits, as we can see in the left part of chart 8, while the regressive influence of social contributions (measured in the right hand axis of the right part) neutralises completely the progressive impact of income taxes, plus the positive impact on redistribution of the other net transfers and even part of the effect of social benefits.



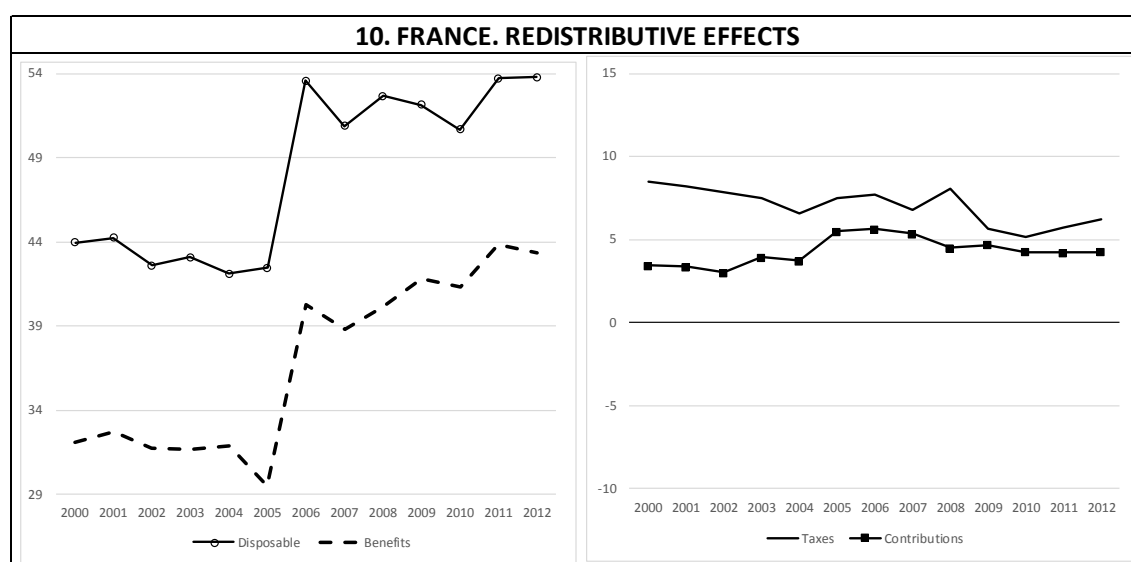


**In Germany, the inequality of primary incomes by regions has declined more than the inequality of disposable incomes.** While the former went down by 3.2 percentage points between 2000 and 2012, the latter has diminished by 1.3 percentage points during this period. This has been due to the weakening redistributive impact of the tax and transfers system, whose structure and evolution can be seen in chart 9. There has been a similar declining trend in the positive contribution of social benefits and in the negative impact of social contributions, while income taxes have kept a redistributive effect oscillating around 8%.

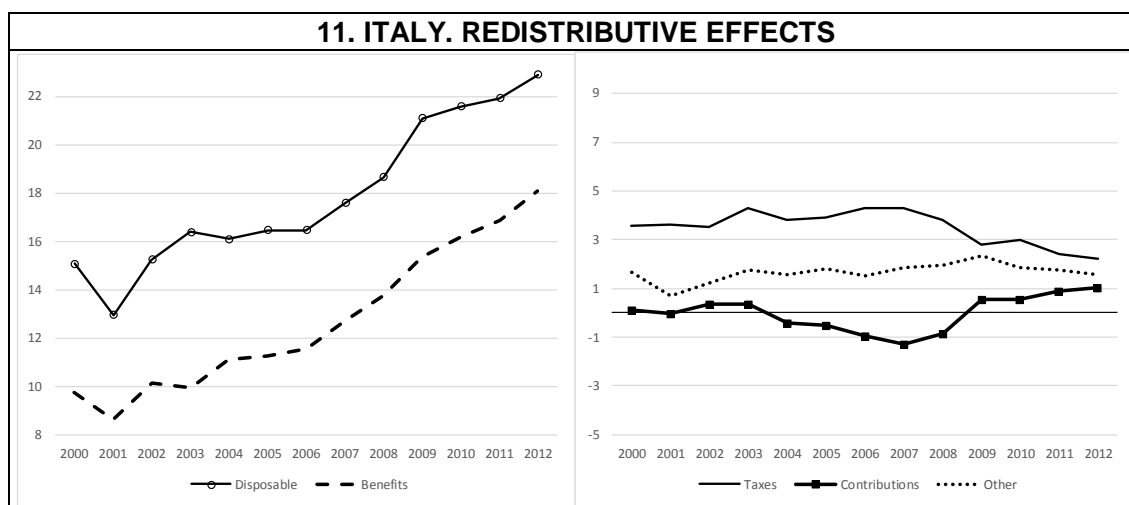


**The regional distribution of incomes has remained broadly stable in France.** Both, primary and disposable incomes, have experienced a slight reduction in their CVs, of a

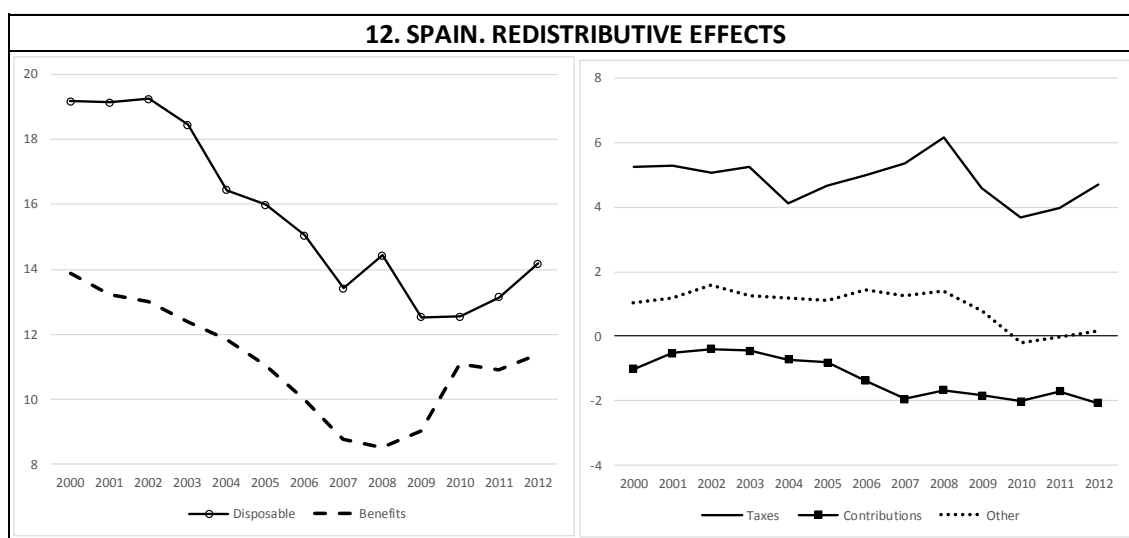
little less than one percentage point the first and a little more the second. In terms of structure, social benefits are the main redistributive operation, as in other countries, while in contrast, social contributions are progressive and have a positive impact on regional income redistribution of between 3.5 and 5.5 percentage points. The redistributive effect of social benefits pulled down marginally the global effect on disposable income in the first half of the past decade, but it has trended upwards after the break in 2006, rising almost 5 percentage points in the last six years of the period. However, this effect has been neutralised by the declining positive additions of income taxes and social contributions, so that the global redistributive effect has remained oscillating around 52.5%.



**In Italy, the inequality in the regional distribution of primary incomes has declined.** The CV has dropped from 25.5% to 23.9%. The impact of this reduction on the distribution of disposable incomes has been strengthened by the rising redistributive effect of social benefits, which has increased 9 percentage points during this period. In contrast, the other operations have had a minor and stable influence in this evolution, with taxes losing weight since the crisis in 2007, social contributions having also a small but positive effect (1%) on redistribution, and the other net transfers remaining relatively flat around 2 percentage points of positive contribution to the redistributive effect on disposable income.



**In Spain, the evolution of regional inequality of primary incomes shows a perfectly U-shaped pattern.** Up to the onset of the crisis in 2007, the CV of primary incomes declined 3 percentage points, to 17.7%, and in the following five years raised again to 20.8%. As in the other countries, developments in social benefits determined the size and evolution of the overall redistributive effect on disposable income, but in contrast to the Italian experience, this effect has come down by five percentage points over the period, even after a small rebound of 2 percentage points in 2011-2012. The shrinking redistributive power of social benefits up to 2008 was compounded by a more regressive impact of contributions and, in the years 2009-2010, by the fading of the positive impact of net transfers. Income taxes have kept a positive redistributive effect of between 4 and 6 percentage points during the whole period.



### 3.4 Stabilising effects

**Stabilising effects are estimated through the elasticity of disposable income with respect to primary income.** In the empirical literature these estimates exploit the time series dimension of panel data and find a wide range of results, which differ from one another not only in the size and the composition of the effects, but also in the puzzling differences between redistributive and stabilising effects. Despite the variety of approaches taken and the efforts invested in refining the econometric techniques used in successive studies, discrepancies persist. The estimation of annual ELT is a simpler method, whose transparency may contribute to clarify some issues. We present first the crude regressions estimating elasticities on the time series of annual data for the different countries and then use the parameters of the estimated ELT to analyse the results<sup>19</sup>.

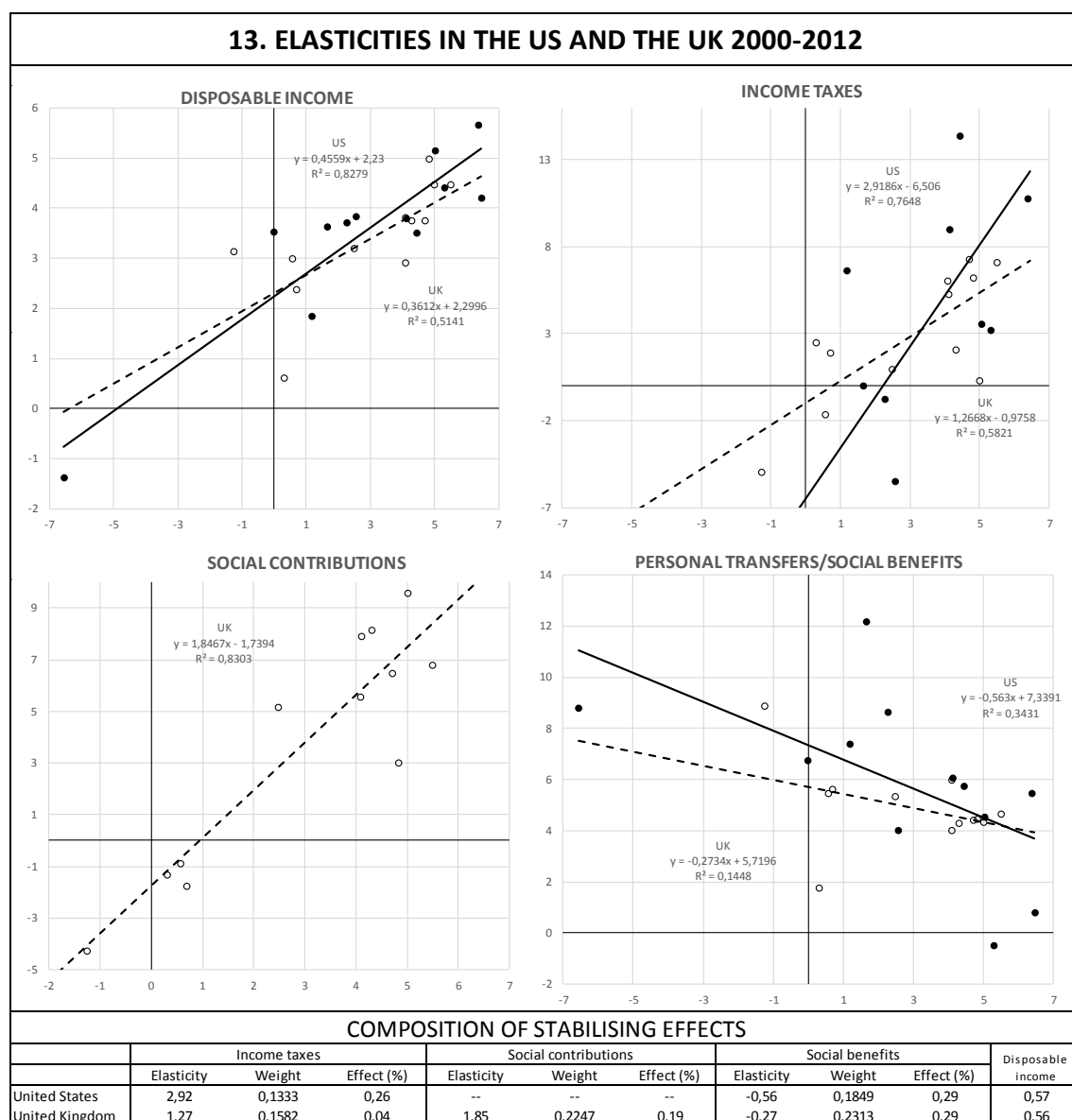
#### 3.4.1 The puzzling observed effects

**A direct estimate of elasticities produces puzzling results.** Rough regressions based on twelve observations cannot provide reliable evidence to support firm conclusions, particularly if their fit is very poor. Nevertheless, they are a starting point to formulate some propositions derived from the observed data, which reveal the puzzles and difficulties of interpreting the estimates and require further analysis of the evidence later, based on the separation of the observed effects into their automatic and discretionary components. The chart and table displayed in panel 13 offer the results of these most elementary regressions for the US and the UK. In the charts, we represent in the horizontal axis the rates of change of primary income, and in the vertical axis the various redistributive operations and disposable income. Data for the US are shown with full points and for the UK with empty points, the regression lines are continue for the US and dashed for the UK. In the figures below the charts, the overall stabilising effects and their composition are calculated as the elasticity minus one times the average weight in primary income of the different variables for the period 2000-2012.

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<sup>19</sup> We analyse here the whole national economy. The regions are like a (non-random) sample of the national economy. The closer the sample average of each variable to the average of the same variable for the national economy, the smaller the residuals of applying to the national data the parameters of the ELT estimated with the sample data. The same analysis can be replicated at the level of each region, but with bigger residuals and less precise results than for the national economy.

**The stabilising effects of fiscal policies in the US and the UK have been very high.** In both countries the stabilising effect for the period considered is estimated to be slightly above 0.55. While the elasticity is smaller in the UK (0.36) than in the US (0.46), the average ratio of disposable income over primary income is also smaller in the UK than in the US (87% in the former and 105% in the latter). This result is puzzling because the size of the aggregate effect estimated with the time series for aggregate incomes in both countries is more than double the values of the automatic stabilisers derived from the structure of the ELT estimated with annual cross section data from their states and regions, values which have moved in the range of 24%-27% in the US, and 19%-26% in the UK.



**Income taxes show a much higher stabilising effect in the US than in the UK.** The estimated slope of the regression line on observed rates of change is 2.9 in the US and 1.3 in the UK, which contrasts with the cross section elasticities implicit in the annual ELT, which have been declining in the US from 1.7 to 1.5, and increasing in the UK from 1.4 to 1.6.

**Social security contributions in the UK are much more stabilising than income taxes.** Despite being very regressive and offsetting completely the redistributive impact of income taxes every year, as we have highlighted before, social contributions have a stabilising influence on disposable income fluctuations which is four times more powerful than the effect of income taxes.

**Current personal transfers in the US and social benefits in the UK are the most important redistributive operations** in the stabilisation of disposable income, although in the cross section estimates of the ELT they are practically independent from the income level of states and regions.

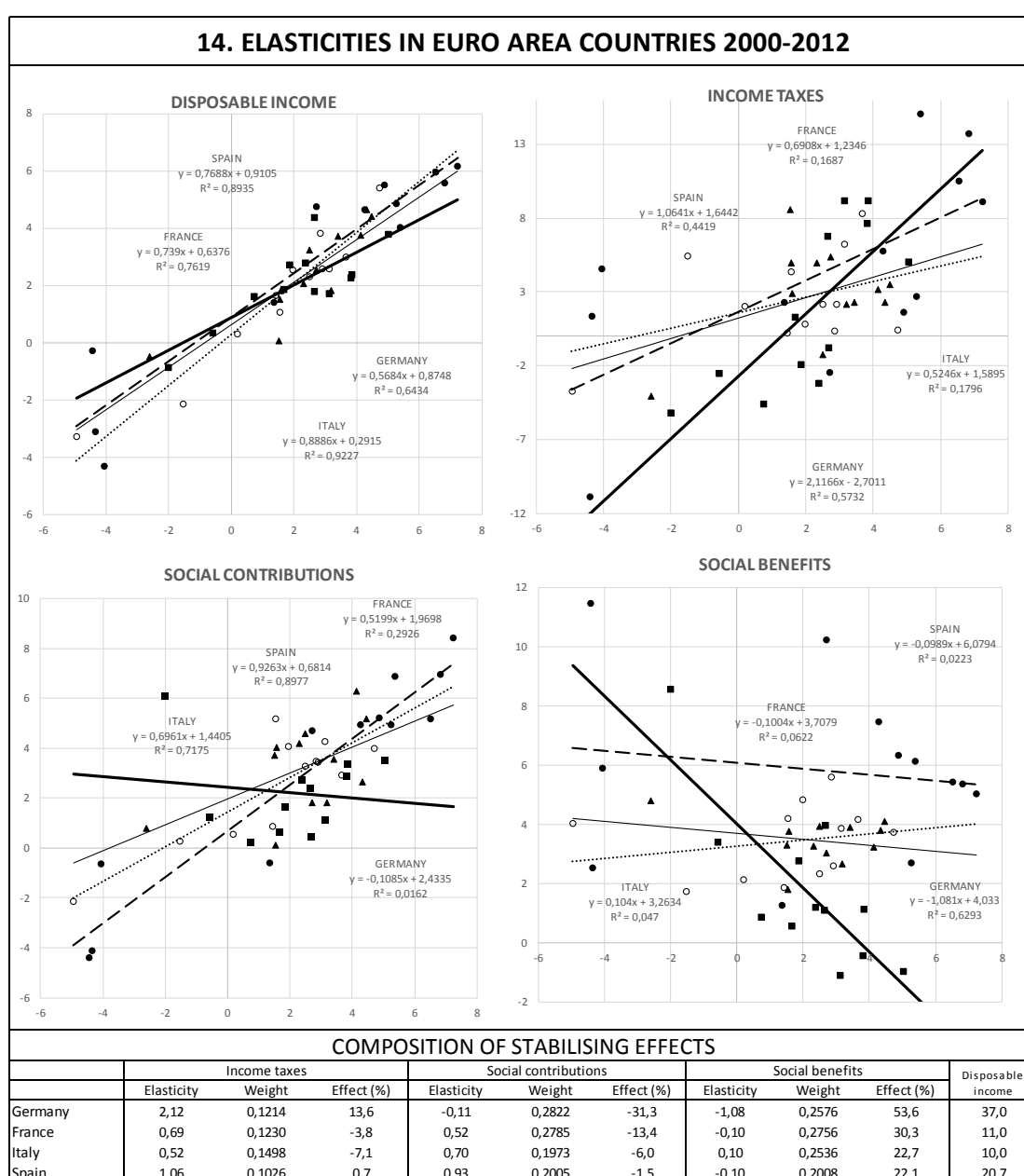
**The direct estimates of elasticities in the euro area countries produce equally puzzling results.** These estimates are seen in the panel of charts 14 and quantified in the table below it. We present the estimated elasticities for disposable income and the main redistribution operations, following the same conventions adopted in chart 5: the symbols are full squares for Germany, triangles for France, empty circles for Italy and full circles for Spain. The regression lines are continuous for Germany (thick) and France (thin), with fine points for Italy and discontinue strokes for Spain.

**The stabilising effects on disposable income have been much higher in Germany (37%) than in Spain (21%), France (11%), and Italy (10%).** While the estimate for Germany is in line with the cross section figures of the automatic effect of the ELT, it is significantly above for Spain and below for Italy. But the biggest discrepancy is in France, which has the most redistributive system of taxes and transfers, and where the stabilising effect for the period is only a quarter of the average value found in the annual ELT estimates of automatic effects.

**Income taxes have had an important stabilising effect in Germany, but this effect has been negligible in Spain and destabilising in France and Italy.** This is puzzling with respect to the cross section estimates of income tax elasticities, which are very

similar in Germany, France and Spain (around 1.5), and just a little below those for the UK and the US.

**Social security contributions have been destabilising in the four euro area countries.** This is less surprising in Germany and in Spain, where their structure is regressive, than in France and Italy, where they show some progressivity. In any case, these destabilising effects contrast with the results found in the UK, where contributions have had a higher stabilising influence than income taxes.



**Social benefits have provided also in these four countries the most important contribution on average to stabilise disposable income**, although they do not depend much on income levels in the ELT estimates and the fit of the regression lines is very poor, as in the US and the UK.

### 3.4.2 Automatic stabilisers

**The decomposition of observed changes into automatic and discretionary effects allows understanding many of the puzzles observed.** Table 2 summarises the estimated values of the automatic stabilisation effects on disposable income, as well as the contributions of the different redistributive operations, applying definition [4] and formula [5]. These effects are equal to the difference in percentage points of marginal minus average rates of disposable income and its components. They also measure the ratios to average primary income of the intercept with the vertical axis of the regression lines estimated for the structure of the ELT each year: the ratio of the MGI to the average primary income, which is the stabilising effect on disposable income, as well as the contribution of each redistributive operation to this ratio.

TABLE 2. AUTOMATIC STABILISATION EFFECTS (Percentage points)													
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
On disposable income													
United States	25,1	25,6	23,4	23,4	24,3	25,6	24,8	26,2	25,9	27,3	28,0	27,3	27,0
United Kingdom	18,7	19,7	20,3	20,1	20,5	21,4	21,8	21,8	21,4	23,5	24,4	25,9	26,3
Germany	38,4	37,5	39,6	39,0	37,8	36,8	36,9	35,6	35,7	40,1	37,7	35,3	35,4
France	39,4	39,7	38,5	38,9	38,1	38,3	48,7	46,5	48,1	48,3	47,1	49,7	49,3
Italy	13,5	11,7	13,9	15,0	14,7	15,0	14,9	15,9	16,7	19,2	19,7	20,1	20,9
Spain	20,3	20,1	20,4	19,5	17,6	17,1	15,9	14,1	15,5	14,2	14,2	14,8	16,1
Social benefits/personal transfers													
United States	14,1	15,5	16,0	16,5	16,9	17,9	17,7	17,8	19,2	21,8	22,4	21,5	21,2
United Kingdom	21,4	21,9	22,6	23,5	23,1	22,4	22,8	23,0	24,1	26,5	26,7	27,5	28,9
Germany	40,2	41,3	43,1	42,8	43,1	39,6	37,8	35,6	34,6	38,4	38,0	36,3	36,0
France	28,7	29,4	28,6	28,6	28,8	26,6	36,6	35,4	36,7	38,7	38,4	40,5	39,7
Italy	8,7	7,8	9,2	9,1	10,1	10,3	10,5	11,5	12,3	14,0	14,8	15,4	16,5
Spain	14,7	13,9	13,8	13,1	12,7	11,8	10,6	9,2	9,2	10,2	12,5	12,2	12,9
Income taxes													
United States	11,0	10,1	7,4	6,9	7,4	7,7	7,1	8,4	6,7	5,5	5,6	5,7	5,8
United Kingdom	7,1	6,9	6,4	6,4	7,5	9,3	9,7	10,1	7,7	7,1	9,2	9,1	8,4
Germany	9,8	8,1	7,6	6,2	4,6	6,3	7,4	7,8	8,6	8,1	6,4	5,9	6,2
France	7,6	7,4	7,1	6,8	5,9	6,8	7,0	6,2	7,3	5,3	4,7	5,3	5,7
Italy	3,2	3,3	3,2	3,9	3,5	3,6	3,9	3,9	3,4	2,6	2,7	2,2	2,0
Spain	5,6	5,5	5,4	5,6	4,4	5,0	5,3	5,6	6,6	5,2	4,1	4,5	5,3
Social contributions													
United States	--	--	--	--	--	--	--	--	--	--	--	--	--
United Kingdom	-11,8	-11,2	-11,1	-12,0	-12,4	-12,6	-13,1	-13,5	-12,6	-12,5	-13,7	-12,8	-13,3
Germany	-12,8	-13,0	-12,3	-11,0	-10,8	-10,0	-9,2	-8,5	-8,1	-7,2	-7,6	-7,8	-7,8
France	3,1	3,0	2,7	3,6	3,4	4,9	5,1	4,9	4,1	4,3	3,9	3,9	3,9
Italy	0,1	0,0	0,3	0,3	-0,4	-0,5	-0,8	-1,1	-0,8	0,5	0,5	0,8	0,9
Spain	-1,1	-0,5	-0,4	-0,5	-0,8	-0,9	-1,5	-2,0	-1,8	-2,1	-2,3	-1,9	-2,4
Other net transfers paid													
United States	--	--	--	--	--	--	--	--	--	--	--	--	--
United Kingdom	2,0	2,1	2,4	2,3	2,3	2,3	2,3	2,2	2,2	2,3	2,2	2,1	2,3
Germany	1,2	1,2	1,2	1,1	1,0	1,0	0,8	0,7	0,6	0,8	0,9	0,9	1,0
France	--	--	--	--	--	--	--	--	--	--	--	--	--
Italy	1,5	0,6	1,1	1,6	1,4	1,6	1,4	1,7	1,7	2,2	1,7	1,6	1,4
Spain	1,1	1,2	1,7	1,3	1,3	1,2	1,5	1,3	1,5	0,9	-0,2	0,0	0,2



**The level, structure and developments of the automatic stabilising effects are very similar to the redistributive effects** reported in table 1, and whose composition and evolution was described in the charts of the previous section. Therefore, the evolution of these stabilising structures can be summarised in a few lines. In the US, the automatic effects have been stable, moving in a range of 23%-28%, with current transfers gaining weight from 21% to 29% and income taxes losing it from 11% to below 6%. In the UK, automatic stabilisers have increased from 19% to 26% due to the rise in the stabilising capacity of social benefits, while the other operations kept relatively flat and jointly balanced their respective influences. Automatic stabilisation has fluctuated in Germany between 35% and 40%, with social benefits reducing their stabilising power and social contributions reducing symmetrically their automatic destabilising influence. Automatic stabilisers have increased substantially in France and Italy, driven by the rising influence of social benefits in both countries, whereas the other operations played a minor role. In contrast, automatic stabilisation capacity has shrunk in Spain, also led by the declining power of social benefits.

**The automatic stabilisers estimated in the ELT for each year provide a sound support to disposable income in levels through the level of the MGI.** This support is the basis of automatic stabilisation. The redistributive and automatic stabilising effects of the system are stable, as they depend on the levels of the parameters estimated in the ELT, which only change gradually. However, when considering the fluctuations of disposable incomes, the functioning of the stabilisers embedded in the system is complemented by discretionary changes which often override them. The observed stabilising effects in each year are a mix of the annual discretionary changes in this structure, which may be stabilising or destabilising in that particular year, and the effect on disposable income of changes in primary income through the existing structure of the system, which are always stabilising. The former may be expansionary or restrictive depending on whether they increase or diminish disposable income, respectively, as shown in an upward or downward shift of the regression line for the level of primary income of the preceding year. The later are restrictive when primary income expands and expansionary when it declines, as reflected in the slopes of the regression lines identifying the structure of the ELT each year.

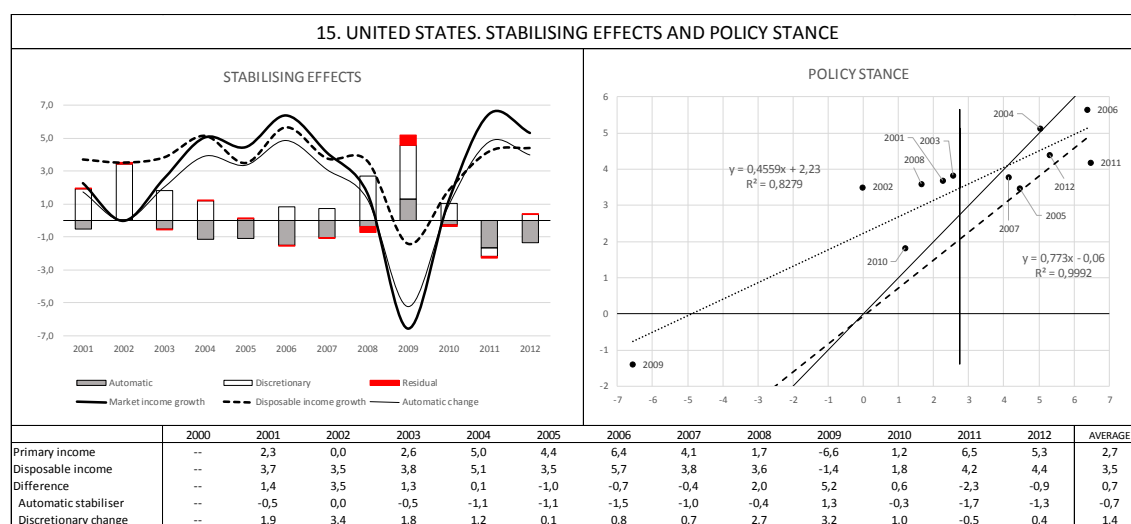
### **3.4.3 Discretionary changes**

**The focus of the analysis of stabilising effects is on the gap between the annual rates of change in primary and disposable incomes.** We examine the relative importance of automatic and discretionary changes in explaining this gap every year, the contributions of social benefits, income taxes, and social contributions to the gap (leaving as a residual the regression errors and the impact of the other net transfers), and finally the automatic or discretionary nature of each one of these contributions. In characterising the effects of fiscal policies we will follow the same scheme in the different countries, presenting the results in panels of charts. After estimating the annual ELT for each country, the automatic increase of the variable is calculated multiplying the estimated slope of each regression (say, 0.8122 for disposable income in 2012 in the US, as seen in chart 3) times the rate of change of primary income. Then we regress these figures on the rate of change of primary incomes to obtain the regression line (to be represented in the charts as a dashed line) of automatic stabilisation, as depicted in figure 5. This regression line represents stabilising effects when it has a slope lower than one for social benefits and disposable income, and higher than one for income taxes and social security contributions. We also add to the chart the vertical line on the average rate of growth of primary income and the 45° line. Plotting the observed annual rates of change of primary and disposable incomes as points into figure 5, and fitting to them a new regression line (represented with small points), we have all the elements to describe the size and composition of the stabilising effects and the overall and discretionary stance of fiscal policy in each year.

#### **3.4.3.1 United States**

**Fiscal policy in the US has been highly stabilising and systematic.** Panel 15 shows the estimated decomposition of the gap into automatic effects, discretionary changes and a residual from the errors in the regression on which the decomposition is based. The size of these errors indicate how good the decomposition of the observed changes based on the estimates of the ELT parameters each year is. In the left chart, the gap defined by the thin continuous line (automatic change) minus the thick continuous line (market income growth) is the automatic effect. The gap defined by the dashed line (disposable income growth) minus the line of automatic change (continuous thin line) is the discretionary change. The size of the bars in the left chart is the sum of both effects in absolute value (the gap between the rate of change of disposable income minus the

rate of change of primary income), which corresponds in net value to the vertical distance measured by the difference of each point minus the 45° line in the right chart. In the same chart, the vertical distance measured by the gap defined by the dashed line minus the 45° line is the automatic stabiliser effect on disposable income, and the vertical distance measured by the difference between each point minus the dashed line is the discretionary change. The figures corresponding to these effects are reported at the bottom of the panel. Discretionary changes have dominated the automatic effects in half of the years. In 2001-2003 and 2008-2010, the size of the discretionary change is bigger than the automatic effect.



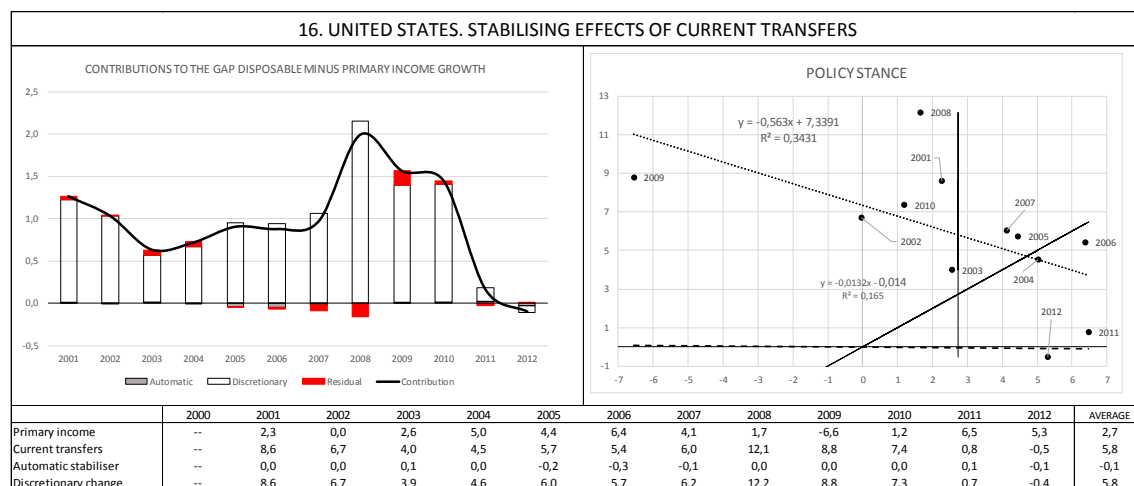
**Discretionary policies have strengthened automatic stabilisation in the period as a whole**, as shown by the regression line of observed effects being flatter than the regression line of automatic effects. At 0.46 the estimated slope implies that fiscal policy has attenuated on average by more than a half the impact on disposable incomes of the fluctuations in primary incomes, doubling by discretionary changes the effect of automatic stabilisation (the vertical distance between the dashed line of automatic stabilisation and the 45° line). Fiscal policy has always been countercyclical. All observed points fall in the two regions of countercyclical effects (NW and SE) defined in figure 5. Only 2004, when primary and disposable incomes grew at 5%, is at the edge of being procyclical.

**Fiscal policy has had a clear expansionary bias in the period**, as shown in the same chart by the intersection of the regression line of observed points with the vertical line of

average growth of disposable income at a point above the intersection of this vertical line with the line of 45°. Discretionary policies were almost always expansionary. The only exception is 2011, when primary income grew at its maximum rate (6.5%) and disposable income 2.3 percentage points less, so that this is the only point below the regression line of automatic stabilisers. Discretionary changes did not fully compensate the restrictive automatic effects when primary incomes grew above the average of the period. This partial compensation left the overall stance of fiscal policy with a restrictive orientation in the years of above average expansion, as shown by the fact that all points to the right of the vertical line are below the 45° line (2004 is on the boundary). Discretionary policies overcompensated the restrictive influence of automatic stabilisers in all years when primary income grew less than the average of the period. All points to the left of the vertical line are above the 45° line. Discretionary policies had almost always the opposite sign of automatic stabilisers. The exceptions were 2009, when both were expansionary, and 2011, when both were restrictive. This is apparent in the left chart of the panel, which shows the relative size and sign of both effects. The goodness of fit of the regressions is shown in the small importance of the residuals.

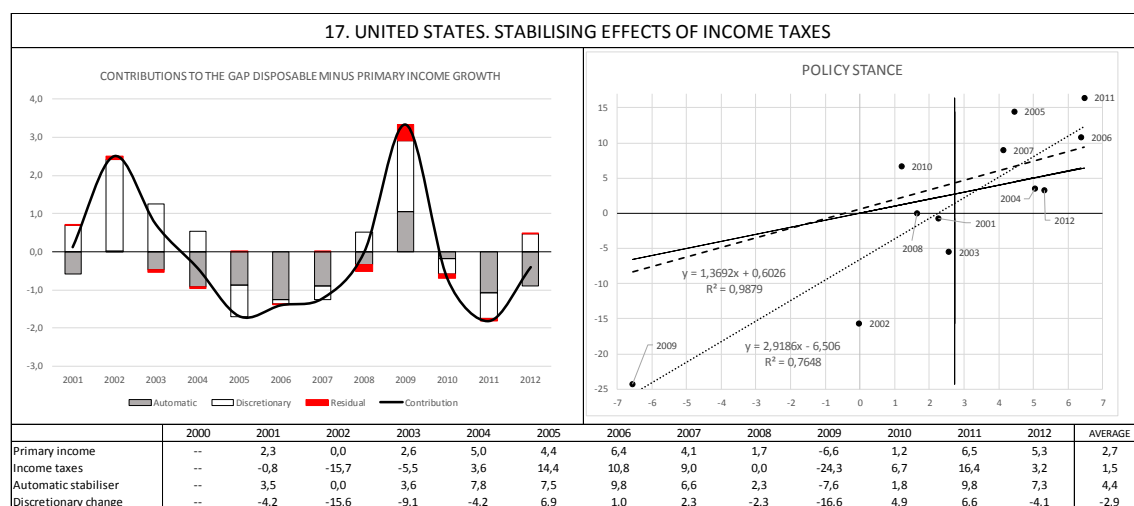
**Changes in current transfers were of a discretionary character.** The ELT estimates for 2012 presented in chart 3 indicate that these transfers are independent from the level of primary incomes. Hence, their adjustment is deemed discretionary in the decomposition proposed here, notwithstanding the fact that some adjustments may be mandated by existing regulations. This is shown in bars on the left chart of panel 16, where the line gives the contribution in percentage points of current transfers to the gap defined by the rate of growth of disposable income minus the rate of growth of primary income. The empty bars represent the discretionary part of this contribution, which explains all this contribution. In the right chart of the panel, the dashed line represents the automatic stabiliser, while the vertical distance measured by the difference of each point minus the dashed line represents the discretionary change. As seen in this chart, current transfers were expansionary (above the 45° line) in eight years, and countercyclical (in the NW or SE regions defined in the plane by the vertical line and the 45° line) in ten of the twelve years considered. While the contribution to disposable income growth (the result of the rate of growth of transfers times their weight in disposable income) was always positive, except marginally in 2012, current transfers were restrictive in the four years of the highest growth in market income, as shown in the

right chart of the panel, growing slightly less than primary income in 2004 and 2006, and more markedly in 2011 and 2012. Current transfers were always countercyclical, except in 2005 and 2007.



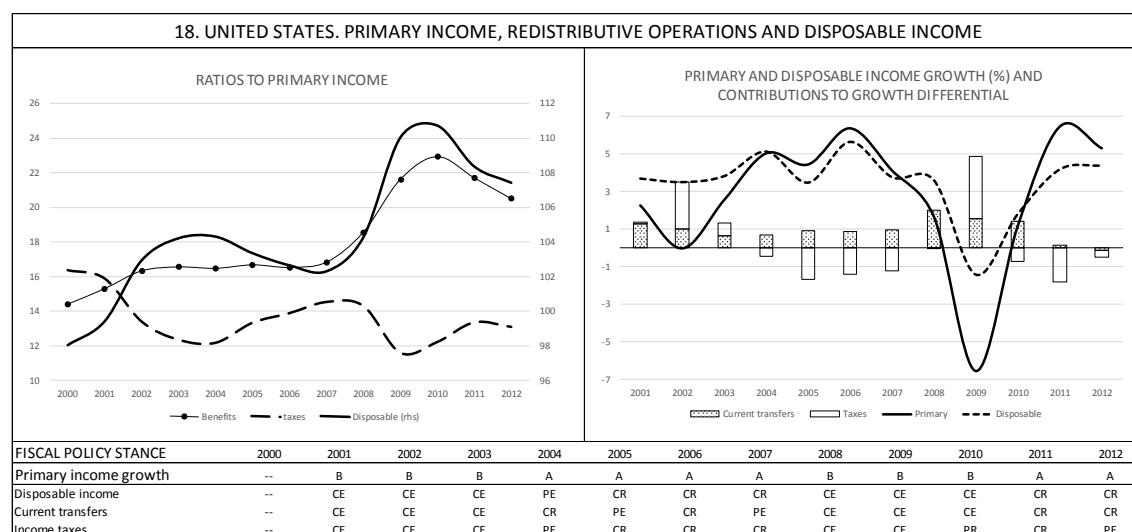
**Automatic stabilisers depend exclusively on the progressivity of income taxes.**

The contribution of income taxes to the growth gap of disposable income minus primary income was positive only in 2001-2003 and 2009, although only in this last year the contribution of the automatic stabiliser was also positive, as we can observe in the left chart of panel 17. To assess the stabilising effects by reading this chart, it should be remembered that they are restrictive whenever the points are above the line of 45° and expansive when below; and that countercyclical regions of the plane are the North-East and the South-West, whereas the procyclical ones are the North-West and the South-East.



In this chart, there were restrictive and procyclical changes in income taxes only in 2010, when primary incomes were recovering from the deep recession and just growing at 1.2%, but fiscal consolidation requirements raised income taxes at a 6.7% rate. The other two procyclical observations were slightly restrictive in 2004 and 2012. In the other nine years, income taxes changed in a countercyclical direction, and extremely so in 2009, when there was an exceptional fall of 24.3%. All in all, the strong discretionary changes of a stabilising character implemented not only in that year of severe recession, but also in 2005 and 2011, with a restrictive orientation, and in 2002 with an expansionary bias, buttress the very high slope (2.9) and the restrictive influence on disposable income growth observed for the period as a whole.

**To wrap up this analysis with a sequential narrative, we can distinguish four phases in the period considered, looking at the expansion of market incomes.** The first is 2000-2003, with a mild recession and the recovery from it. The second is a phase of steady growth above the average of the period in the years 2004-2007. In the third, 2008-2010, there was the Great Recession. The last two years of the period were again of growth above average. In panel 18, we represent to the left the ratios to primary income of the redistributive operations and disposable income, and to the right, the rates of change of primary and disposable incomes and the contributions of the redistributive operations that fill the gap between them. Below the panels, the table describes whether the rate of growth of primary income was above (A) or below (B) the average of the period (2.7%), and whether the stance of fiscal policy was countercyclical or procyclical, expansionary or restrictive.



**In the first phase of the period, primary income grew below disposable income** and the orientation of policy was systematically expansionary in a recessionary environment, after the dotcom crisis of March 2000. Personal transfers contributed around one percentage point per year to support disposable income. Income taxes gave the main boost to disposable income, adding to its growth half a percent in 2001, two and a half the following year, after the tax cuts adopted in response to the slowdown of the economy, and one percent in 2003. Discretionary fiscal policies, therefore, had a countercyclical and stabilising effect on disposable income, which grew between 3.5% and 3.8% in these three years, impervious to the fluctuation of economic activity. As a result, the ratio of disposable to primary income rose six percentage points (up to 104%, on the rhs), propelled by a decline of the tax ratio by four percentage points, to 12%, and an increase in the ratio of current transfers by two percentage points, to 16%.

**In the second phase (2004-2007), primary income expanded above the average and disposable income kept growing at a relatively close but lower rate.** The year 2004 is on the boundary. It was still an exercise of acceleration in which both primary and disposable incomes rose by 5%, still fuelled by an expansive orientation of discretionary changes in income taxes. Although current transfers reduced their support to disposable income, the combination of redistributive operations was of a marginally procyclical and expansionary character. In the following three years, income taxes had a restrictive and countercyclical orientation, rising by two percentage points its ratio to primary income, on the back not only of the automatic restraining effect induced by the expansion of output, but also reinforced by restrictive discretionary changes. In contrast, current transfers, which had reduced their support to disposable income in the previous two years, rose at higher rates of between 5.4% and 6% that were mildly procyclical in 2005 and 2007, keeping stable at above 16% the ratio to disposable income they had attained in the expansion of 2001-2002.

**The slowdown of incomes leading to the Great Recession started already in 2007.** The first financial shock was recorded early in August. In the course of the following three years, the ratio of current transfers would rise by six percentage points and the ratio of income taxes drop by two percentage points, bringing disposable income close to 111% of primary income in 2010. The strong discretionary changes behind these developments had a countercyclical and expansionary orientation which managed to limit substantially the impact of the recession on disposable incomes. Current transfers reacted first to the



slowdown of incomes, while income taxes were still restrictive in 2007. When the slowdown was more pronounced in 2008, current transfers doubled their contribution to the support of primary income, while discretionary income taxes barely compensated the still dragging effects of automatic stabilisers with the late tax cuts of G. W. Bush, which just managed to make neutral the contribution of taxes to the gap between primary and disposable income growth. This composition of redistributive operations changed in 2009, with current transfers reducing the support to disposable income and the unprecedented fall of income taxes by almost 25%, after the huge tax cut of Obama, contributing more than two percentage points to arrest the impact of the decline of primary income on disposable income. The joint effect of both operations put a floor to the drop in disposable income at -1.4%, in a year in which primary incomes collapsed at a rate of -6.6%. It is doubtful whether discretionary changes stimulated output and shortened the recession. It is undisputable that it managed to stabilise disposable income fluctuations. It is debatable whether the benefits delivered by this policy in fostering the confidence of the public in the functioning of the tax and transfer system, as a reliable mechanism based on income redistribution to prevent the worst consequences of a recession, are worth the deferred costs taxpayers would have to foot later to rebalance the budget and reduce the debt accumulated<sup>20</sup>. In 2010, at the beginning of the recovery, the orientation of tax policy turned to be restrictive again. The concern of the economic advisers of Kennedy in 1962 about the “blindly symmetrical” effects of automatic stabilisers was not enough to inhibit a discretionary action of fiscal consolidation, dictated by the generalized fear to the skyrocketing deficit figures. This change of orientation materialized in a slightly weaker, but still expansionary, contribution of current transfers to disposable income, and a renewed drag of income taxes.

**The years 2011-2012 witnessed the recovery of primary income growth above average and a continuation of fiscal consolidation.** In the first of these years, with primary income reaching the highest rate of expansion in the period, current transfers were drastically scaled down and discretionary changes in income taxes accentuated the restrictive effect of automatic stabilisers, so that the two redistributive operations contributed to contain the acceleration of disposable income, which still expanded at a

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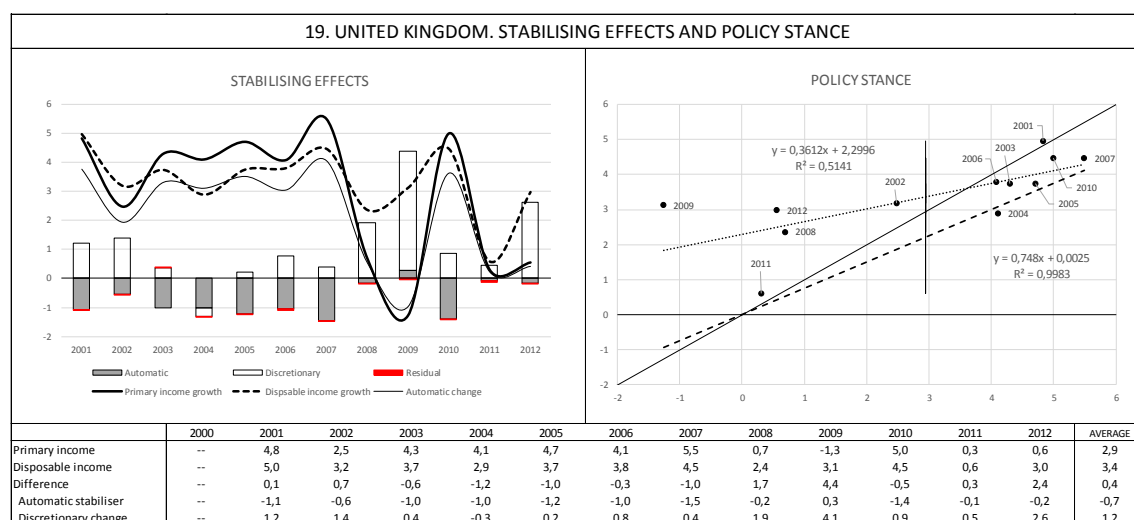
<sup>20</sup> See a thorough explanation of the contrasting views in Blinder A. (2013) and Taylor, J.B. (2011).



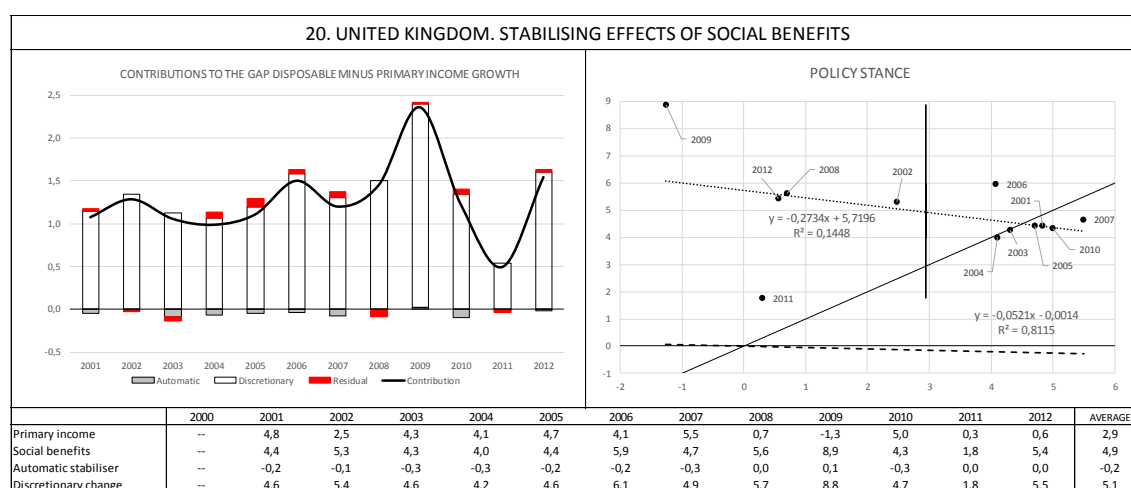
rate of growth above the average of the period. In 2012, primary income slowed down a little and kept growing at a rate doubling the average of the past twelve years. Current transfers contributed negatively to disposable income for the first and only time in the period, while discretionary change on income taxes was moderately supportive, but without offsetting the restrictive influence of automatic stabilisers. As a consequence, from the bottom of the recession, the ratio of disposable to primary income went down by three percentage points, remaining still above 107%, with an increase of one percentage point in the ratio of income taxes and a decline of two percentage points in the ratio of current transfers.

### 3.4.3.2 United Kingdom

**Fiscal policy in the UK has been even more stabilising than in the US, but also notably more volatile.** Discretionary policies have strengthened automatic stabilisation in the period as a whole. At 0.36 the estimated slope of the regression line on observed rates of change implies that fiscal policy has attenuated by almost two thirds the impact on disposable incomes of the fluctuations in primary incomes, while automatic stabilisers effects only would have provided one quarter of this mitigation (See panel 19). However, the lower correlation coefficient in the UK (0.51 against 0.82 in the US) indicates that fiscal policy has been more erratic. All observed points of disposable income, but one, fall in the two regions of countercyclical effects. Only 2001, when primary income grew at 4.8% and disposable income at 5%, is barely procyclical.



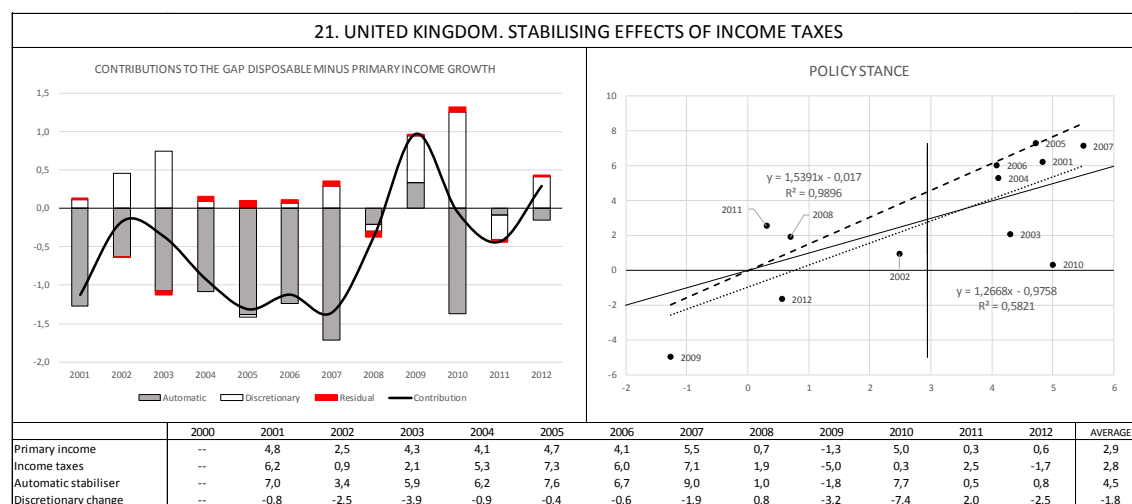
**Fiscal policy has imparted an expansionary impulse in the period of half a percentage point on average.** This expansion took place in the period of below average growth of primary incomes and kept disposable income rising at rates between 2% and 3% in these five years, except in 2011, when there was a retrenchment policy to contain the ballooning budget deficit. Discretionary policies were almost always expansionary. All the points save one (2004) are above the dashed line of automatic changes in the right hand chart of panel 19. Discretionary expansion policies were moderate in the years of high growth and they did not fully compensate the restrictive automatic effects when primary incomes grew above the average of the period. This partial compensation, shown in the fact that the points are between the dashed line and the 45° line, kept the overall stance of fiscal policy with a stabilising restrictive orientation in this years of above average expansion (As noted before, 2001 is a borderline case). On the contrary, discretionary policies overcompensated the restrictive influence of automatic stabilisers in all years when primary income grew less than the average of the period (all points to the left of the vertical line are also above the 45° line) and had almost always the opposite sign of automatic stabilisers, the exceptions being 2009, when both were expansionary, and 2004, when both were restrictive.



**Changes in social benefits are of a fully discretionary character.** They contributed every year by more than one percentage point to the growth of disposable income, with the single exception of 2011, when a less supportive stance was adopted in view of the fragility of public finances, after the strong expansion of previous years. In the period as a whole they were very expansionary, growing on average two percentage points above the average rate of increase of primary income, and particularly so in 2009, when the

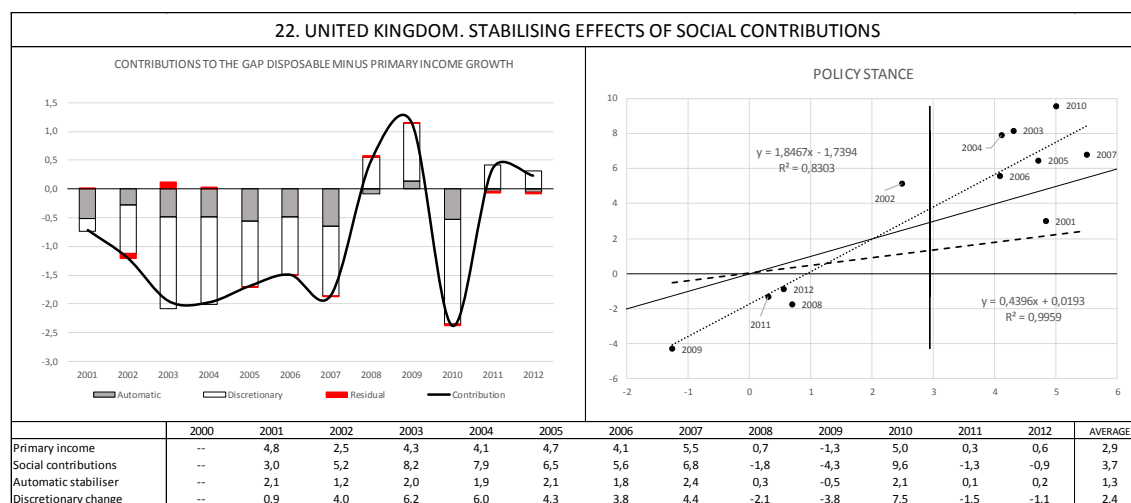
contribution reached almost 2.5 percentage points. As shown in the right chart of panel 20, all points fall into the countercyclical regions, except 2006, when primary income was growing more than 4% and benefits increased by 5.9%. Discretionary policies strengthened the role of automatic stabilisers, notably in supporting disposable income growth when primary incomes were increasing below the average of the period, although the discretionary changes were not very systematic. The correlation coefficient is low, with two outliers: the years 2009, of strong expansion (8.9%), and 2011, of forced retrenchment (1.8%).

**Income taxes are the main automatic stabiliser in the UK, but discretionary policies reduced their effects.** The slope of the regression line of income taxes actually observed was still high (1.27), but much lower than the embedded in the progressive structure of income taxes on average during the period (1.54). This is due to the four years of procyclical adjustments. In 2003 and 2010, income taxes were expansionary when primary income was growing more than 4%, while in 2008 and 2011 they were restrictive when primary income growth was below 1%.



The automatic effect moderated disposable income growth by around one percentage point in the years before the crisis. However, income taxes were expansionary in 2009, when the automatic stabilisation effect was reinforced by a sizeable discretionary boost, and 2012, when the discretionary change prevailed over the restrictive operation of automatic stabilisers. In the the years 2001 and 2004-2007, when primary income was growing above the average of the period, discretionary changes did not fully compensate the automatic stabilisation effect.

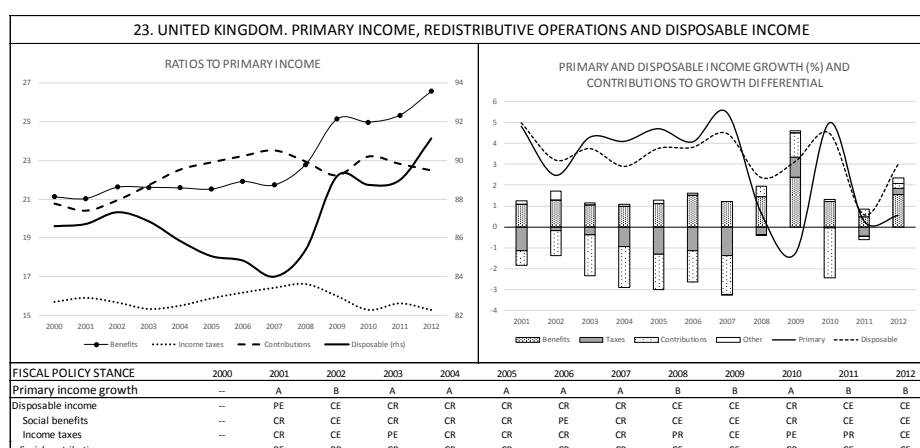
**Social contributions provided strong stabilising effects.** This is a singularity of the UK, not observed in other countries. Despite their regressive structure which is apparent in the low slope of the automatic stabiliser line (0.44), discretionary changes managed to adjust the contributions collected every year in a countercyclical way and raised the slope estimated for the period on actually observed changes to 1.85. This is in contrast also with the consequences of discretionary changes on income taxes, which reduced their structural progressivity. Discretionary adjustments of social contributions produced procyclical effects only in two years: they were expansionary in 2001, when social contributions increased by just 3% at a time of high growth (4.8%) of primary income, and restrictive in 2002, when they accelerated to 5.2% as primary income decelerated to 2.5%. They exercised the most restrictive effects on disposable income growth in the years of high growth of primary income, as seen in the NE area of the right chart, but also declined in the years of low growth and recession, boosting disposable income growth in 2008-2009 and 2011-2012.



**All in all, discretionary changes in the UK strengthened substantially the automatic stabilisers effects built in the structure of its tax and transfers system.** In this period, it is possible to distinguish three different phases. In the years 2000-2003, there was a mild cycle in primary income with its bottom in 2002. After 2003 and up to the onset of the crisis in 2007, primary income expanded at high speed, with rates of growth above 4% every year, which reached a peak of 5.5% in 2007. Then, the five last years are of low growth, on average, with the Great Recession in 2009 and a very short-lived, though strong, rebound of the economy in 2010, a largely policy induced and

unsustainable reaction of the economy, which would still need several years to restore the conditions for a sound recovery of disposable income growth.

**There was a short down and up fluctuation of growth in the years 2000-2003.** This blip was in line with, but much more benign than, the cycle in the US and the bigger EU countries, which in 2002 went to the brink of recession. Social contributions had a destabilising influence in the downswing, increasing less than primary income in 2001 and leading to the edge of being procyclical the change in disposable income, while accelerating sharply in 2002, when primary income was slowing down fast. These were the only two years of procyclical influence of social contributions during the whole period. In contrast, the adjustment in social benefits and income taxes were countercyclical in those two years, and managed to smooth the path of disposable income.



**In 2003 the economy started a long phase of sustained growth of primary incomes.** In this phase of five years, fiscal policy had a systematic stabilising influence, with disposable income expanding less than primary income. This stabilisation was instrumented through revenues, with the ratio of income taxes and social contributions to primary income trending upwards, while social benefits remained flat as a ratio to primary income. The stance of fiscal policies in these phase can be summarised in leaving automatic stabilisers work on income taxes, and taking discretionary action to raise social contributions in order to finance a steady expansion of social benefits in line with primary income. These Thatcher-Lawson years saw a sharp increase of inequality in the regional distribution of primary income per capita of households by regions (6 percentage points in the CV, as we saw in chart 6). At the same time, the orientation of fiscal policy limited the adverse impact on the distribution of disposable incomes to 3

percentage points, by making the tax and transfer system more redistributive through social benefits (which increased its ratio to disposable income), while keeping broadly balanced the positive influence of income taxes (progressive) and the negative influence of social contributions (regressive) on disposable income distribution.

**The slowdown of primary income in 2008 triggered an immediate discretionary change in the policy orientation**, with social benefits and contributions now providing support to disposable income, while income taxes were more sluggish to react and kept a restrictive procyclical mood. In the recession of 2009, which was not as great in the UK as in the other countries, social benefits and contributions were again the main sources of support of disposable income, with income taxes also contributing positively to check the impact on it of the mild decline (1.3%) in primary income. This strong discretionary change of more than 4 percentage points led to an actual acceleration of disposable income up to 3.1% (in the year of the Great Recession!) from the low growth recorded the year before. In these two years, social benefits increased their weight in primary income by 3.5 percentage points, and the ratios of income taxes and social security contributions to primary income declined by 0.4 and 0.2 percentage points, respectively. The consequences were felt immediately<sup>21</sup>. The budget deficit, which had been below 3% of GDP in 2007, reached an unsustainable imbalance of 10.8% of GDP in 2009, and primary income rebounded temporarily to a 5% growth rate in 2010. Discretionary changes in this year reduced the support of social benefits to disposable income and increased the restraining role of social contributions, while at the same time neutralising the operation of automatic stabilisers in income taxes. The joint effect of this combination led to a fresh acceleration of disposable income to a rate of 4.5%, the highest since 2001, and a small decline of the budget imbalance by 1 percentage point of GDP.

**The fear of the public to the future implications of budget deficits prevailed, like in the US.** The British electorate voted out the belligerent labour government of Gordon Brown, and a more restrictive stance to consolidate public finances was adopted in the emergency budget of the new conservative-liberal government after the elections of May 2010. The recovery of output seen in that year could not continue in a still recessionary international environment. Primary income stagnated in 2011 and the change in the

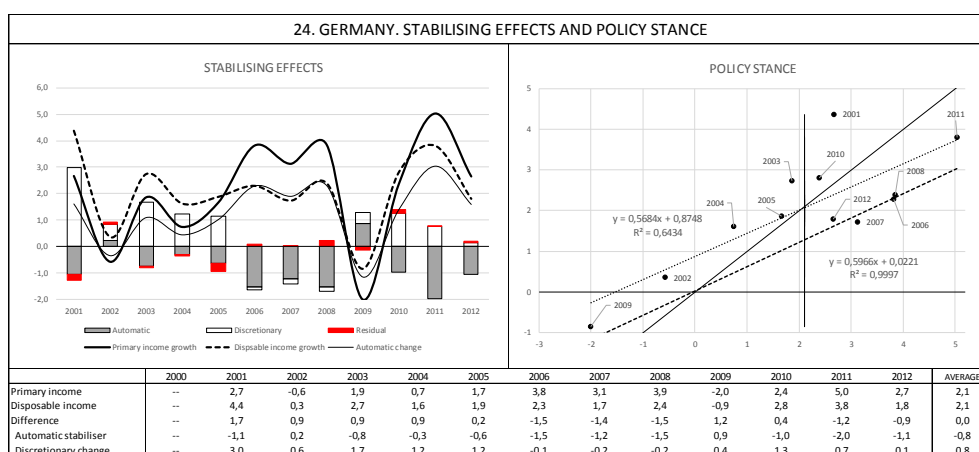
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<sup>21</sup> See a detailed analysis of these developments in Riley, J., and Chote, R. (2014).

orientation of discretionary action materialised in another reduction of the support of social benefits to disposable income to the minimum of the period, as well as in a restrictive and procyclical move of income taxes, partly compensated with a countercyclical and supportive adjustment of social contributions. The combined impact of these discretionary changes on disposable income still left the overall stance of fiscal policy marginally countercyclical and expansionary, an impact which would be much stronger in 2012, when primary income barely increased by 0.6% and all redistributive operations were aligned to boost disposable income growth up to 3% again, an expansionary and countercyclical alignment<sup>22</sup> which had occurred only in the not so great recession of 2009.

### 3.4.3.3 Germany

**Fiscal policy has been neutral in Germany.** The average growth rates of disposable and primary incomes have been the same (2.1%), while at 0.57 the estimated slope of the regression line on observed rates of change is practically identical to the slope of the automatic stabilisers line (0.6), as shown in the right chart of panel 24. Overall, it has moderated the fluctuations of disposable income with respect to primary income by 43%, against almost two thirds in the UK and more than half in the US. The correlation coefficient (0.64) indicates a more volatile policy stance than in the US, but less than in the UK.



<sup>22</sup> The chagrin of Keynesians against premature fiscal consolidation does not seem justified on this occasion. See the criticism of this policy as a severe contraction by Eichengreen, B, (2015, chapter 26)



All observed points but two fall in the two regions of countercyclical effects. In the years 2010, and especially in 2001, when there was a discretionary impulse of 3 percentage points to disposable income, fiscal policy was expansionary and procyclical. Apart from these two cases, discretionary policies were expansionary whenever primary income grew below the average of the period, with a countercyclical stance in 2002-2005, and restrictive whenever primary incomes were growing at a faster rate than the average of the period. In 2006-2008 and in 2012 there were practically no discretionary changes, so that the increase of disposable income was in line with automatic stabilisers, with negligible contributions of the discretionary component towards additional restraint in the years 2006-2008 and towards more income support in 2012. In the year of the Great Recession, the discretionary component was comparatively small in reinforcing the automatic stabilisation effect, as it was also in the shallower recession of 2002, and at variance with the stronger discretionary expansions of the years 2003-2005.

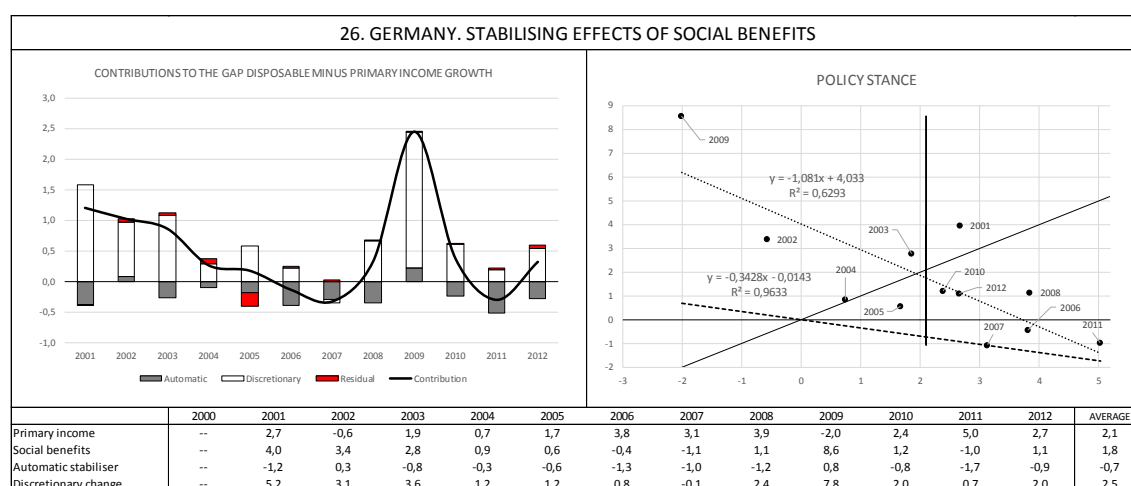
**Social benefits have a restraining automatic stabiliser component<sup>23</sup> in Germany which is not significant in the US and the UK.** However, as shown in the left chart of panel 25, this component has a minor importance in comparison with the discretionary adjustments. As shown in right chart of that panel, this is apparent in a negative slope of the regression line of automatic stabilisation. Only two points fall in the procyclical regions of the plane in the same chart, of which 2001 was expansionary and 2005 restrictive. In contrast, in the six years after 2005 in which primary income grew above the average of the period (all except 2009), social benefits increased very little or even declined (in 2006, 2007 and 2011), whereas in the two years of recession in primary incomes, 2002 and 2009, social benefits rose by 3.4% and 8.6%, respectively. In the period as a whole, Germany is the only country of the six analysed here where social benefits have grown on average slightly less than primary incomes. Discretionary changes, which have always contributed positively to support disposable income, made

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<sup>23</sup> Although the link between income and (future) benefits is sometimes considered a legacy of the contributive or “Bismarckian” character of social insurance in Germany and other continental European system, in comparison with the universal or “Beveridgian” character of social welfare in the UK and the US, the relationship between benefits and primary income is negative in Germany and France (but not in Italy or Spain), as revealed in the estimates of the ELT. The pay as you go financing of current benefits with current contributions and the means-tested elements in German and French social protection systems have become dominant features and there is a negative, not positive, contemporaneous relationship between the two variables at this macro level of aggregation.

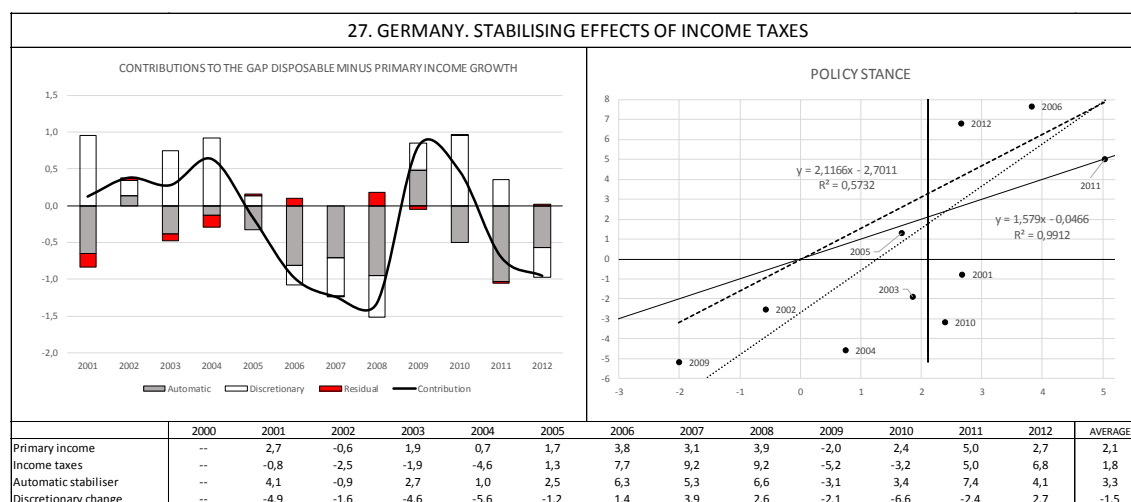


more negative (-1.08) the slope of the regression line on observed data, so that for an increase of 1% in primary incomes, social benefits have declined 1.08% on average during this period in Germany. This strongly countercyclical effect, as well as the high coefficient of correlation (0.69) are determined by the outlier of 2009. Excluding this observation, the slope of the regression line and the coefficient of correlation are close to zero, so that discretionary changes have been rather destabilising and unsystematic.



**Income taxes have strong in-built automatic stabilisers in Germany and discretionary changes have reinforced their effects.** Panel 27 shows that, with a slope of the automatic stabilisers line of 1.58, the growth of income taxes induced by an average annual expansion of 2.1% of primary incomes would have been 3.3%, but discretionary changes have reduced this rate to 1.8%, slightly below the average increase of primary incomes. Therefore, discretionary changes in this period have made income taxes both more restrictive and more stabilising than the automatic stabilisers embedded in its structure, with a slope of the regression line on observed rates of change of 2.1. Discretionary changes in income taxes were aligned with automatic stabilisers in half of the years in the period. Only in two years, 2001 and 2010, discretionary changes turned procyclical the overall influence of income taxes on disposable income, and in both occasions acted in an expansionary direction (2011 is on the boundary, when discretionary changes exactly compensated the automatic stabiliser effect). In contrast, in the five years in which primary incomes grew below the average of the period, income taxes were expansionary, and strongly so in 2002-2004 and in 2009. In the left chart of the panel it can be seen that the contribution of income taxes to disposable income

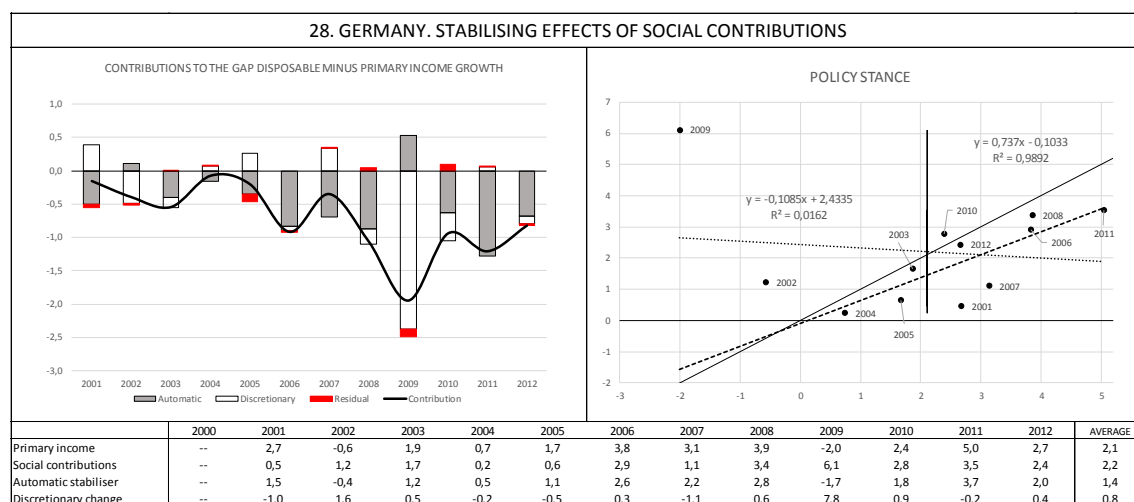
growth (the rate of change of taxes times its weight in disposable income, with inverted sign) was positive in 2001-2004 and in 2009-2010.



In contrast, social contributions are structurally regressive and have had a destabilising influence on disposable income. Their built-in regressive feature is observable in the slope lower than one of the automatic stabiliser line<sup>24</sup>. In the left chart of panel 28, it is shown that, with the exception of 2009, the automatic component has dominated the discretionary changes in many years leading to procyclical adjustments induced by the regressive structure of contributions. Only four of the twelve points in the right chart of panel 28 fall in the two regions (NE and SW) of countercyclical changes. Three of them correspond to the period 2003-2005 in which social contributions were expansionary, growing less than primary incomes, while the last year in which they were countercyclical was 2010, when they increased slightly more than primary income. It is worth noting that, except in 2001 and 2003-2005, social contributions have had in the rest of the years an orientation misaligned with the overall impact of discretionary

<sup>24</sup> The estimated slope over the time series of rates of change in the period is even negative. This is due to the outlier of 2009, which is primarily due to a reclassification. Since the beginning of 2009, (health) insurance is compulsory for all employees and self-employed persons. In addition a basic tariff was introduced by the private health insurance. Due to these changes, the private health insurance is classified now as part of social protection in national accounts and the contributions for private health insurance are since 2009 part of net social contributions in national accounts. Excluding this outlier, the slope still declines, but not much (to 0.53).

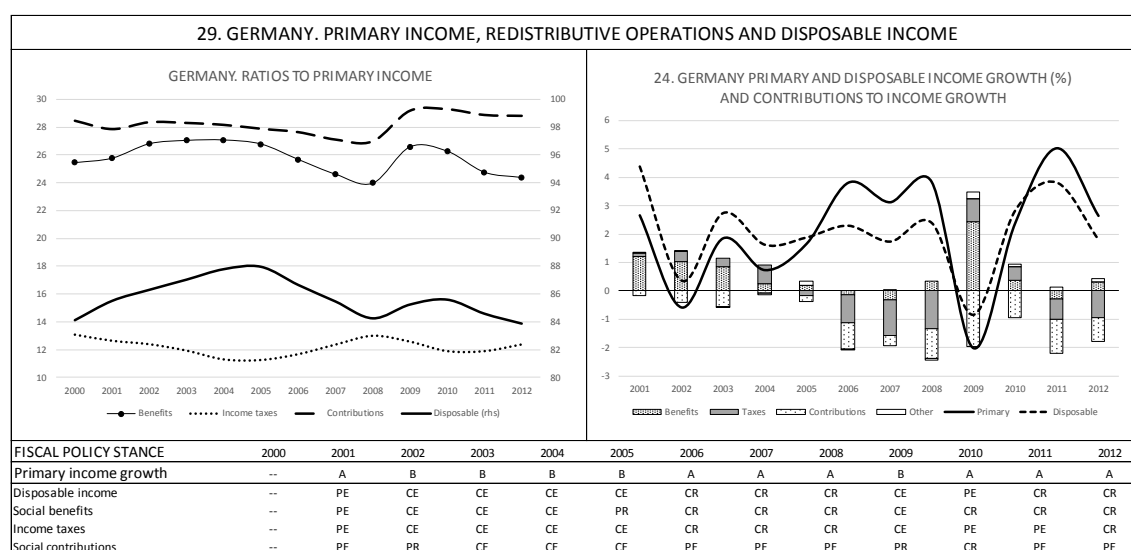
changes on disposable income, which was determined by the other two redistributive operations.



**Summing up, fiscal policies in Germany have left automatic stabilisers work, with discretionary changes keeping a broadly neutral stance on average.** In the period under consideration, it is possible to differentiate four phases. Before 2005, there were three years of low growth, including one year (2002) with a drop in primary income, and a slow recovery in the following two years. After a transition exercise in 2005, the following three years were of solid expansion at rates of growth of primary income between 3% and 4%. The third phase was the blip of the short (one year) and comparatively shallow (-2%) recession of primary income in 2009, with a quick and sharp fall from a peak of 3.9% growth still in 2008, and with an equally fast rebound to a rate of growth of 2.4% in 2010. The last phase is the years 2010-2012, when the German economy consolidated its recovery, against the background of a fragile international economy and the unfolding sovereign financial crisis in Europe.

**Germany was a poor performer in the first years of the millennium.** With high unemployment, relative rigid labour markets and very low productivity in the new länder from the East, income growth was declining. The social democrat government of Schroeder implemented expansionary demand policies to stimulate economic activity, which did not prevent a recession, but generated high budget deficits, breaching the 3% reference value of the Stability and Growth Pact already in 2001, when primary income was still growing above the average. All the redistributive operations had an expansionary orientation until 2005, with a declining ratio of income taxes and an

increasing ratio of social benefits over primary income, while social contributions were kept in pace with developments in primary incomes. This orientation introduced a procyclical bias in 2001, when the economy was still expanding above the average of the period, which turned to be countercyclical in the following two years of stagnation in which primary incomes rebounded sluggishly and disposable income more markedly. The surge in unemployment persuaded the government of the need to revise labour market regulations (the Hartz reforms) in the years 2003-2005.



**Germany had three years of steady expansion of primary incomes (2006-2008).** In the second phase of the period, a policy of fiscal consolidation that eliminated the budget imbalance was implemented, reinforcing the restrictive effects of automatic stabilisers with minor discretionary changes, and keeping disposable income growth almost 1.5 percentage point below the average increase of primary income. Social benefits and income taxes managed to stabilise disposable income and consolidate public finances. However, social contributions had a procyclical bias and their ratio to primary income continued to slide down until 2008, as part of a policy oriented to boost competitiveness in terms of unit labour costs.

**The Great recession was sharp but not deep in Germany,** like in France, and just marginally more severe than in the UK. The German economy slumped later than the other economies, after exports were severely hit by the contraction of world trade, and its impact was mainly arrested by keeping people at work with reduced hours and wages,

through a “short time working scheme” largely financed by the government<sup>25</sup>. This scheme explains a small part of the large increase in social benefits and contributions recorded in 2009, with the consequent jumps in their ratios to primary income. Apart from that, the stimulative measures were relatively timid and consisted mainly in tax cuts, rather than in more generous social benefits. Although primary income fell by 2% in 2009, the decline in disposable income was limited to 0.9%.

**The economy bounced back briskly in 2010, more quickly than policy could react.**

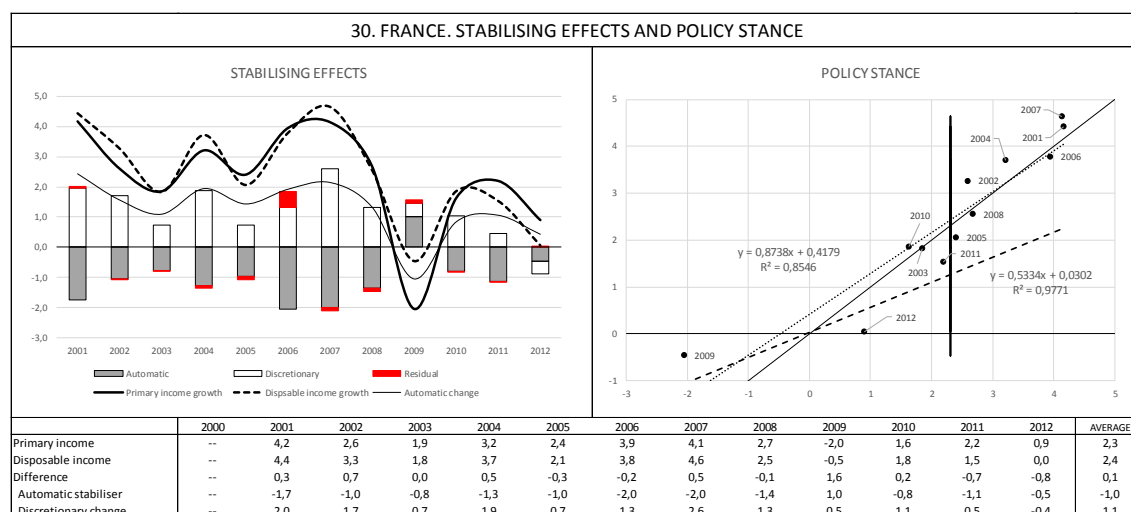
The expansionary stance adopted in 2009 persisted in the following years, and particularly the impulse of the tax cuts was felt more intensely in 2010, turning procyclical the overall stance of policy influence on disposable income, prevailing over the restrictive orientation of social contributions and the less supportive role of social benefits. In the last two years of the period, there was a further expansion of primary incomes at rates above the average, peaking at 5% in 2011, the highest rate of the period. Despite the thrust to fiscal consolidation through the additional moderation of social benefits support, which made the overall stance countercyclical and restrictive and reduced the budget deficit by three percentage points, disposable income still grew by 3.8% in that year. The economy slowed down a little in 2012, the stance of policy remained restrictive and countercyclical, and fiscal consolidation continued with an additional reduction of one percentage point of GDP in the deficit ratio, which restored the budget balance achieved in the years 2007-2008.

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<sup>25</sup> In this scheme, the employer only pays the hours worked. The government pays two thirds of the wage reduction and complements all the social contributions as if the employee was working full time. In May 2009 almost 5% of employees paying social contributions were benefitting from this scheme.

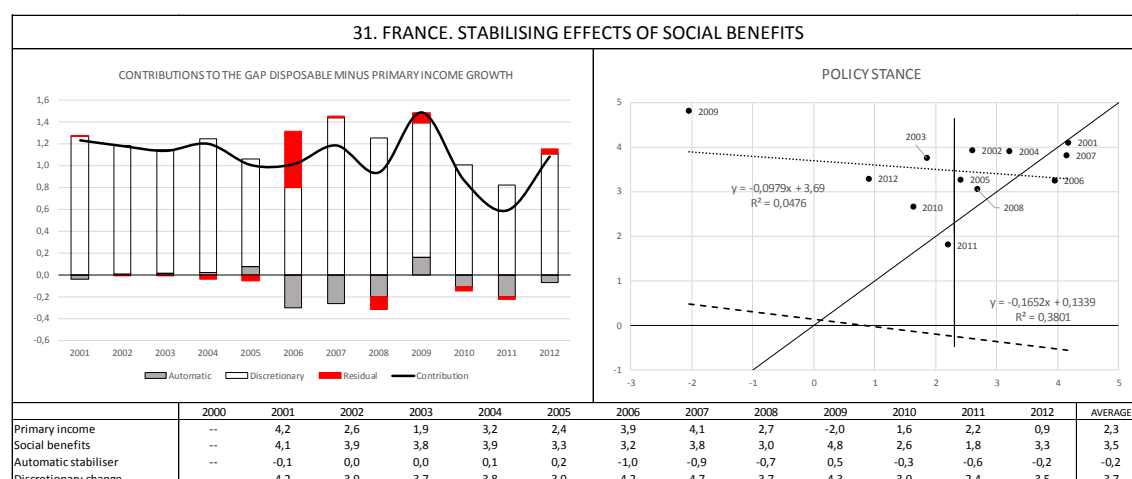
### 3.4.3.4 France

**France has the strongest automatic stabilisers of the six countries considered, but the overall stabilisation achieved was small.** Fiscal policies have almost always been procyclical, marginally expansionary on average, and very systematic. While automatic stabilisation would increase disposable income only 0.53% for each percentage point of increase in primary income, the average observed fluctuation was on average 0.87% per percentage point of primary income fluctuation, as shown in the slopes of the dashed and dotted lines in the right chart of panel 30. The average rate of growth of disposable income was just one tenth of a percentage point above the average increase in primary income. The correlation coefficient of the regression on the observed points is high (0.85). Almost all the points in the chart fall in the two procyclical regions or very close. Only the expansionary policy implemented in 2009, which strengthened the automatic stabilisation effect, brought the corresponding point well inside the countercyclical region. In the left chart of panel 30, it is apparent the wider fluctuation of disposable income growth than primary income increases in the period before the crisis.

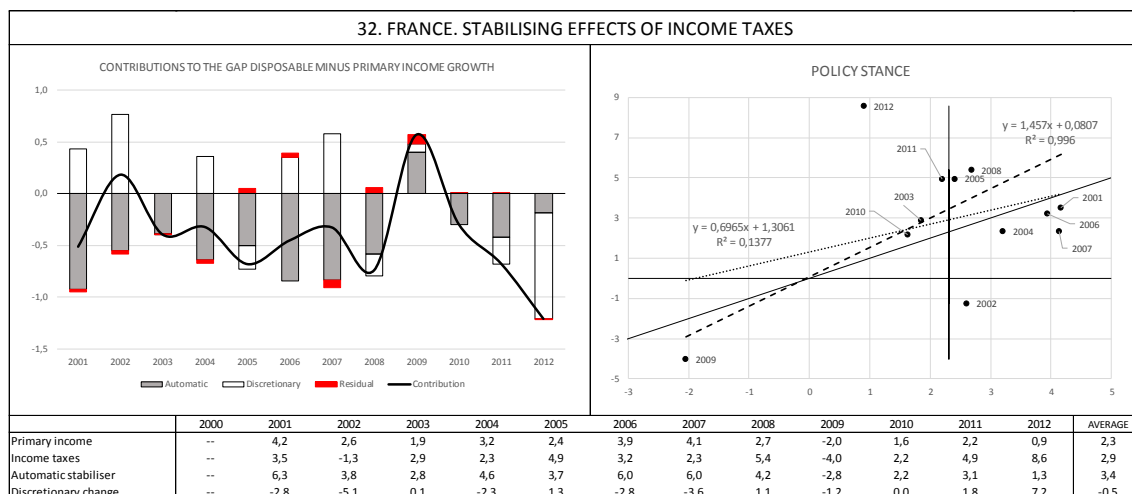


**Social benefits are almost fully discretionary in France.** The slope of the automatic stabilisers line is slightly negative, and for each increase of 1% in primary income benefits would decline automatically 0.1%. However the discretionary changes have more than offset this small automatic effect in most years, the exceptions being 2001, 2006-2007 and 2011. In the years of expansion, these changes have been of a procyclical character. The impulse of social benefits to the growth gap of disposable minus primary incomes has also been the determinant of the expansionary impact of redistributive operations on

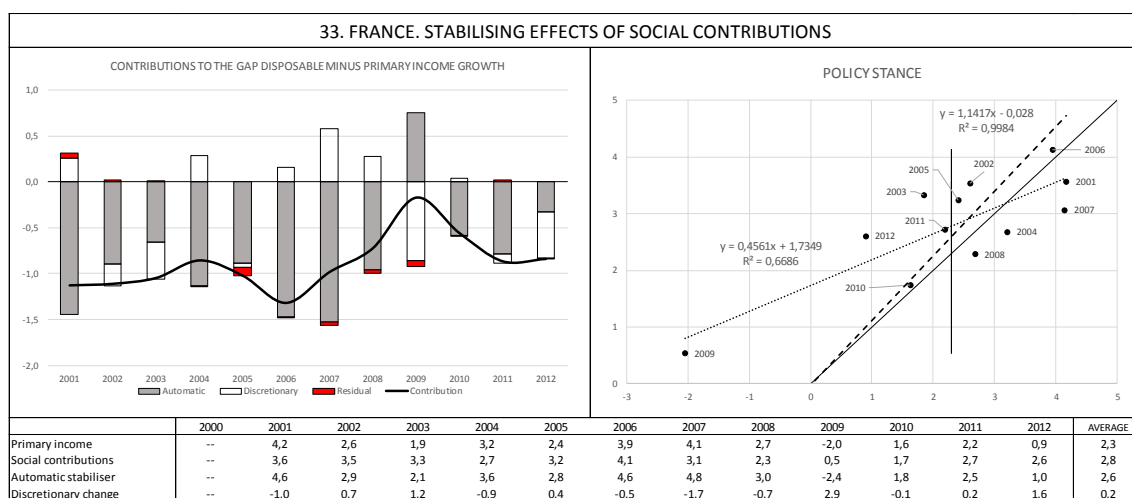
disposable income, which has increased on average 1.2 percentage point more per year than primary income. There is an important residual in 2006, which is associated to the break in the series already mentioned, when the slope of the regression line of social contributions over primary income in the estimate of the ELT changed from positive to negative.



**Income taxes have a sizeable automatic stabiliser power in France.** With a slope close to 1.5, the line of automatic stabilisers provides a potentially substantial drag on the growth of disposable income in years of expansion and a boost during recessions. Nevertheless, discretionary changes of a procyclical orientation have often counteracted this automatic effects, reducing to less than half the slope of the regression line on observed data of income taxes actually collected with respect to primary income. The only years in which discretionary changes strengthened automatic stabilisers were 2005 and 2008, in a restrictive direction, and 2009, limiting the fall of disposable income. In contrast, discretionary changes were expansionary and destabilising in a number of years of above average growth (2001-2002, 2004 and 2006-2007) and restrictive in years of lower growth: slightly in 2003-2004 and more intensely in 2011 and, particularly, in 2012. This last point is an outlier, without which the slope of the regression line of income taxes with respect to primary income would be marginally above one.



**Social security contributions have been destabilising and restrictive in France.** Although social contributions are structurally progressive and have a weight around 28% of primary income, providing an important contribution to reduce the inequality of disposable income with respect to primary income, the observed impact on the fluctuations of disposable income has been destabilising. The structural progressivity of social contributions is reflected in a slope of the automatic stabilisers regression line higher than one (1.14). However, as in the case of income taxes, but much more intensely, discretionary changes have countered the automatic stabilising effects in cyclical fluctuations, turning destabilising the overall effect on disposable income by reducing the estimated slope of the regression line on observed data far below 1 (0.45).

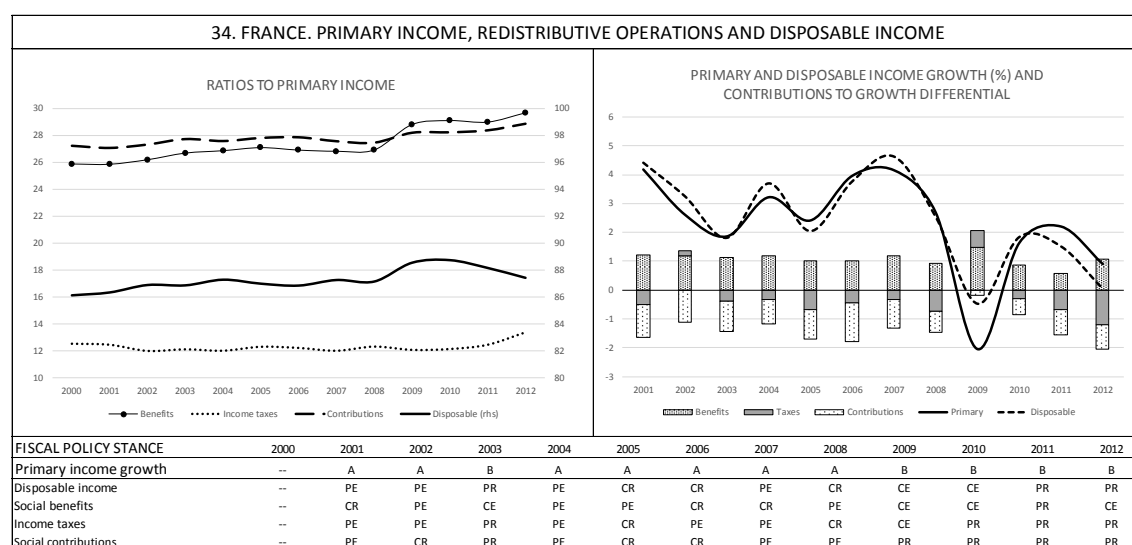


This is the opposite experience of the UK, where social contributions are highly regressive but have had a stabilising impact on the fluctuations of disposable income



because of discretionary changes. Social contributions have also had an important restrictive effect on disposable income growth, bigger than the impact of income taxes, whose weight with respect to primary income was just 12.3% on average over the period. As shown in the left chart of panel 33, the size of the dark part of the bars is more than 50% bigger than the size of the same bars in the same chart of panel 32, thus exercising an important and regular drag on primary income growth. As shown on the right chart of this panel, social contributions never grew less than primary income in years of below average growth, and there were only three years of above average growth (2002 and 2005-2006) when they increased faster and exercised a stabilising effect.

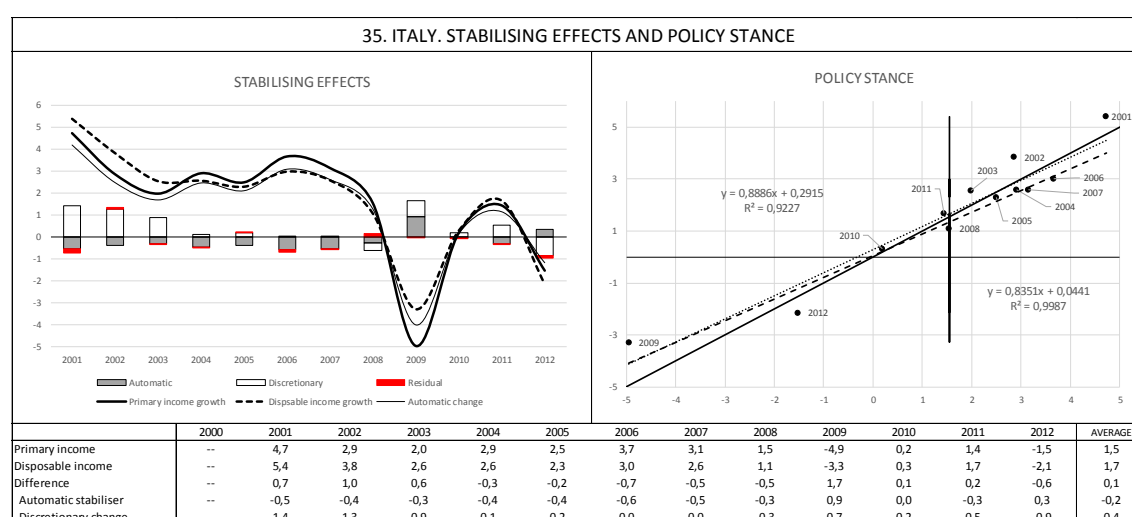
**All in all, discretionary changes weakened automatic stabilisers in France during this period.** It is useful to split just in two phases the twelve years contemplated here. In the first one, covering the years 2001-2008, primary income grew above the average of the period in all years, except in 2003, while expansionary policies were fuelling disposable income growth to reach rates even above primary income increases in 2001-2002, 2004 and 2006-2008. Furthermore, restrictive procyclical policies were applied in 2003, bringing the rate of growth in disposable income below the increase in primary income in the only year before the crisis when the latter was slowing down below the average of the period. During this phase the ratios to primary income of social benefits, income taxes and social contributions were practically flat, as shown in the left chart of panel 34, and the policy stance was countercyclical only in 2005-2006.



**In the second phase, starting with the year of the Great Recession, fiscal policy was first countercyclical and then procyclical.** With the slump of primary income in 2009, the ratio of social benefits jumped 2 percentage points and also the ratio of income taxes declined marginally, supporting disposable income, in contrast with social contributions, which increased their weight in primary income by 0.7 percentage point in a destabilising way. This procyclical bias of social contributions persisted in the following years and was strengthened in 2011 with discretionary changes in income taxes and social benefits. In the final year of the period, although benefits turned again to be countercyclical, the discretionary changes of a restrictive nature in income taxes and social contributions kept procyclically biased the overall impact of the redistributive operations on disposable income.

### 3.4.3.5 Italy

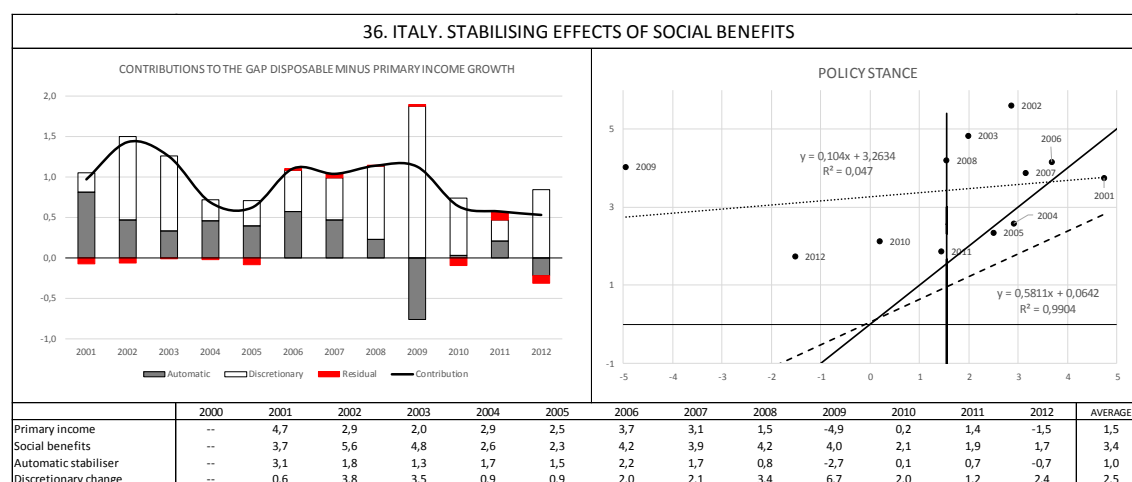
**Italy had the lowest automatic stabilisation effects of the six countries studied, and the overall stabilisation provided by fiscal policy was also the weakest.** The estimated automatic effect implied, on average, that disposable income changed 0.84% for each percentage point of change in primary income, as shown in the right chart of panel 35, while the fluctuation actually observed in data has been somewhat higher (0.89%), so that discretionary policies have weakened automatic stabilisers exercising a slightly destabilising influence over the period, although less pronounced than in France.



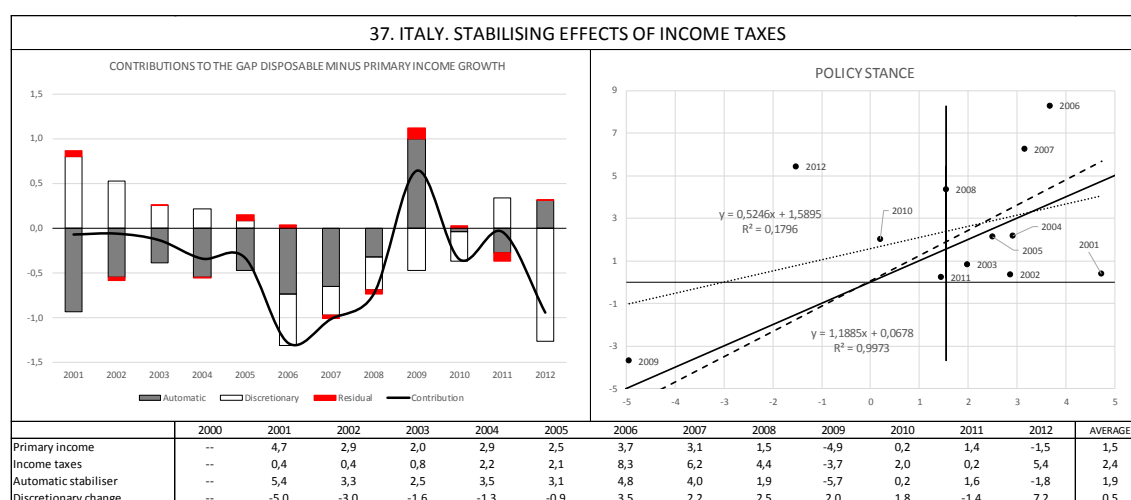
**Fiscal policies have been almost neutral in Italy.** The differences in the average rates of growth of disposable income (1.7%) and primary income (1.5%), and in the slopes of

the automatic (0.84) and observed (0.89) regression lines, are small. Thus, the orientation in one or the other direction of discretionary changes has had very weak effects on the overall stance. Only in 2001-2003, 2009 and 2011-2012, discretionary policies had a significant role in affecting the gap between the growth rates of primary and disposable incomes, as shown in the left chart of panel 35. In contrast, the observed points were close to the automatic stabilisation line in 2004-2008 and 2010.

**Automatic stabilisers embedded in social benefits are less stabilising in Italy than in the other countries.** Automatic stabilisation of disposable income in Italy is low because in the estimated structure of the ELT social benefits increase with primary incomes. This is reflected in the slope of the automatic stabilisation line of regression. As shown in the right chart of panel 36, social benefits tend to grow automatically by 0.58% for each percentage point of increase in primary income. Discretionary policies have attenuated this effect embedded in the structure of social benefits, reducing the slope of the regression line on observed rates of change to 0.1. However, this reduction in the variability of benefits with respect to primary income fluctuations have been accompanied by a strong and systematic expansionary impulse, which is apparent in the average annual growth of benefits during the period being more than double of the rate of increase of primary income. The expansionary contribution of automatic stabilisers to widen the gap between disposable and primary income growth in years of positive growth was reinforced by discretionary policies in all years (left chart of panel 36), so that there is no point below the automatic stabilisation line (right chart of this panel). In addition, this expansion of social benefits had destabilising effects in the years 2002-2003 and 2006-2008.



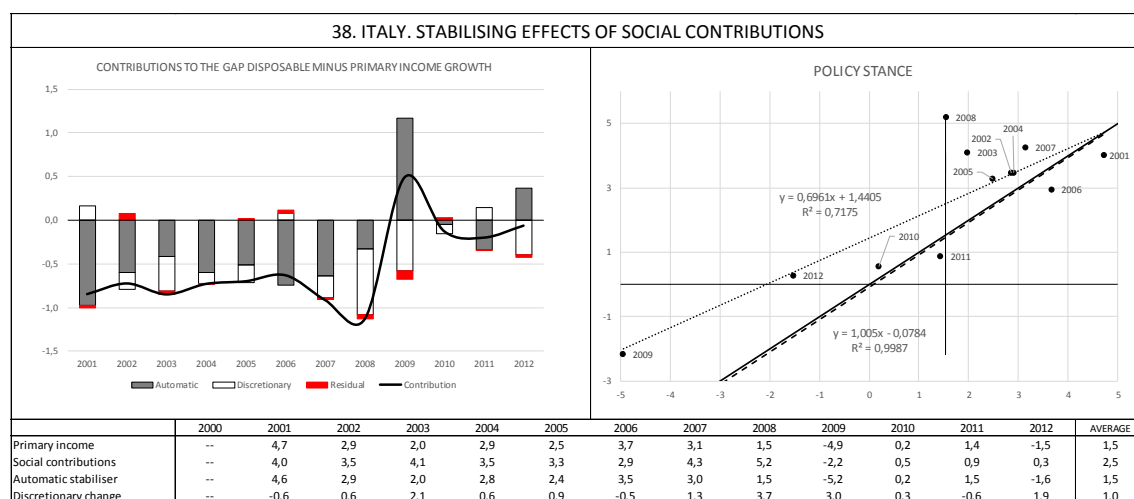
**Discretionary changes have weakened the automatic stabilisers embedded in the structure of income taxes.** As shown in the right chart of panel 37, the slope of the regression line of income taxes estimated on observed data has been much lower than 1, indicating that income taxes have had a destabilising influence on disposable income fluctuations on average during the period due to discretionary effects. This can also be seen sequentially in the left chart of panel 37.



Discretionary changes overrun the restrictive effect of automatic stabilisers introducing a procyclical bias in most years of expansion (2001-2005). In 2006-2008, this expansionary orientation of discretionary changes was reversed and contributed to stabilise disposable income in these three years. The only other year of the period in which discretionary changes in income taxes were positive and had a countercyclical influence was in 2011. Italy was, in addition, the only one of the countries considered in which discretionary changes in income taxes were restrictive in the year of the Great Recession. Income taxes would be again adjusted procyclically in a restrictive direction in 2010 and more strongly in 2012, while the economy was still in recession.

**Social contributions in Italy have broadly neutral automatic stabilisation effects.** However, as in France, discretionary changes have reduced the estimated slope of the regression line on observed data below 1, thus generating a destabilising influence on average, as seen in the right chart of panel 38. In almost all years of the period, discretionary changes were of a restrictive orientation, including the years 2009-2010 and 2012, in which they had a destabilising impact. On average, social contributions grew one percentage point per year more than primary income during this period. Only

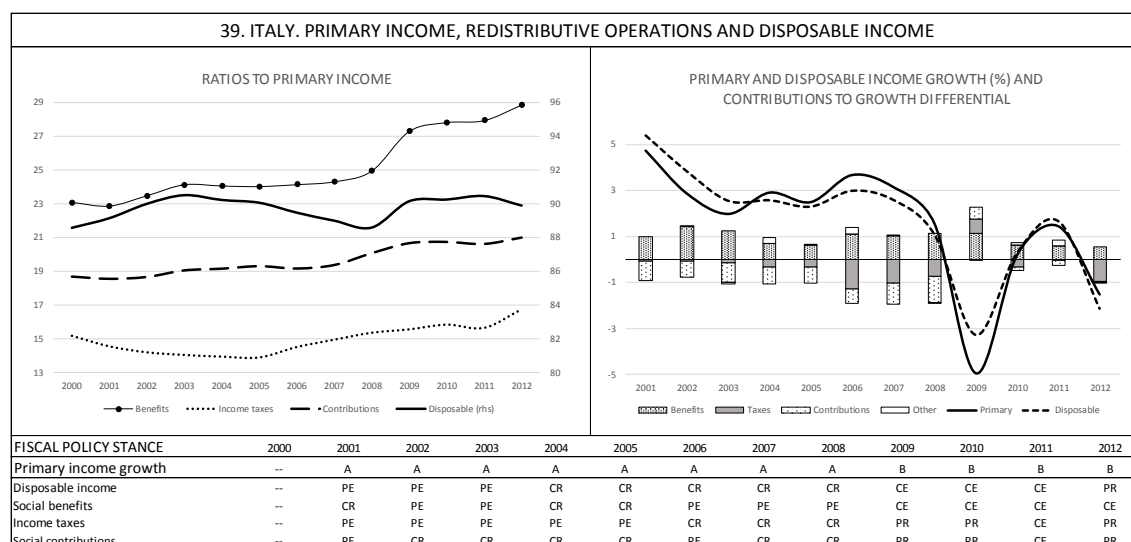
in 2001, 2006 and 2011 discretionary changes were supportive of disposable income growth, with a destabilising influence in the first two years. In contrast, in the other years of above average growth of primary income, and particularly in 2002-2005 social contributions had a stabilising influence.



**Summing up, we can differentiate in Italy three phases in the period 2001-2012.** In the first three years, there was an expansionary policy, like in other countries, to try to arrest the recessionary trends of declining growth. The following years, up to 2008, when the economy was hit by the international financial crisis, the policy stance change orientation towards restriction and managed to deliver a stable expansion of disposable income. In the third phase, after the year 2008, the economy was in a recessionary environment and public finances in a permanently fragile position, which prevented any bold discretionary expansion and forced to adopt a procyclical stance of fiscal consolidation in the critical financial circumstances of the last years.

**Fiscal policy in Italy was expansionary and procyclical in 2001-2003, and restrictive and countercyclical in the following five years.** The expansionary stance of the first three years was discretionary, based on the expansion of social benefits and the decline of income taxes as ratios to primary income, while the same ratio for social contributions remained broadly flat, putting a drag to disposable income growth derived from the restraining effect of the automatic stabiliser. The policy stance is assessed to have been procyclical in those years because it kept disposable income growing above primary income, perhaps trying to provide a demand stimulus to counter the slowdown

of the economy in these three years, when the economy was still expanding at a rate that would turn out to be (ex-post) higher than the average of the period.

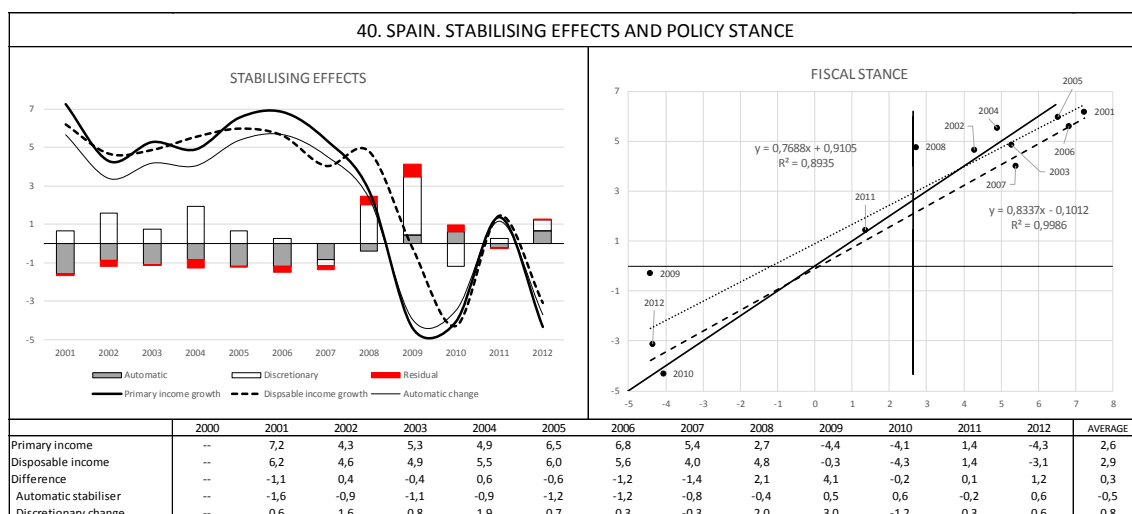


**The change of orientation to a restrictive stance in the second phase (2004-2008) was gradual.** In the first two years, the expansionary impulse of social benefits and income taxes was more moderate than in the previous phase, with less discretionary change to add to the positive effect of the automatic stabiliser in social benefits, and less compensation of the negative effect of the automatic stabiliser in income taxes. In these two years, discretionary changes in social contributions reinforced the restrictive effect of their automatic stabiliser. The overall stance was countercyclical, due to social benefits growing less and social contributions more than primary income, although income taxes had a procyclical influence on disposable income by growing less than primary income. The overall stance would continue being countercyclical in the next three years (2006-2008), but the composition of the impulses was different. Income taxes and social contributions would be the restrictive components, while social benefits had a rising and procyclical expansionary influence. It is worth noting that these discretionary changes of composition were approximately balanced, so that the restrictive orientation of the years 2004-2008 was due to the effect of automatic stabilisers, with a largely neutral overall discretionary stance. Nevertheless, the different composition of the discretionary changes underlying the neutral countercyclical stance of the whole phase 2004-2008 had a different impact on the size of government in the first two years (gaining weight) and in the last three (losing it).

**Fiscal policy was again somewhat expansionary in the year of the Great Recession.** Discretionary policies strengthened moderately (by less than one percentage point) the operation of automatic stabilisers in that year, a rather timid impulse in comparison with other countries, which was probably dictated by prudence in view of the fragility of public finances apparent in the elevated debt ratio and the size of a fattening government sector. Still, the composition of the support to disposable income growth was the same of the last years, with more discretionary changes of rising benefits, contributions and taxes ratios to primary income. This stance would persist, but even more timidly in 2010. However, facing a double dip recession in 2011, discretionary changes in income taxes and social contributions turned again expansionary, even if social benefits were less supportive of disposable income, an orientation which could not be sustained in the final year of the period. In 2012, the economy fell in a new recession and the sovereign debt crisis in Europe precluded any further impulse to disposable income. On the contrary, additional discretionary changes raising revenue from income taxes and contributions had to be adopted, partially compensating their procyclical impact with a new expansion of social benefits.

### ***3.4.3.6 Spain***

**Fiscal policy has had small stabilising effects in Spain and has been slightly expansionary on average.** While automatic stabilisers are comparatively weak, discretionary policies have reinforced them a little in this period. As we can see in the right chart of panel 40, the automatic stabiliser effect on disposable income reduces by 0.17% the fluctuation of disposable income for each percentage point of fluctuation of primary income. Discretionary changes have increased slightly the overall stabilisation effect as reflected in the lower slope of the regression line on observed rates of change (0.77) than the slope of the automatic stabilisers line (0.83).

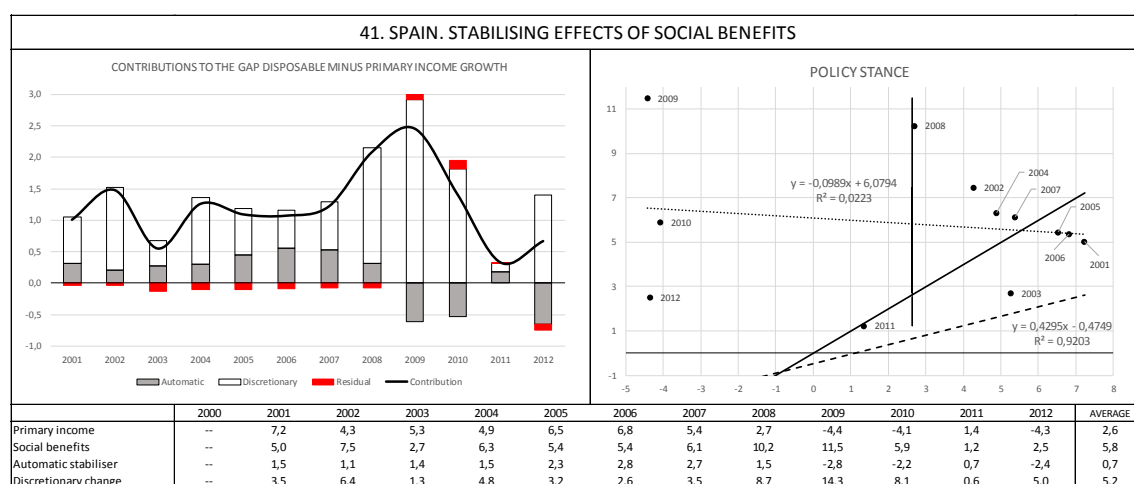


Discretionary changes had a restrictive orientation in just two years, marginally in 2007, and more intensely in 2010, when it was necessary to limit the rapid deterioration of public finances after the strong discretionary changes of the preceding two years. In all years, save 2007 and the recessions of 2009 and 2012, discretionary changes were offsetting automatic effects. In this period discretionary changes have not deviated much from automatic stabilisers and redistribution operations have had a relatively systematic impact on disposable income, as shown by the correlation coefficient (0.89). By comparing the relative size of the empty and the full parts of the bars in the left chart of panel 40, it is seen that discretionary changes have prevailed over automatic effects in 2002, 2004, 2008, and 2009. In all these years, save the last, the fiscal stance was expansionary and procyclical.

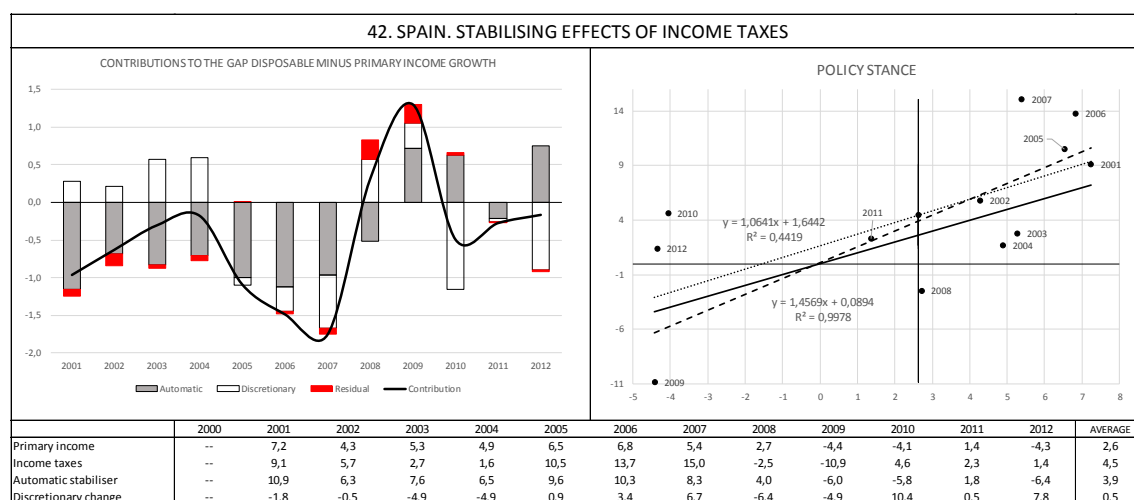
**Social benefits have produced the most powerful, though erratic, stabilising effects.** Both, the automatic effect (with a slope lower than 1 in the regression line) and the discretionary changes (which have made negative the slope of the regression line on observed rates of change) have had a part in this result, as can be seen in the right chart of panel 41. The left chart of this panel shows that discretionary changes have always been expansionary and they have more than offset the automatic effect in all the years of the period. This ever expansionary stance of social benefits, which on average have expanded by more than three percentage points per year above the rate of growth of primary income, was also erratic, as shown in the zero coefficient of correlation. The already mentioned procyclical orientation of fiscal policy in 2002, 2004 and 2008 has its origin in this expansion of social benefits. In contrast, in the other four years of primary



income growth above the average, the discretionary increase in social benefits did not compensate fully the automatic stabiliser effect. Instead, the big discretionary increase of benefits in the years of recession (2009-2010 and 2012) provided a strong countercyclical support to disposable income, which is the feature explaining the negative slope of the regression line estimated on observed data.



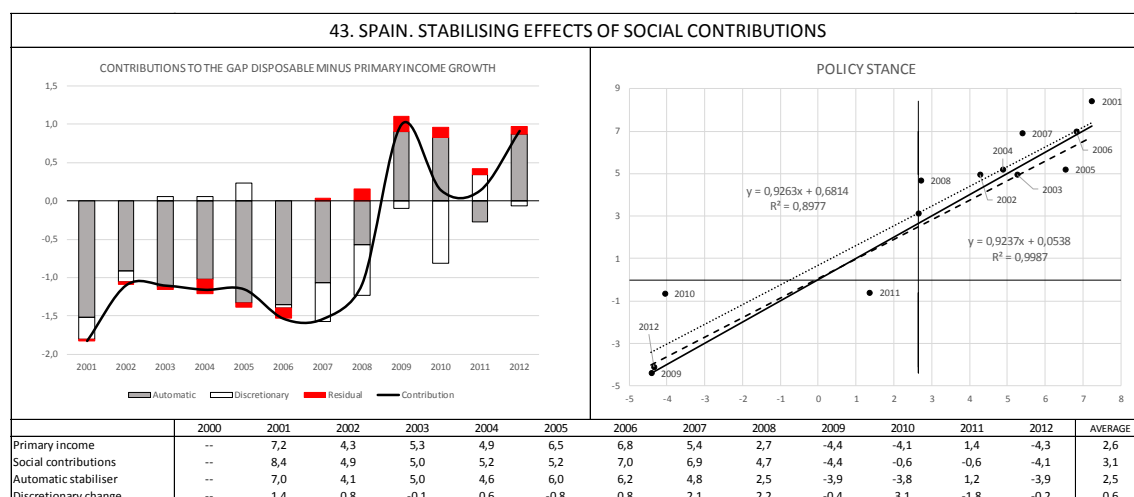
**Discretionary policies have reduced the automatic stabilisation effect of income taxes.** While the automatic stabiliser effect embedded in the progressive structure of income taxes would produce an increase of 1.46% of tax collection for each percentage point of growth of primary income, the slope estimated in the regression line on observed data is just 1.06, as shown in the right chart of panel 42.



Discretionary policies have also been erratic, as the low correlation coefficient indicates. In the right chart of this panel, it can be seen that discretionary policies overpowered the

automatic stabilising effect with strong procyclical impulses in the years 2003-2004 and 2008, in an expansionary direction, and in 2010 and 2012, in a restrictive direction. These five years determine the smaller slope estimated in the regression line on observed data. In the period as a whole, income taxes have had a restrictive bias, growing almost two percentage points more per year than primary income.

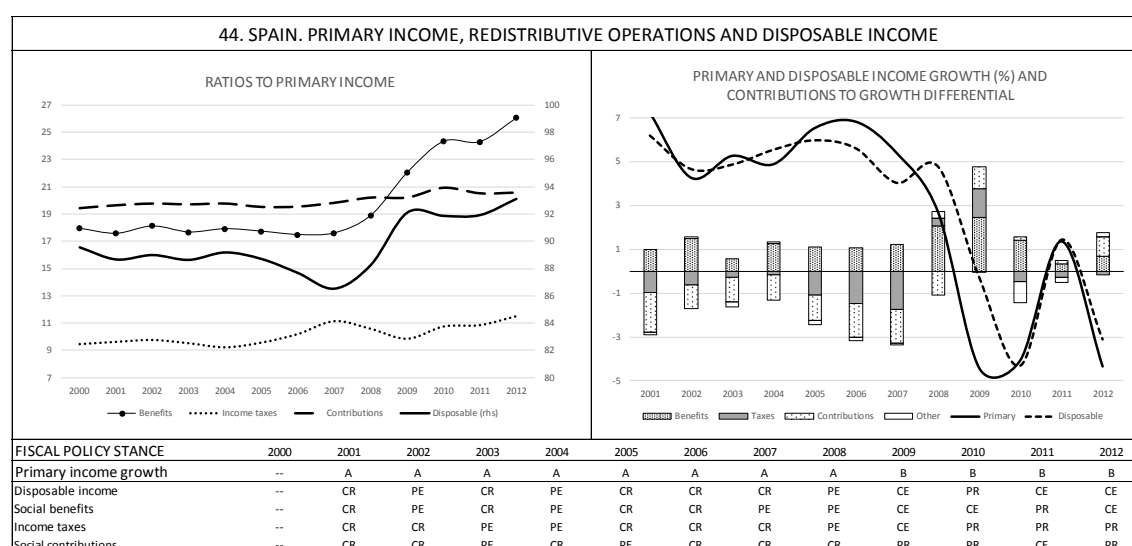
**Social contributions have followed closely automatic stabilisers in Spain.** They have produced a very predictable, slightly destabilising and restrictive influence on disposable income. As represented in the right chart of panel 43, the regression lines of automatic stabilisers and on observed data are quite close and the correlation coefficient is high. In the left chart of the panel, it is apparent that automatic stabilisers dominate the discretionary changes. These changes have been procyclical in 2005 (expansionary) and in 2010 (restrictive). On average, social contributions have increased half a percentage point per year more than primary income, insufficient to finance the expansion of social benefits, whose growth differential with respect to primary income was 3.2 percentage points.



**All in all, the period contemplated can be split into two differentiated phases, one of strong expansion (2001-2007) and another one of recession (2009-2012), with a transition year in 2008.** In the first phase, fiscal policy was accommodative<sup>26</sup>, without

<sup>26</sup> A general analysis of the Spanish economy in this period, which notes the inadequacy of fiscal policy to compensate the expansionary thrust of the common monetary policy is available in

restraining much (less than half percentage point) the expansionary effect on disposable income of the high rate of primary income growth of around 6%. Until 2005, the ratios to disposable income of social benefits, income taxes and social contributions remain flat, as shown in the left chart of panel 44. In 2006-2007, in an environment of acceleration of primary income growth towards a peak close to 7%, income taxes adopted an increasingly restrictive role, with discretionary changes adding up a drag to the automatic stabilisation effect. This orientation raised the ratio of income taxes to primary income by two percentage points, reducing by the same amount the ratio of disposable income, whereas the ratios of social benefits and contributions were stable.



**After the onset of the financial crisis in the summer of 2007, fiscal policy adopted a more belligerent approach.** In 2008, there was a sharp slowdown in primary income to a rate of growth of 2.7% and fiscal policy, trying to break the recessionary trend, became procyclical with an acceleration of social benefits above a rate of 10% and a fall of 2.5% in income taxes, partially compensated with a rise in social contributions. It is doubtful whether this fiscal expansion had any impact on output trends, but it contributed to open a big hole in the budget, with a surplus of 2% of GDP in 2007 turning into a deficit of 4% of GDP in 2008. The deceleration of the economy continued the following year to a deep recession of 4.4% in primary income, and fiscal policy redoubled its efforts to limit the impact on disposable income with a fresh expansion that added to the meagre half

Estrada, A., Jimeno, J. F. and Malo de Molina, J. L. (2009). A more technical analysis is in Gavilán, A. Hernández de Cos, P., Jimeno, J. and Rojas, J. (2011).

percentage point of automatic stabilisation effect on disposable income a huge discretionary impulse of 3 percentage points, thus stabilising practically disposable income, which declined less than half percentage point, at the cost of inflating further a ballooning budget imbalance that would reach a deficit of 11% of GDP in 2009. The size of the budget and the external imbalances were frightening market participants.

**As in other countries, fiscal policy in Spain had to abandon its expansionary orientation in 2010**, with the economy still in the middle of the recession, forced by a looming sudden stop of financial flows after the sovereign debt crisis erupted in Greece. Although social benefits moderated just a little bit their support to disposable income growth, discretionary changes in income taxes and social contributions were the most severely restrictive of the whole period, making the overall impact of redistributive operations procyclical. Without the brakes of the automatic stabilisers, which had been neutralised, disposable income fell by more than 4%, in line with the drop of primary income. Despite the further jump in the ratio of social benefits to primary income by 2.4 percentage points, the ratio of disposable to primary income stabilised, as the ratios of social benefits and income taxes also increased.

**After this turnaround of policy, economic activity broadly stabilised in 2011 before plunging again into recession in 2012.** Fiscal policy was neutral in 2011. With a primary income growth of 1.4%, social benefits were frozen and barely had a positive contribution to boost disposable income beyond the automatic stabiliser support, whereas income taxes were slightly restrictive as well due to the automatic stabiliser effect, and social contributions declined just a little, as a consequence of a policy to facilitate the disinflation of unit labour costs. The second dip of the Spanish economy was shallower than the first one in terms of output losses, but the fall of primary income by 4.3% in 2012 was as severe as those of 2009 and 2010. Spain was also particularly affected by the ongoing sovereign financial crisis in Europe and the skyrocketing risk premium on Spanish assets, as market participants were sceptical about the ability of highly indebted countries to remain in the euro area. The fiscal adjustment triggered to correct the financial imbalances was of a similar composition to the one instrumented in 2010 in that there was some restraint in the discretionary expansion of social benefits and tax increases, but without any hike in social contributions, in view of the need to help containing unit labour costs growth.

## 4 Conclusions

**The main finding of this paper is that the observed data of primary and disposable incomes per capita of households by regions can be represented by a (negative) linear income tax.** A simple regression line of disposable income over primary income gives directly the two parameters (the slope of the line, or marginal rate, and the intersection with the vertical axis, or minimum guaranteed income MGI) defining the structure of an equivalent linear tax (ELT). This tax is equivalent from an aggregate point of view to the existing system, in the sense that it takes the same total values for each variable (primary income, income taxes, social contributions and benefits, etc.) and thus it redistributes the same resources. By exploiting this finding, it is possible to rely on the properties of this type of tax to understand the redistributive and stabilising effects of the complex systems of taxes and transfers existing in reality.

**As a redistribution mechanism, the key property is that a linear income tax is univocally associated with the coefficient of variation, as a measurement of inequality.** The type of redistribution produced by a linear tax is a contraction of the dispersion around the mean of primary income shares, so that all shares in disposable income are closer to the average by a constant than the initial shares in primary income. The redistributive effect of the linear tax is given by the ratio of the MGI to the average disposable income. It is thus possible to check whether this effect is a good estimate of the reduction in the inequality directly observable in the data through the coefficients of variation of disposable and primary incomes. It is also possible to do the same for each of the redistributive operations (taxes and transfers) that link primary and disposable incomes.

**As a stabilising mechanism, the key property of the linear tax is that it allows to have a clear distinction between automatic and discretionary effects.** By calculating separately the effect on disposable income produced by changes in the structure of the system (the two parameters of the ELT) for a given level of primary income (discretionary change), and the effect produced by changes in primary income for a given structure of the system (automatic change), it is possible to decompose the observed changes in disposable income into three elements: a discretionary effect, an automatic effect, and a residual whose size indicates how good is the approximation of the ELT to the data.

Automatic effects are “blindly symmetrical” and proportional to the change in primary income. When primary income grows, automatic stabilisers are a fiscal drag on disposable income, while in recessions they limit its decline. Hence, if the average rate of change of primary income is positive, a discretionary fiscal policy is neutral if just compensate this drag without changing the automatic stabilisers built into the system of taxes and transfers. An activist policy tries to complement the role of automatic stabilisers with a more aggressive stance.

**The existing systems of taxes and transfers provide effective redistribution and stabilisation of per capita disposable incomes of households by regions.** However, there is no indication that they affect the sources of inequality and fluctuation of the respective market economies. Year after year, the inequality in the distribution as well as the fluctuations of primary incomes do not seem to be corrected by the effects of these systems, which are just able to attenuate their impact on disposable income. Seen through the filter of the ELT, the structure of the systems, represented by the parameters of the ELT, and the redistributive and automatic stabilisation effects calculated from these parameters change slowly, while the residual of the regressions identifying the parameters of the ELT are very persistent in size and structure.

**The distribution of per capita primary incomes of households by regions is most unequal in the UK and least unequal in France.** During the years 2000-2012, inequality has tended to rise in the UK and the US, has declined in Germany and Italy, and remained stable in France, while in Spain declined first and rose later in the period to reach in 2012 the same level of 2000. The Great Recession does not seem to have affected at all the developments in the inequality indices by regions in any country.

**The size of the redistribution effects is very different in the different countries.** The most redistributive system is in France, where inequality in the distribution of primary incomes is reduced by half in the distribution of disposable incomes. Redistribution in Germany is somewhat smaller and reduces inequality by 40%. In the UK, the tax and transfer system shrinks inequality in the distribution by almost 30%. The redistributive effects are just a little below one quarter in the US, and a little above one fifth in Italy and one sixth in Spain. These orders of magnitude of the effects are the same in both, the values calculated as the ratio of the MGI estimated in the ELT to the average of

disposable income, and those observed directly in the data through the CVs of the distributions.

**The redistributive power of the taxes and transfer systems has also evolved in divergent directions.** It has increased substantially in the UK and in Italy, limiting the effects on disposable incomes of the rising inequality in primary incomes in the British case and adding up to the decline of inequality in the Italian case. In the US, Germany and France (discounting the jump of the structural break of 2006) it has remained more stable, while in Spain has declined markedly up to the Great Recession, recovering later only one third of the loss in the redistributive capacity of the system.

**The redistributive effects operate primarily through the transfer part of the system.** Current personal transfers in the US and social security benefits in France, Italy and Spain explain 80% of the redistribution effect, while in the UK and Germany more than 100%. Although income taxes are progressive in all countries and have positive redistribution effects, they contribute in different degrees to the overall redistribution: in the UK and Spain explain one third of the aggregate effect, in the US and Germany around one fifth, and in France and Italy little more than one tenth. Social security contributions, instead, have regressive effects on redistribution in three countries. In the UK, they neutralise one third of the effect from the other operations, in Germany one fifth and in Spain more than one tenth. In contrast, they add some redistribution in France (one tenth) and Italy (very small). The other net transfers add some redistribution only in the UK (one tenth) and Germany (less than 5%).

**The size and structure of automatic stabilising effects is close to the size and structure of the redistributive effects.** The automatic stabilisation effect of a linear tax is equal to the ratio of the MGI to the average primary income. For each of the redistributive operations, the automatic stabilising effects is defined by the ratio of the constant in the regression (in absolute) value to average primary income. The respective redistribution effects are the same ratios, but divided by the ratio of disposable to primary incomes, so that automatic effects are practically equal to the redistributive effects in the US, between 15% and 20% higher in the UK and Germany, and a little more than 10% in France, Italy and Spain.

**Discretionary changes policies have been stabilising in some countries and destabilising in others.** Discretionary changes have strengthened automatic stabilisers effects in three countries (very notably in the US and the UK, and a little in Spain), have been neutral in Germany, and have weakened them in Italy (a little) and in France (remarkably). Discretionary changes have often been more influential than automatic stabilisers in determining the gap between primary and disposable income growth. On average over the period considered, the size of discretionary changes in the US (1.7) doubles the size of the automatic stabiliser drag (-0.7), and also on a much smaller scale in Italy (0.4 versus -0.2). In the UK and Spain there have also been activist policies, with discretionary changes boosting disposable income growth by 1.2 percentage point on average over the period in the UK (0.8 in Spain), and automatic stabilisers restraining it by 0.7 percentage point in the UK (0.5 in Spain). In contrast, Germany and France have exercised more restraint, with the automatic effects and discretionary changes balanced at 1 percentage point.

**Transfers have been very expansionary on average over the period.** Personal current transfers in the US and social benefits in European countries have determined both the orientation of fiscal policy and the impact of discretionary changes on disposable income stabilization. As we have seen in the redistributive effects, the influence of the transfer part of the system has been dominant and even increasing in all countries except Germany. The size of the automatic stabiliser effect in transfers is small in all countries, with a positive sign in Italy and Spain (i.e., boosting disposable income when primary income grows), practically zero in the US and the UK, and negative in Germany and France. Hence, the main influence on the observed gap between disposable and primary income growth had a discretionary character. On average over the period, current personal transfers in the US have expanded at a 5.8% rate, more than 3 percentage points above the rate of primary income growth. Social benefits have increased at 5.1% in the UK (more than 2 percentage points above primary income growth), and at 3.7% in France (almost 1.5 percentage points above primary income growth). All this expansion has been fully discretionary, without any drag from automatic stabilisers, in any of the three countries. Germany is the exception: the discretionary expansion of social benefits has been 2.5%, with a drag of -0.7% from the automatic stabiliser, which reduces the overall increase below the 2.1% rate of growth of primary income. In Italy and Spain, the automatic stabiliser has fuelled disposable income growth (by 1% and 0.7%,



respectively, per year), with discretionary changes adding 2.5% in Italy and 5.2% in Spain, figures which entail an annual growth differential of social benefits over primary income of 2 percentage points in Italy and 3.2 percentage points in Spain. Always expansionary, save in Germany, the more or less fortunate fine tuning of the degree of expansion of transfers, depending on the cyclical phase of primary income growth, has determined the overall stabilising (in the US, in the UK and less so in Spain) or destabilising (very strongly in France, and somewhat in Italy) influence of discretionary policies in this five countries, while in Germany it has been neutral.

**Income taxes, and social security contributions in the European countries, have struggled both to finance the expansion of transfers and to modulate its impact on disposable income growth fluctuations.** The relative weight and progressivity of these two sources of revenue in the different countries determine the automatic stabilisers on the tax side of the system, while the way in which they have been discretionarily managed is reflected in their additional stabilising or destabilising influence on disposable income changes. In the US, the automatic effect of income taxes represents less than one quarter of the overall automatic effect, but discretionary policies have strengthened very much their stabilising impact. In the UK, the automatic effects in built in the regressive structure of social contributions are destabilising and more powerful than those coming from progressive income taxes. However, discretionary changes have turned around their relative influence on observed data, reducing substantially the stabilising effect of income taxes and turning strongly stabilising the changes in social contributions. In Germany, the contrary has happened, and discretionary changes have strengthened the automatic stabilising effect of progressive income taxes and the automatic destabilising effect of regressive social contributions. Discretionary changes in France and in Italy have diminished the automatic stabilisers in built in the progressive structure of both income taxes and social contributions, which is the reason why the overall stabilisation effects have been much weaker than the automatic ones in both countries. Finally, in Spain, where income taxes are also progressive and social contributions proportional, discretionary changes have weakened the automatic stabilisers in the former and have kept the neutrality of the second.

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