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Does Globalization Affect Top Income Inequality?

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Abstract: We reexamine in this paper the role of globalization on top income shares (five classes from top 0.1% to top 10% of the income distribution) for a sample of 15 economies over the period 1970-2004. We investigate financial globalization measures that complement trade openness. Our system GMM (SGMM) estimations allow for a robust treatment of the endogeneity between income concentration and GDP per capita (as well as with taxation or government size). We find two interesting new results. First, the financial integration measure based on portfolio equity and FDI stocks (GEQ) turns out to have a large impact on top income shares, suggesting that the channel through which globalization affects income concentration is through FDI/equity flows. Second, we find strong support for the progressivity of taxation: there is an almost one to one negative effect of higher tax on top income (top 0.1%), which declines monotonically until the top 10% class.

Keywords: Capital Inflows, Dynamic Panels, Globalization, Income Inequality.

JEL Classification Numbers: F31, F32, F33, F34.

1. Introduction

What makes income concentration increase at the top income shares in the more recent period when globalization forces are more visible? This paper attempts to answer this question revisiting the debate on globalization and inequality. While a burgeoning literature has blamed "globalization", this concept has to be made more precise. Ravallion (2006) employs both macro (cross-country comparisons and aggregate time series data) and micro lens (household-level data combined with structural modeling of the specific impact of trade reforms) to question widely heard generalizations from both sides of the debate. As discussed by Goldberg and Pavcnik (2007, p. 41): "Research on the effects of globalization in economics has concentrated on those aspects of globalization that are easier to capture empirically. Accordingly, we confine our discussion on the more narrowly defined components of globalization: trade liberalization, outsourcing, flows of capital across borders in the form of FDI, and exchange rate shocks. Even when one hones in on a narrow dimension of globalization, measurement challenges abound…"

In addition to a more careful treatment of globalization, some of the long-run determinants have to be present as "control variables" which admittedly have a role in explaining income inequality. Following early analysis by Kuznets (1955, pp. 7-8) on rural and urban populations, theoretical models of the *structural transformation* (progressive and stagnant sectors) have been developed by Rogerson (2008) and Blum (2008), among others. For the U.S., Blum (2008) finds that changes in the sector composition of the economy (from manufacturing to services and other non-tradable sectors) are the most important force behind the widening of the wage gap in the U.S. between 1970 and 1996, which has been confirmed by Mollick (2012) in the long-run from 1919 to 2002. The substantial widening of the U.S. wage structure during the 1980s has been extensively documented by, e.g., Katz and Murphy (1992) and Beaudry and Green (2005), with Acemoglu

(2002) providing a review of theory and evidence. One way to characterize this body of work is through the "ongoing, secular rise in the demand for skill that commenced decades earlier and perhaps accelerated during the 1980s with the onset of the computer revolution. When this secular demand shift met with an abrupt slowdown in the growth of the relative supply of college-equivalent workers during the 1980s … wage differentials expanded rapidly." (Autor et al. 2008, p. 300).[1]

Recent studies have increasingly focused on the experiences of other countries. Atkinson et al. (2011) review this vast literature from the viewpoint of long-run determinants of income distribution. Examining 20 countries in the very long-run, they report that top income shares over the last 30 years have increased substantially in English speaking countries and in India and China but not in continental European countries or Japan. They attribute this increase in part to an unprecedented surge in top wage incomes.[2] Detailed country-by-country analyses are provided by Piketty and Saez (2003) for the U.S., Saez and Veall (2005) for Canada, Moriguchi and Saez (2008) for Japan, Leigh and van der Eng (2009) for Indonesia, and Gustafsson and Jansson (2008) for Sweden, among many others.

The observed increase in wage inequality can be also a result of a progressive tax on income. However, the effect of marginal tax rates on top income inequality is far from clear due to the shifting effects to alternative income sources in order to avoid a more progressive taxation.

[1] In Piketty and Saez (2006, p. 204): "During the post-1970 period, one observes a major divergence between rich countries. While top income shares have remained fairly stable in continental European countries or Japan over the past three decades, they have increased enormously in the U.S. and other English-speaking countries. The rise of top income shares is due not to the revival of top capital incomes, but rather to the very large increases in top wages (especially top executive compensation)."

[2] Also Leigh (2007), using a standardized top income shares dataset for 13 developed countries, finds that there is a strong and significant relationship between top income shares and broader measures, such as the Gini coefficient.

Sivadasan and Slemrod (2008) have documented shifting of income from profits to managerial wages after 1992 Indian reform, which had a significant impact on wage inequality. Lee and Gordon (2005) found also patterns of shifting in income in opposite direction. They provide evidence that a low corporate tax leads to a fall in personal income tax revenue. It seems that in such scenarios people reduce their time as employee, where income is subject to high personal tax, and instead become entrepreneurs, generating corporate tax revenue and reducing personal tax revenue. These shifting effects are not limited to individual decisions, since it has been documented that taxes can also play an important role in a firm's choice of organizational form. Goolsbee (2004) using cross-sectional data on organizational form choices across states in the United States found that firms in states where corporate income tax is progressive are able to break up into multiple firms to keep the marginal taxes low. Intangible assets, like patents and trademarks, have also been recognized as a major source of profit shifting opportunities. Dischinger and Riedel (2011) using data on European multinational enterprises found that the lower a subsidiary's corporate tax rate relative to other affiliates of the multinational group the higher is its level of intangible asset investment.

This paper revisits the globalization and income concentration debate. The closest paper to ours is Roine et al. (2009), who adopted a long-run approach to inequality determinants. We do have at least three important modifications, however, ranging from the research question to methodological issues. First, Roine et al. (2009) used the conventional measure of openness (imports plus exports divided by GDP), which is admittedly restrictive given that the economies have also developed the financial system throughout the period. In addition to trade openness, we also use in this paper the measures of financial development developed by Lane and Milesi-Ferretti (2007) on assets and liabilities of capital account transactions, including equity, bonds, debt and

other financial instruments. The gain associated with the usage of these measures is that they cover a wide range of financial transactions that became available to financial institutions and individuals, thus expanding the more conventional trade channel. This approach also helps verifying the channel put forward recently by Pica and Rodríguez Mota (2011), who examine a world where entrepreneurs set up firms abroad: Depending on the degree of globalization, they may choose to run a firm in the foreign country, thus clarifying the FDI-inequality channel. As a result, globalization increases inequality at the top of the distribution. Due to the use of these new measures of globalization, in order to make the analysis compatible with data availability, the time span in this paper starts in 1970. [3,4]

Second, our study emphasizes the connection between inequality and openness to trade or financial flows. It is obvious that income inequality is inherently linked to growth opportunities, which makes it important to frame properly the long-run determinants of growth. Calderón and Chong (2001) have used dynamic panels for 1960-1995 for regressions of the Gini coefficient on a vector of variables for the external sector (volume and terms of trade, real exchange rate, black market premium, and capital controls). They argue that some of these variables have affected the distribution of income in the long-run: e.g., a 10% real depreciation of local currency helps decrease income inequality by 0.9 points. It is also very likely that the impact of trade openness on growth depends on the complementary reforms undertaken as documented by Chang et al.

[3] Roine et al. (2009, p. 981) attempt to remedy the deficiency of not capturing financial development with two fixes; both are - at best - only partially successful as they acknowledge: "Since our approach here is to take an agnostic view on several potential explanations for top incomes over a long period, instrumentation is not feasible for all variables. However, when estimating the impact of internationalization we will rely on both de facto and de jure measures of openness. In order to get at the impact of financial development, we will both use direct measures and analyze the effects of banking crisis on top income shares. Neither of these approaches is ideal so we cannot claim to establish causality…"

[4] The measures of financial globalization, taken from Lane and Milesi-Ferretti (2007), are only available for the period 1970-2004.

(2009). Using the ratio of the sum of world trade to the sum of world GDP and capital flows (as measured by the ratio of the sum of the absolute values of the current account gap to the sum of world GDP), Dutt and Mukhopadhyay (2005) estimate Granger causality tests and impulse response functions for the years 1977 – 1998 and found that these globalization measures cause an increase in the inequality of per capita GDP across nations. Heyman et al. (2007) compare foreign owned firms with domestic multinationals and local firms in Sweden to question previous results at a more aggregate level on a foreign ownership wage premium. Tomohara and Takii (2011) also find wage spill overs benefits in the Indonesian manufacturing industry for the years 1989-1996. For their sample of 65 developing countries over the 1980-1999 period the results by Meschi and Vivarelli (2009) suggest that trade with high income countries worsens income distribution in developing countries. Baltagi et al. (2009) find evidence that both trade and financial openness measures are statistically significant determinants of private credit, a measure of banking sector development.

Third, the methodology employed herein to verify the link between income concentration and its determinants is fundamentally different from Roine et al. (2009), who used a first-differenced approach based on generalized least squares (FDGLS). The problem with the latter is its inability to handle endogeneity issues and we attempt to remedy this with system generalized methods of moments (SGMM). Since we have as control variables income per capita and series related to the public sector (such as top marginal tax and government share of GDP), it is likely that income inequality may also cause these control variables to change over time, which casts doubt on the one-way causality implicit in the FDGLS methodology.[5] For example, because

[5] Roine et al. (2009, p. 981) argue that "these GMM-procedures are not appropriate in a setting with small N and large T." In our case, because T is not so large (we do capture financial globalization with post-1970 data) this technical point is overcome. More importantly, we are able to handle the endogeneity problem mentioned above with the SGMM

income is too concentrated at the top, government may decide to increase taxation on the rich as well as to allocate more discretionary spending to classes at the bottom of the distribution. Income concentration may have a clear impact on GDP growth and on investment share ratios, as well. Forbes (2000), for example, documents that an increase in a country's level of income inequality has a significant positive (and fairly robust) relationship with subsequent economic growth. Voitchovsky (2005) uses household surveys - under dynamic panels - and finds that inequality at the top end of the distribution is positively associated with growth and inequality at the bottom of distribution is negatively associated with economic growth. From those perspectives, one may seriously question the adequacy of having per capita income as exogenous. In addition, theoretical work in Greenwood and Jovanovic (1990) provides an articulated view that financial intermediation promotes growth because it allows a higher rate of return on capital, while growth in turn provides the means to implement costly financial structures. This implies a two-way causation between growth and financial structures. Brückner et al. (2010) examine the experience of U.S., U.K., and Sweden over 70 years to conclude that decreases in wealth inequality lead to significant declines in real interest rates. Herzer and Vollmer (2013) find in a panel of nine high-income countries during 1961-1996 that causality runs in both directions. This body of work makes clear the link from income concentration to output as consistent with a reverse causation mechanism, which require an alternative approach to Roine et al. (2009). Claessens and Perotti (2007) provide an extensive review of financial development and inequality.

With these motivations, we re-examine in this paper the role of globalization on top income shares (five classes from top 0.1% to top 10% of the income distribution) for a sample of 15

procedure by allowing the degree of income concentration to have an effect on economic growth as reviewed by Forbes (2000) and many others.

economies over the period 1970-2004. Our system GMM (SGMM) estimations allow for a more robust treatment of the endogeneity between income concentration and GDP per capita (as well as with taxation or government size) than first-differenced generalized least squares (FDGLS). We find three interesting new results. The financial integration measure based on portfolio equity and FDI stocks (GEQ) turns out to have much larger impacts on top income shares, suggesting that the channel through which globalization affects income concentration is through either FDI or equity flows. We also find support for the progressivity of taxation: there is an almost one to one negative effect of higher tax on top income (top 0.1%), which declines monotonically until the top 10% class. And when we split the sample into GEQ below and above (panel) averages, we do find positive coefficients for GEQ on income concentration: for relatively low levels of financial globalization increases in GEQ lead to very strong effects on income concentration at the very rich households.

The rest of paper is structured as follows. Section 2 contains the data and Section 3 introduces the models and methodology employed. The results of the empirical estimations appear in Section 4 and Section 5 gives some policy recommendations. Finally, Section 6 concludes the article.

2. The Data

We explore the effects of globalization on top income shares employing the dataset compiled by Roine et al. (2009). We have information for a total of fifteen economies in our sample: twelve developed countries (Australia, Canada, Finland, France, Germany, Ireland, Japan, New Zealand, Spain, Sweden, United Kingdom and the United States) and three developing

economies (Argentina, China and India) between 1970 and 2004. To observe the role of financial globalization, we construct a couple of measures of financial globalization based on the Milesi-Ferreti and Lane (2007) dataset.

Our first measure of globalization is the traditional trade openness (TO), which is calculated as total trade, the sum of exports and imports, over GDP. Following Lane and Milesi-Ferretti (2007), we construct two alternative measures of financial globalization. First, a measure of international financial integration (IFI) with respect to GDP: $IFI_{it} = (FA_{it} + FL_{it})/GDP_{it}$, where: FA (FL) denotes the stock of external assets (liabilities). Second, a financial integration measure also with respect to GDP as an indicator of the level of equity (portfolio and FDI) cross-holding: $GEQ_{it} = (PEQA_{it} + FDIA_{it} + PEQL_{it} + FDIL_{it})/GDP_{it}$, where: PEQA (PEQL) denotes the stock of portfolio equity assets and FDIA (FDIL) denotes the stock of their direct investment assets (liabilities).

Our main variables of interest, the top income shares, are based on personal income tax data bases. These indicators can be compared relatively easily across countries, yet some limitations should be borne in mind and great care is required when conducting data analysis over time and across countries (Atkinson and Brandolini, 2009). Since countries under analysis have established their income tax systems at different point in times and follow different changes in their income tax law according to countries' specific needs, we cannot expect the series to be homogeneous. This certainly affects comparability over time and across countries. However, an argument that favors this type of comparison was given by Roine et al. (2009) by noticing that the composition of income distribution varies across the distribution. They found that labor income

dominates the lower deciles of the distribution while capital incomes dominate the top percentile which gives some homogeneity in the income composition at the top of the distribution.[6]

Table 1 presents some descriptive statistics for the 15 economies in our sample. According to Leigh (2007), the top income shares represent alternative measures of income inequality with a strong and significant correlation with other inequality measures. We observe significant variability in the concentration of income across countries and for each particular top income share. For instance, across the sample, people at the top 1% of the distribution concentrate on average 7.83% of the total income. In countries like Argentina, the United States, and Germany the top 1% of the distribution controls more than 10% of total income while less than 5% in China, Finland and Sweden. Figures 1 and 2 show, respectively, the evolution of the 1% top income share for each of the countries in the sample and for the other top income shares along with a fitted trend line. The upward trend in top income remains strong across the 1970-2004 period.

Also in Table 1, China has the largest average population and the United States the highest per capita income. A variable with considerable impact on income inequality, the top marginal tax is on average equal to 0.54 or 54%. It shows, however, considerable variation across the sample with Sweden having the largest average marginal tax (70%) and Argentina the lowest (38%). Figure 3 presents the evolution of the top 1% share along with the top marginal tax for each of the countries in the sample. Although they move in different scales, the negative association of the two series is evident; this is true even for Argentina that has a significant gap from the mid-1970s

[6] Atkinson and Leigh (2010) overcome these problems of comparability in the income variable by selecting a group of five countries with similar backgrounds, whilst the variables of their research are focused on the relationship between taxes and top income shares. We pursue a different approach here since we are interested on the relationship of top income shares with a broad set of development variables related with trade and openness. Our interest on this set of variables also justifies our selection of 12 developed countries and 3 developing countries according to the different hypotheses being tested.

to the mid-1990s. In Table 1, as expected, government spending follows the same trend than the marginal tax variable: with an average government spending to GDP ratio of 17%, Sweden shows the largest proportion (27%) and Argentina the lowest (13%).

We also build a proxy for structural transformation in order to account for the effect of tertiarization on top income inequality. From the different variables associated to tertiarization we could gather, the ratio of service value added to GDP was the most complete series available from the World Bank's *World Development Indicators* database. Across the sample the average ratio of service value added is nearly 58% of GDP with the United States (68.4%) and France (67.3%) at the top of the ranking and China (29.7%) and India (43.6%) at the bottom.

Finally, with respect to globalization, we reexamine the role of trade openness (TO) as measured by Roine et al. (2009) and explore the role of our two alternative measures of financial international integration (IFI and GEQ). In Table 1, the economies with the highest trade openness indexes are Ireland (with nearly 100% of its GDP), Canada (58.8%) and Sweden (57.1%); those countries with the lower level of trade openness are Argentina (13.5%), Japan (15.2%) and the U.S. (16.6%). For financial globalization, the ranking at the top and bottom is quite similar for IFI and GEQ, with Ireland and the U.K. presenting the highest indexes and India and Japan the lowest.

Despite the similarity in the ranking of the two financial openness indexes, Table 2 indicates that both financial indexes are not perfectly correlated and covary differently with other explanatory variables: TO correlates negatively (but very weakly) with top income shares and usually mildly with the other series; and IFI and GEQ correlates positively with top income shares and also mildly with the other series. While TO correlates more strongly with either IFI (0.52) or GEQ (0.63), these never enter the estimations jointly. Finally, a variable to capture the structural

transformation of the economy (service value added) correlates strongly with GDP per capita (0.90) and we will proceed using the latter in the estimations as discussed below.

3. The Hypothesis and Estimation Strategies

One way to interpret the link between top income concentration and globalization is under the theoretical construction by Pica and Rodríguez Mota (2011), who examine a world where entrepreneurs are allowed to set up firms abroad, especially on investments at establishing production facilities in a foreign country in order to serve the local market by making use of the local workforce. When comparing how individuals with different values of talent (a) fare in steady-state of a world characterized by different values of globalization (c), they suggest a 3-type classification of agents: with little talent ($a <$ threshold L); with intermediate talent (threshold L $\leq$ $a \leq$ threshold H); and with high-talent ($a >$ threshold H). For the latter, in particular, they obtain the following result: "agents in the high-talent ($a >$ threshold H) are always domestic entrepreneurs, and all run a domestic firm whose profits decrease with globalization. Depending on the degree of globalization, they may choose to run a firm in the foreign country as well, whose profits are instead increasing in the degree of globalization. Thus, highly talented agents gain from an increase in globalization only if the foreign gains are larger than the domestic losses. Clearly, this cannot be the case for the agents with a relatively low level of talent, as their level of foreign operations is either small or zero…" Pica and Rodríguez Mota (2011, p. 100). In this set-up, other than workers, only the agents at the very top of the distribution may win from globalization. The reason is that because the benefits from an increase in globalization are larger the larger the size of the foreign subsidiary, which in turn increases with talent.

The empirical models in this paper allow for these insights and combine elements from the public finance approach to taxation and the structural transformation hypothesis. The general equation to be tested is as follows:

$$\text{TOP INCOME SHARE}_{it} = f(\text{TOPMGTAX}_{it}, \text{GDP per capita}_{it}, \text{GLOBALIZATION}_{it}, Z_{it}) + \varepsilon_{it} \quad (1),$$

for i = 1 to 15 countries and t = 1970 to 2004 and where: TOP INCOME SHARE is the share of income associated with either top 0.1%, 0.5%, 1%, 5%, or 10% of households. TOPMGTAX is the top marginal tax rate on the wealthiest individuals. Research by Piketty (2005) on income distribution in the long-run for over 20 countries and for most of the 20th century emphasizes the role of progressive taxation in income concentration. We expect the response of top income share to TOPMGTAX to be negative and for progressivity to exist a larger negative effect as we move towards higher income shares. GDP per capita captures the income-inequality link in Forbes (2000). Early research by Kuznets (1955) linked the structural transformation of the economy (from rural to urban populations) to income inequality. Despite our interest in capturing this effect, due to the high correlation between the two series, we prefer to focus on GDP per capita rather than service value added, since GDP per capita is more commonly used in related studies. There is a well-researched (and mixed) relationship between economic growth and income inequality. Andrews et al. (2011) pool data for the Twentieth Century in the long-run for 12 developed nations and estimate by fixed effects models GDP growth as function of top income share and lagged GDP and find no relationship between top income shares and economic growth. However, when looking

at post-1960 data only, they find that a one percentage point rise in top decile's income share is associated with a robust 0.12 point rise in GDP during the following year. The context of causality in their paper is from top income shares to economic growth as in Forbes (2000), which reinforces the reverse causation mechanism to be dealt with in this paper. GLOBALIZATION includes any of the three variables (TO, IFI, or GEQ) discussed in Section 2. Finally, Z is a vector of control variables including population growth and government spending ratio to GDP; and ε is the white-noise error.[7]

The key point of this paper is how globalization (measured by either TO, IFI, or GEQ) affects income inequality at the top income shares. Globalization may have a direct or indirect impact on income inequality. In order to assess the former channel, it is interesting to contrast the conventional trade-related (TO) measures of globalization in the previous section to alternatives that allow for portfolio capital flows such as IFI or GEQ. If the latter effect is in any way different from the one under trade openness, there might be evidence that the FDI-type mechanism scrutinized in Pica and Rodríguez Mota (2011) has a role in income inequality. It is also possible that globalization has no direct effects but can be seen through alternative routes. The literature on "profit shifting" and international tax competition by Dischinger and Riedel (2011) emphasizes the role of tax havens. It is thus possible that globalization may not have a direct impact on inequality but may be particularly effective through the domestic taxation channel. Top income earners are very heterogeneous (CEOs of firms, rentiers, etc.) and their income may vary more or less with foreign factors. For example, capital income may vary more with international factors

[7] Chamon and Kremer (2009) show that widespread prosperity can occur with small differences in population growth rates between advanced and developing countries. It is well known than an increase in G/Y (other than war or defense related build-up) can be associated with welfare programs, thus reducing income inequality.

than labor income, which is subject to marginal tax rates. As long as firms find ways to avoid being taxed internationally, more progressive taxation can have more pronounced effects and thus affect income inequality through the coefficient of TOPMGTAX.

With the discussion above as theoretical reference, we start our analysis taking as benchmark the basic first difference model employed by Roine et al. (2009) to evaluate top income inequality determinants:

$$\Delta Y_{it} = \gamma \Delta Y_{it-1} + \Delta X_{it} \Phi + \mu_i + \lambda_t + \varepsilon_{it} \quad (2),$$

where: Y stand for any of our five top income shares (the top 10%, 5%, 1%, 0.5% and 0.1%). In X we have a vector of one of our globalization measures and control variables also employed by Roine et al (2009) which include: population, GDP per capita, top marginal tax and central government spending divided by GDP. Finally, μ and λ are, respectively, vectors of country and time effects.

The most appropriate method to estimate the model in equation (2) is the difference Generalized Method of Moments (DGMM) procedures proposed by Arellano and Bond (1991). Under DGMM procedures, lagged differences of the dependent variable are instrumented with suitable lags of their own. Roine et al (2009) notice that due to the characteristics of their data set, in which T (about 100 years) is significantly larger than N (16 countries), the use of DGMM procedures was inappropriate to estimate (2). Indeed, DGMM and System GMM (SGMM) methods were designed to work with short time dimension since the number of instrument grow quadratically in T, biasing the typical test of overidentification. As a result of these limitations, Roine et al. (2009) decided to estimate a static specification that does not include the lagged first difference of top income shares on the right hand side as follows:

$$\Delta Y_{it} = \Delta X_{it} \Phi + \mu_i + \lambda_t + \varepsilon_{it} \quad (3)$$

Some potential problems arising while estimating equation (3) are those of heteroskedasticity, serial correlation of the residuals, and endogeneity. In order to control for the first of these problems, Roine et al (2009) estimate equation (3) using Generalized Least Squares (GLS) methods which allow for heteroskedasticity.

We start our analysis reproducing the results in (3) but augmenting the specification to control for openness by including each of our three measures of globalization (TO, IFE and GEQ), while allowing for heteroskedasticity and first order serial correlation employing GLS methods. In dealing with the problem of endogeneity we follow, however, a different estimation approach and modify our dataset accordingly. We employ SGMM procedures using the xtabond2 STATA command developed by Roodman (2009). In order to avoid the proliferation of instruments while using SGMM we follow three strategies. First, we focus our analysis on the effects of globalization over the period 1970-2004; this greatly reduces the time dimension effect in our estimations. Second, for each country dataset we take three-year averages of all variables (T=12).[8] Dynamic panels with annual data were also estimated but due to the propagation of instruments (as verified by the Hansen test), they lead to over-identification problems of the estimated models. Third, we collapse the maximum number of lags by creating only one instrument for each variable and lag distance, instead of one for each time period.

To facilitate the interpretation of coefficients, we estimate the models in logs rather than in first differences. The model to be estimated is:

[8] This follows from work on growth regressions which typically use year averages to remove business cycle effects. A recent example of measuring the effects of government size on output growth in yearly panels versus average data panels is provided by Mollick and Cabral (2011) for two samples of industrial and emerging market economies.

$$y_{it} = \beta\, y_{it-1} + x_{it}\, \Theta + \mu_i + \lambda_t + \varepsilon_{it} \qquad (4),$$

where small letters represent logs. An additional advantage of employing SGMM is that we are able to address the potential endogeneity of some of our control variables: GDP per capita, central government spending and top marginal tax. Because controlling for all of the potential endogenous variables might increase the number of instruments considerably, we control for each of these variables individually.

4. Results

4.1 Static models

Table 3 presents the estimations of the static benchmark model under fifteen different specifications. We estimate (3) for the five top income shares (top 0.1%, 0.5%, 1%, 5% and 10% of the distribution) and for every income share we control for the influence of our three measures of globalization (TO, IFI or GEQ) separately. For most of our control variables we find the expected signs and statistical significance at least at the 10% level. We observe a positive and statistically significant but declining (as we go from top 10% to top 0.1%) contribution of population growth to income inequality. Population growth has the largest and most significant effect on inequality at the top 10% class but it declines in size and significance as we move ahead in the distribution. At the top 0.1%, the influence of population is the smallest and its coefficients are not statistically significant.

The top marginal tax and the central government spending show both, as expected, negative and statistically significant influence on top income inequality in all our specifications. On the one hand, the top marginal tax presents not only a very strong statistical significance (at the 1% level)

in every regression but interestingly also a declining tendency in the size of the coefficients as one moves ahead on the distribution (towards the top 10%). Despite targeting the wealthiest, the top marginal tax is less progressive, or rather regressive, at higher income levels. On the other hand, in spite of its lower statistical significance, a similar trend can be observed for central government spending which seems to be more effective at reducing income concentration at top 5% or top 10% income shares than at relatively higher shares. The effect of government spending at reducing income concentration is on average two to three times higher at the top 10% of the distribution than at the 0.1%.

GDP per capita is the less consistent of our control variables. For this variable we observe only a positive and significant effect at the top 0.1% of the distribution. As economic growth increases, there is an increase in top 0.1% share only, and only at the 10% level. This result on GDP per capita contrasts to Roine et al. (2009), who reported positive coefficients for top 1% share in the long-run. Finally, with respect to our three globalization variables, in contrast to previous estimates by Roine et al. (2009), we find positive and statistically significant effects of trade openness (TO) on top income shares, with larger coefficients for top 5% and top 10% income shares. This might be happening because we focus our analysis in post-1970 data, a period with greater openness to trade than in their more comprehensive and historical larger sample. As with trade openness, our two measures of financial openness (IFI and GEQ) have a positive and significant influence on top income shares. Only the IFI coefficient at the top 10% income share shows the expected sign but is not statistically significant. In general, there is a higher impact of overall financial globalization (by the IFI measure) on top income shares than on trade openness. More importantly, the effects of the portfolio equity and FDI stocks (by the GEQ measure) on income concentration are consistently positive at all top income classes with a closer to one

coefficient for top 5% (0.924) and top 10% (0.815). This is evidence supportive of the FDI-based channel developed by Pica and Rodríguez Mota (2011).

Overall, these static results present a considerable fit, with a pseudo R^2 ranging from 26% to 36%. They also differ with previous results in the literature. In particular, with respect to the role of trade openness on income inequality previously judged as not significant and in regard to the effect of financial integration not previously explored before. Our analysis gives account of significant positive effects of trade openness and financial globalization on top income shares. Nonetheless, a potential problem that remains in these estimates is that of endogeneity. In what follows we instrument the potential endogenous variables employing SGMM techniques.

4.2 Dynamic models

Following the results of the static benchmark model, we proceed in this section with the estimation of the dynamic model proposed in (4) using one step SGMM procedures as proposed by Blundell and Bond (1998). For these estimates we consider GDP per capita, the top income tax and government spending divided by GDP as endogenous. In Table 4 we report the regression results controlling for the endogeneity of GDP per capita.[9] In this specification, we allow for the possibility that top income shares have feedback effects on GDP growth. Along with the regressors, we report at the bottom of Table 4 the required tests to check the validity of instruments:

[9] Estimates controlling for the endogeneity of top marginal tax and central government spending are not qualitatively different from these. Those results are not presented here to conserve space but are available from the authors upon request.

the Hansen test of overidentifying restriction and the second order autocorrelation test. In addition, the standard errors reported in parenthesis are robust to heteroskedasticity.

The null hypothesis of the Hansen test of overidentifying restrictions implies that the instruments employed are valid. In addition, moment conditions are valid only if there is no second order serial correlation in the residuals. Hence, rejecting the null of no second order autocorrelation (and thus of further orders) would also imply that the model specification is not properly specified. For all the regressions in Table 4 the Hansen test and the second order autocorrelation tests suggest the identified restrictions are valid.[10]

At least three interesting results can be observed in Table 4. First, once we control for the persistence of income inequality and the endogeneity of the GDP per capita, only the top marginal tax remains a significant determinant across all top income shares. Most importantly, the negative impact of taxation on income concentration is reverted and presents now an increasing monotonic effect as one move ahead in the distribution. As a result, a 1% increase in the top marginal tax leads to decline of around 0.8% in the top 0.1% top income share but only to roughly 0.17% of the top 10% income share. In contrast to the estimates of the static model, this result supports the progressivity of taxation. Interestingly, progressive taxation occurs despite the possible income shifting effect previously documented in other studies.

Second, looking at the significance of our three globalization variables, we observe that, in contrast to the static estimates but consistently with Roine et al. (2009) results, trade openness (TO) is not a significant determinant for any of the five top income shares under consideration. As for our proxies of financial globalization, we find a less consistent pattern of significance for IFI,

[10] Only in the case of the top 10% income share the null of no second order autocorrelation can be rejected at the 10% significance level. For all the other columns the null cannot be rejected at this significance level.

which has only positive effects on income concentration at the top 0.5% and 1%, and a more steady significance for GEQ which presents positive effects on income concentration from four of the income classes up to the top 5% class. The reason behind this might be the more comprehensive inclusion of financial assets included in GEQ. The largest effect is found for the GEQ coefficient on top 0.1% share at 0.186 and statistically significant at 5% the level. As in Table 3, the effects of the portfolio equity and FDI stocks (the GEQ measure) have positive effects on top income shares, yet the magnitudes of the coefficients are much smaller in Table 4 under SGMM. This suggests that the Table 3 results on the degree of financial integration were biased upwards.

Third, GDP per capita has a positive impact and is only statistically significant in one of our fifteen specifications in Table 4: column (13). Despite being not statistically relevant, for twelve occurrences the coefficient is even negative. Similar results are found when we treat all our regressors as exogenous or when we consider the top marginal tax and the central government expenditure, respectively, as endogenous. In contrast to the findings by Roine et al. (2009) and to our own results in Table 3 for the top 0.1%, our dynamic panel estimates suggest that economic growth has no effect on top income inequality. These results also contrast with other studies [Alesina and Rodrick (1994), Perotti (1992), Ram (1997), and Mo (2000) among others] that relate inequality to economic growth and found a negative and significant relationship between GDP per capita and inequality. On this regard, Bourguignon and Morrison (1998) find a great deal of variability in this relationship depending on sample compositions and period of analysis. The estimates reported in Table 4, controlling for the persistence of inequality in equation (4), suggest that the association between top income inequality and GDP per capita, while negative in most cases, results not statistically significant.

In order to explore the effects of financial globalization in more depth, in Table 5 we partition the sample in two in accordance with the degree of financial openness observed by the GEQ index of each economy above and below the sample's GEQ average (0.46). Using this cut-off for GEQ, we have seven economies above the panel average and eight below it. We re-estimate (4) for two top income shares: top 0.1% (columns (1) to (6)) and top 1% (columns (7) to (12)). As in our previous results for dynamic panels, the top marginal tax is negative and statistically significant in each regression. Trade openness and some other explanatory variables remain not significant across the different subsamples. For both top income shares in Table 5, we observe that a GEQ index below average results in positive and statistically significant effects on the two top income shares but we do not observe the same results for the estimates of GEQ above average. This implies that when financial openness is low financial openness leads to further income concentration. We find a similar impact for IFI across the top 0.1% of the distribution for the panel with GEQ below average.

A limitation of the above results in Table 5 is that while the number of instruments employed in each regression has been restricted, serial correlation tests do not detect second order autocorrelation and Hansen tests do not reject the null of valid restrictions, for the latter test there is evidence of p-value close to one in some columns. Subject to this caveat caused by the reduction in the number of observations, we note that the impact of marginal tax rate is higher on top income shares for cases when GEQ is above the panel average. For the panels when the degree of financial integration is higher, higher taxes on the very rich lead to a more significant reduction in income concentration at the top. At the same time, the coefficient on GEQ is not statistically significant: there is no impact from the globalization measures. Taken together, these threshold effects of financial openness suggest that for relatively low levels of FDI and stocks, increases in financial

globalization leads to fairly robust higher income concentration at the top 0.1% (0.286 coefficient on GEQ) and 1%. (0.139 coefficient on GEQ). As in the static panel case, this is evidence supportive of the FDI-based channel developed by Pica and Rodríguez Mota (2011). One possible interpretation is that, for high levels of financial openness (captured by GEQ), globalization has no impact because of tax havens and the ability of profit shifting by firms reported by Dischinger and Riedel (2011). At the individual level, taxation of capital income is not the key, the impact of taxation on top income shares is more pronounced by domestic components, as the one captured by the TOPMGTAX rate.

5. **Policy recommendations**

There is a widespread view that the most effective instrument for achieving faster economic growth and the reduction of inequalities among countries is the integration of world economies through globalization. In the case of top income inequalities, we find evidence that globalization, measured as openness to foreign capital (FDI or equity flows) increases income concentration at the top. It is clear that international efforts to build a more equitable society have not been successful and part of the problem has been the inability to understand the real drivers behind increasing inequality, particularly at the top. There is, however, an opportunity in policy design that could bring about a correct path in the distribution of income and preventing extreme inequality. The question then becomes the relative impact of tax collection or government expenditures on redistribution policies.

According to our results, increasing marginal tax rates is an important instrument in reducing inequality. Nevertheless, policy responses should be carefully tailored in order to avoid

taxes to be shifted to other members of the society and the way tax burden is distributed. In some cases, highly progressive taxes discourage people from entering high-paying professions; in response, salaries in these professions will be higher than otherwise. Therefore, taxes paid by the upper-income taxpayers who do enter these professions overstate the true burden of taxation to them. In other situations, the upper income individuals have a financial incentive to report their incomes in ways that limit their tax liabilities (Burkhauser, et al., 2012). Fiscal manipulation strategies are sensitive to changes in marginal tax rates, in which people face incentives in reclassifying income as either wage earnings or business profits depending on which is taxed less; hence reducing the effect of progressive taxation. As for OECDs, VATs and other taxes account for a larger share than personal income and Schoenfeld (2015) claims that "the income-tax rate is a subpar proxy for redistribution policy. For example, from 1990-2010 the average marginal income-tax rate within the OECD was cut to 44.9% from 50.6%. But the average VAT was raised to 18% from 16.7%, largely offsetting the cut with respect to revenue generation."

It is also important to pay more attention to the taxation of wealth, since wealth compounds and then the advantage of top income individuals builds on itself. High top rate of taxation on the transmission of wealth by inheritance and gift, reduce the capacity of large wealth holders to sustain a disproportionate increase in income. Alvaredo et al. (2013) points out that a key factor in determining the capacity to transmit wealth is the difference between the internal rate of accumulation and the rate of growth of the economy, and for that taxation of income and wealth transfers can cause the share of the top income individuals to fall.

While our results suggest that government spending has only a role on inequality when we do not take into consideration the persistence in inequality (i.e. employing static panel data methods), its impact is actually larger than that of taxation, particularly at the top 10% of the

income distribution under GLS methods. Government expenditures through welfare state have had a major role in reducing inequality in the past. According to the OECD (2011), the reduction in the redistributive capacity of the governments between mid-1990 and 2005 was sometimes the main source of increasing poverty and inequality. OECD data find that public spending on education, health and family care reduces inequality by about a fifth on average and that government should be responsible for this (Gurría, 2011). It is therefore important to improve the efficiency of public expenditure and social safety nets which calls for policies that sustain and enhance social expenditure levels and a more effective targeting of transfers geared towards the poor.

6. Conclusions

The recently proposed theoretical model by Pica and Rodríguez Mota (2011) supports the link between openness to foreign capital (through FDI and investment abroad) and income inequality and find an intriguing relationship: the very rich and the very poor benefit mostly from openness to foreign capital, not the ones located in the middle of the distribution. We conduct in this paper an empirical investigation of this "foreign capital-top income share channel" operating abroad combined with progressive taxation at home.

Our major results are as follows for our sample of 15 economies over the period 1970-2004. We find three interesting new results under the preferred SGMM approach. The GEQ financial integration measure based on portfolio equity and FDI stocks turns out to have much larger impacts on top income shares, suggesting that the channel through which globalization affects income concentration is through either FDI or equity flows. We also find support for the

progressivity of taxation: there is an almost one to one negative effect of higher tax on top income (top 0.1%), which declines monotonically until the top 10% class. And when we split the sample into GEQ below and above (panel) averages, we do find positive coefficients for GEQ on income concentration: for relatively low levels of financial globalization increases in GEQ lead to very strong effects on income concentration at the very rich households (top 0.1%). This is the direct channel of globalization, in which the domestic taxation also has negative effects on top income shares. On the other hand, for relatively high levels of financial globalization increases in GEQ have muted effects on income concentration of the top 0.1% households, while the domestic taxation of income has much larger negative effects on top income shares. One possible interpretation is profit shifting: for countries with highly integrated capital account systems globalization has only an indirect effect on income concentration through the taxation of capital and labor income of the rich at home. This pattern also holds for the top 1% of households for the GEQ variable of globalization.

The behavior of the share of the top income depends on both what is happening to the distribution between rich and poor and to the distribution among the rich (Atkinson, 2004). At central role are the tax policy and the associated trade-off between efficiency of income redistribution. From the efficiency side, marginal tax rate should be zero at the top and at the bottom of the income distribution (Mirrlees, 1971). That is, the optimal tax system cannot be a fully (marginal rate) progressive one. The outcome in terms of policy results is summarized by Meltzer (2012) as follows: “policies that redistribute wealth and income have at most a modest effect on top income shares. As President John F. Kennedy often said, the better way is ‘a rising tide that lifts all boats’ ”. This view is partially challenged by the results in this paper, in which we find strong support for the progressivity of taxation at the top income share and substantiate with

recent results in Herzer and Wollmer (2013), who find that the effect of an increase in top income shares on economic growth is negative. Data limitations preclude our analysis to be performed for the poorest group of households, but this is left as topic for further research.

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Table 1. Descriptive Statistics.

Country	Top 0.1%	Top 0.5%	Top 1%	Top 5%	Top 10%	Population (Millions)	GDP per capita (Thousands)	Top Marginal Tax	Government Spending	Service Value Added	TO	IFI	GEQ
Argentina	6.83	13.92	18.69	30.77	.	31.6	7,747	0.38	0.13	54.59	13.47	0.76	0.16
Australia	1.69	4.16	6.29	17.44	27.74	16.3	16,529	0.55	0.18	61.82	31.58	0.95	0.49
Canada	2.68	6.33	9.25	23.83	37.11	26.9	17,634	0.55	0.20	63.33	58.82	1.37	0.63
China	0.73	2.44	4.12	13.52	22.38	1,081.3	1,888	0.45	0.13	29.66	35.52	0.35	0.11
Finland	0.91	.	4.21	13.23	21.88	4.9	14,675	0.46	0.20	57.53	50.10	1.35	0.44
France	1.97	.	7.86	20.93	32.07	55.8	16,764	0.60	0.21	67.29	37.65	1.50	0.52
Germany	3.88	7.68	10.34	22.30	32.64	79.7	15,343	0.55	0.19	60.55	43.36	1.22	0.29
India	2.41	5.49	7.49	.	.	795.2	1,262	0.48	0.11	43.57	17.78	0.30	0.04
Ireland	1.82	4.65	7.24	.	32.18	3.5	11,943	0.58	0.16	53.77	99.95	4.66	1.49
Japan	1.73	4.81	7.47	21.12	.	119.8	16,189	0.59	0.13	58.74	15.20	0.69	0.11
New Zealand	1.73	4.84	7.34	19.65	30.65	3.4	13,875	0.48	0.17	62.57	52.21	1.16	0.46
Spain	2.12	5.37	8.18	22.31	34.04	38.2	11,030	0.58	0.15	59.53	34.01	0.97	0.31
Sweden	1.09	3.13	4.93	15.18	24.75	8.5	16,484	0.70	0.27	64.62	57.18	1.65	0.71
United Kindgom	2.35	5.71	8.43	21.66	33.20	57.5	15,282	0.57	0.20	63.29	41.56	3.53	0.84
United States	3.91	8.10	11.18	25.01	36.76	246.1	21,574	0.44	0.16	68.37	16.59	0.82	0.37
Average	2.23	5.59	7.83	19.82	30.55	171.2	13,215	0.54	0.17	57.93	40.38	1.42	0.46

Table 2. Correlation Matrix.

Variables	Top 0.1%	Top 0.5%	Top 1%	Top 5%	Top 10%	Population	GDP per capita	Top Marginal Tax	Government Spending	Service Value Added	TO	IFI	GEQ
Top 0.1%	1.000												
Top 0.5%	0.987	1.000											
Top 1%	0.970	0.996	1.000										
Top 5%	0.883	0.938	0.963	1.000									
Top 10%	0.813	0.879	0.913	0.987	1.000								
Population	-0.165	-0.206	-0.223	-0.286	-0.320	1.000							
GDP per capita	0.632	0.628	0.618	0.598	0.583	-0.563	1.000						
Top Marginal Tax	-0.497	-0.516	-0.513	-0.473	-0.427	-0.278	-0.228	1.000					
Government Spending	-0.184	-0.206	-0.224	-0.234	-0.221	-0.515	0.316	0.473	1.000				
Service Value Added	0.503	0.532	0.541	0.576	0.577	-0.724	0.902	-0.143	0.424	1.000			
TO	-0.083	-0.070	-0.076	-0.056	-0.047	-0.108	0.044	-0.072	0.405	0.157	1.000		
IFI	0.244	0.267	0.269	0.298	0.285	-0.206	0.345	-0.239	0.323	0.422	0.519	1.000	
GEQ	0.247	0.263	0.255	0.263	0.241	-0.176	0.447	-0.315	0.270	0.464	0.628	0.839	1.000

Table 3. Top Income Inequality Determinants: Difference GLS Estimates.

Independent variables	Top 0.1%			Top 0.5%			Top 1%			Top 5%			Top 10%		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Δ of population	0.003	0.003	0.002	0.007*	0.007*	0.007*	0.011**	0.010**	0.009*	0.023**	0.022**	0.021**	0.030***	0.028**	0.028**
	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.010)	(0.010)	(0.009)	(0.011)	(0.012)	(0.012)
Δ top marginal tax	-1.229***	-1.223***	-1.106***	-2.594***	-2.539***	-2.250***	-2.648***	-2.581***	-2.153***	-3.403***	-3.310***	-2.952***	-4.313***	-4.178***	-3.952***
	(0.253)	(0.252)	(0.258)	(0.457)	(0.455)	(0.480)	(0.463)	(0.452)	(0.458)	(0.667)	(0.653)	(0.649)	(0.798)	(0.803)	(0.750)
Δ of government spending	-2.849*	-3.053**	-3.113**	-5.116*	-5.066*	-5.250*	-5.924**	-6.585**	-7.027**	-8.096*	-9.095**	-9.816**	-7.879	-10.397**	-12.619**
	(1.530)	(1.541)	(1.568)	(2.706)	(2.728)	(2.844)	(2.873)	(2.844)	(2.861)	(4.367)	(4.243)	(4.187)	(5.286)	(5.295)	(4.934)
Δ of GDP per capita	0.069*	0.067*	0.065*	0.053	0.057	0.069	0.025	0.014	0.006	-0.000	0.016	-0.020	-0.086	-0.074	-0.130
	(0.038)	(0.038)	(0.038)	(0.065)	(0.067)	(0.069)	(0.069)	(0.069)	(0.067)	(0.101)	(0.098)	(0.095)	(0.114)	(0.116)	(0.107)
Δ of trade opennes	0.011***			0.018***			0.025***			0.037***			0.044***		
	(0.004)			(0.006)			(0.007)			(0.013)			(0.014)		
Δ of IFI		0.134***			0.190**			0.292***			0.510***			0.218	
		(0.047)			(0.079)			(0.083)			(0.148)			(0.142)	
Δ of GEQ			0.262***			0.390***			0.697***			0.924***			0.815***
			(0.074)			(0.148)			(0.125)			(0.186)			(0.188)
Constant	-0.011	-0.008	-0.004	-0.009	-0.003	0.002	-0.005	0.007	0.020	0.037	0.039	0.064	0.065	0.100*	0.111**
	(0.017)	(0.017)	(0.017)	(0.031)	(0.031)	(0.032)	(0.033)	(0.032)	(0.031)	(0.050)	(0.049)	(0.046)	(0.058)	(0.058)	(0.052)
N	381	381	381	332	332	332	380	380	380	336	336	336	323	323	323
Presuedo R^2	0.26	0.29	0.29	0.28	0.30	0.30	0.27	0.29	0.31	0.32	0.32	0.36	0.31	0.27	0.30

Note: GLS estimates allow for heteroskedasticity and first order autocorrelation errors structure. Time and country effects are included but not reported.

Table 4. Top Income Inequality Determinants: Difference GMM estimates.

Independent variable	Top 0.1%			Top 0.5%			Top 1%			Top 5%			Top 10%		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Lagged top income	0.863**	0.683**	0.564***	0.586***	0.542***	0.492***	0.544*	0.535**	0.354	0.805***	0.872**	0.753***	0.556***	0.682***	0.842***
	(0.421)	(0.266)	(0.215)	(0.174)	(0.149)	(0.145)	(0.282)	(0.254)	(0.223)	(0.152)	(0.387)	(0.258)	(0.162)	(0.190)	(0.120)
Log of population	-0.211	-0.306	-0.285*	-0.178	-0.242*	-0.128*	-0.122	-0.181**	-0.130**	-0.013	-0.092	-0.068*	0.047*	0.046	-0.009
	(0.147)	(0.214)	(0.148)	(0.112)	(0.131)	(0.066)	(0.077)	(0.080)	(0.055)	(0.024)	(0.069)	(0.037)	(0.028)	(0.034)	(0.021)
Log top marginal tax	-0.898***	-0.835***	-0.760**	-0.615***	-0.619***	-0.587***	-0.457***	-0.465***	-0.413***	-0.252***	-0.252***	-0.229***	-0.184***	-0.177***	-0.188***
	(0.320)	(0.290)	(0.299)	(0.138)	(0.127)	(0.124)	(0.097)	(0.096)	(0.088)	(0.053)	(0.051)	(0.045)	(0.039)	(0.039)	(0.043)
Log of government spend	0.052	-0.133	-0.073	-0.124	-0.15	-0.155	-0.107	-0.144	-0.14	-0.012	-0.036	-0.016	0.027	0.069	0.085
	(0.354)	(0.328)	(0.357)	(0.174)	(0.172)	(0.156)	(0.106)	(0.108)	(0.095)	(0.067)	(0.075)	(0.067)	(0.062)	(0.068)	(0.054)
Log of GDP per capita	-0.299	-0.435	-0.392	-0.173	-0.331	-0.047	-0.058	-0.213	-0.055	0.017	-0.248	-0.167	0.149***	0.127	-0.032
	(0.490)	(0.751)	(0.565)	(0.344)	(0.370)	(0.223)	(0.178)	(0.204)	(0.160)	(0.099)	(0.285)	(0.158)	(0.054)	(0.084)	(0.066)
Log of trade opennes	0.205			0.194			0.186			0.001			-0.076		
	(0.303)			(0.137)			(0.141)			(0.064)			(0.058)		
Log of IFI		0.253			0.169**			0.146***			0.087			-0.033	
		(0.172)			(0.068)			(0.050)			(0.057)			(0.029)	
Log of GEQ			0.186**			0.050*			0.091***			0.054***			0.007
			(0.085)			(0.027)			(0.028)			(0.019)			(0.014)
Constant	3.953	6.789	6.646	2.914	5.795	2.08	1.606	4.298*	2.8	0.386	3.509	2.965**	-0.179	-0.593	0.98
	(5.341)	(9.107)	(6.947)	(3.689)	(4.403)	(2.609)	(2.034)	(2.320)	(1.810)	(0.873)	(2.453)	(1.387)	(0.482)	(0.852)	(0.687)
Number of observations	132	132	132	113	113	113	131	131	131	111	111	111	109	109	109
Number of instruments	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Hansen test	2.304	3.615	3.786	4.318	4.477	6.438	4.22	4.406	6.159	4.67	4.439	5.537	4.866	6.56	9.718
(p-value)	(0.890)	(0.729)	(0.706)	(0.634)	(0.612)	(0.376)	(0.647)	(0.622)	(0.406)	(0.587)	(0.617)	(0.477)	(0.561)	(0.363)	(0.137)
Second order autocorrela	-0.048	0.009	0.105	-1.039	-0.967	-1.001	-1.255	-1.218	-1.05	-1.297	-1.406	-1.083	-1.857	-1.771	-1.905
(p-value)	(0.962)	(0.993)	(0.917)	(0.299)	(0.334)	(0.317)	(0.210)	(0.223)	(0.294)	(0.195)	(0.160)	(0.279)	(0.063)	(0.077)	(0.057)

Notes: For all the estimates standard errors are reported in parenthesis. The Hansen test reports that under the null the overidentified restrictions are valid. The second order autocorrelation tests correspond to the Arellano-Bond test for serial correlation, under the null of no autocorrelation. The symbols *, **, and *** refer to levels of significance of 10%, 5%, and 1%, respectively.

Table 5. Sample Partition according to GEQ Intensity.

Independent variable	Top 0.1%						Top 1%					
	GEQ Below Average			GEQ Above Average			GEQ Below Average			GEQ Above Average		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Lagged top income	0.855**	0.755***	0.504*	0.410**	0.243	0.311	0.688***	0.681***	0.476***	0.342**	0.190	0.214
	(0.415)	(0.237)	(0.272)	(0.167)	(0.184)	(0.191)	(0.188)	(0.155)	(0.160)	(0.155)	(0.150)	(0.171)
Log of population	-0.157	-0.177	-0.266	-0.438	-0.242	-0.262	-0.074	-0.110	-0.136	-0.168	-0.087	-0.081
	(0.139)	(0.119)	(0.182)	(0.418)	(0.235)	(0.266)	(0.081)	(0.082)	(0.108)	(0.232)	(0.136)	(0.162)
Log top marginal tax	-0.580***	-0.570***	-0.452**	-1.409*	-1.322**	-1.388**	-0.372***	-0.391***	-0.342***	-0.567**	-0.534***	-0.537***
	(0.138)	(0.206)	(0.192)	(0.728)	(0.620)	(0.667)	(0.117)	(0.134)	(0.113)	(0.224)	(0.164)	(0.180)
Log of government spending	0.220	-0.012	0.100	-0.153	-0.196	-0.129	-0.021	-0.034	0.049	-0.186	-0.199*	-0.193
	(0.514)	(0.545)	(0.736)	(0.243)	(0.215)	(0.256)	(0.162)	(0.169)	(0.265)	(0.123)	(0.111)	(0.121)
Log of GDP per capita	-0.223	-0.304	-0.392	0.830	0.395	0.299	-0.030	-0.180	-0.178	0.447	0.266	0.255
	(0.466)	(0.493)	(0.729)	(1.356)	(1.090)	(1.215)	(0.224)	(0.287)	(0.360)	(0.607)	(0.438)	(0.504)
Log of trade opennes	0.461			-0.565			0.184			-0.202		
	(0.307)			(0.515)			(0.143)			(0.280)		
Log of IFI		0.289**			-0.052			0.156			-0.009	
		(0.134)			(0.178)			(0.096)			(0.080)	
Log of GEQ			0.286***			-0.043			0.139***			-0.007
			(0.082)			(0.138)			(0.042)			(0.061)
Constant	2.322	4.564	7.260	-2.188	-1.994	-0.884	0.802	3.197	4.294	-1.208	-0.726	-0.737
	(4.960)	(5.946)	(9.574)	(8.782)	(9.757)	(10.370)	(2.645)	(3.514)	(4.623)	(2.888)	(3.073)	(3.411)
Number of observations	66	66	66	66	66	66	66	66	66	65	65	65
Number of instruments	13	13	13	13	13	13	13	13	13	13	13	13
Hansen test	3.684	2.725	0.014	0.000	0.000	0.000	1.796	0.531	0.241	0.000	0.000	0.000
(p-value)	(0.719)	(0.843)	(0.999)	(0.999)	(0.999)	(0.999)	(0.937)	(0.997)	(0.999)	(0.999)	(0.999)	(0.999)
Second order autocorrelation	-1.280	-1.575	-1.634	0.976	0.920	0.901	-1.218	-1.285	-1.171	-0.255	-0.236	-0.250
(p-value)	(0.200)	(0.115)	(0.102)	(0.329)	(0.357)	(0.368)	(0.223)	(0.199)	(0.242)	(0.798)	(0.814)	(0.803)

Notes: For all the estimates standard errors are reported in parenthesis. The Hansen test reports that under the null the overidentified restrictions are valid. The second order autocorrelation tests correspond to the Arellano-Bond test for serial correlation, under the null of no autocorrelation. The symbols *, **, and *** refer to levels of significance of 10%, 5%, and 1%, respectively.

Figure 1: Top 1% Income Share for All Countries during 1970-2004 period.

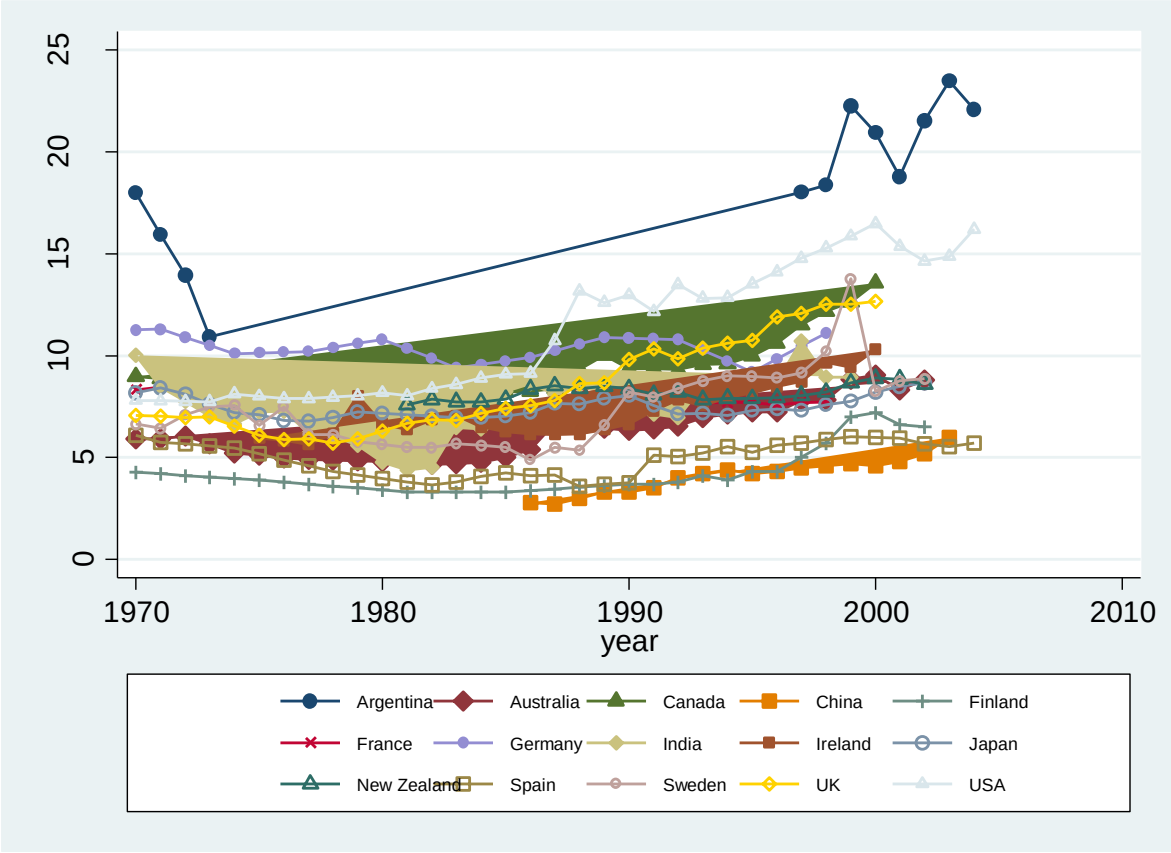

Figure 2. Top Income Shares for All Countries during 1970-2004.

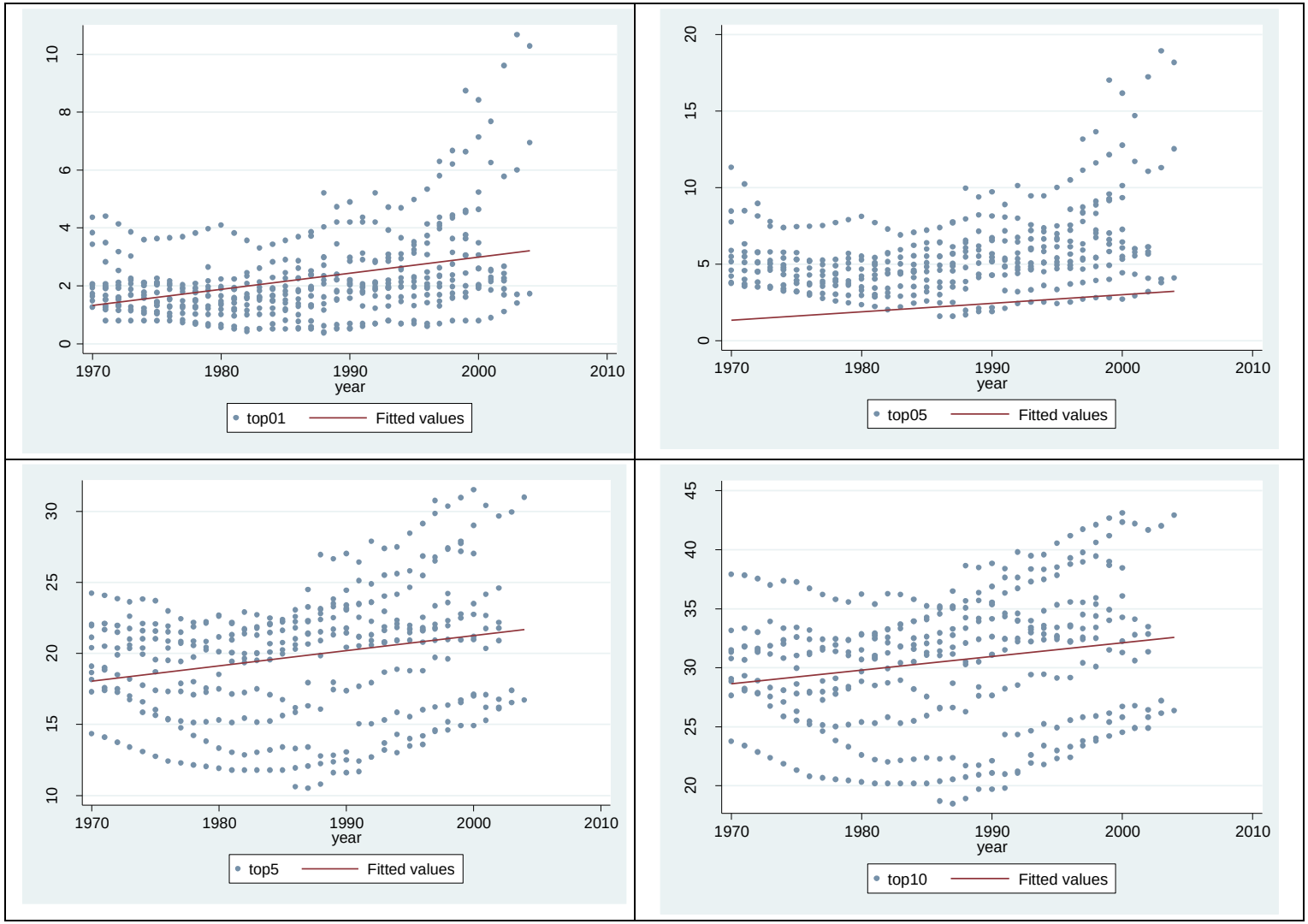

Figure 3. Shares of the Top 1% (solid circle line, left axis) and Top Marginal Tax Rate (starred line, right axis).