

Ostry, Jonathan D.

**Article**

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# Inequality and the duration of growth\*

Jonathan D. Ostry

Research Department, International Monetary Fund, Washington, DC, USA

*The relationship between income inequality and economic growth is complex. Some inequality is integral to the effective functioning of a market economy and the incentives needed for investment and growth. But inequality can also be destructive to growth, for example by amplifying the risk of crisis or making it difficult for the poor to invest in education. This paper finds that the duration of growth spells is robustly associated with more equality in the income distribution. Inequality matters, moreover, even when other determinants of growth duration – external shocks, initial income, institutional quality, openness to trade, and macroeconomic stability – are taken into account.*

**Keywords:** *inequality, redistribution, economic growth*

**JEL codes:** *O11, O15, O47, E62, H23*

## 1 INTRODUCTION

The recent global crisis – and the impact this is having on economic activity, jobs, and the poor – is rightly spurring a renewed focus on the drivers of growth, including possible links between income inequality, crises, and growth sustainability. Piketty/Saez (2003) underscore the sharp rise in income inequality in the United States in the past two decades and its return to levels not seen since the late 1920s. A number of analysts have investigated how this may have contributed to the crisis. Rajan (2010) points to the political and economic pressures that led high-income individuals to save, low-income individuals to sustain consumption through borrowing, and financial institutions and regulators to encourage the process. Kumhof/Ranci re (2010) detail the mechanisms that may have linked income distribution and financial excess, arguing that the same factors may have been at play in both the Great Depression and the Great Recession.

Some inequality is integral to the effective functioning of a market economy and the incentives needed for investment and growth (Chaudhuri/Ravallion 2006). But too much inequality might be destructive to growth. Beyond the risk that inequality may amplify the potential for financial crisis, it may also bring political instability, which can discourage investment. Inequality may make it harder for governments to make difficult but necessary choices in the face of shocks. Or inequality may reflect lack of access of the poor to finance and thus fewer opportunities to invest in education and entrepreneurial activity.

Earlier analyses have recognized the complex linkages among income distribution, growth, and policies to counter inequality. This paper takes up the issue of whether growth can in fact be sustained in the face of a highly uneven income distribution. Does less inequality help to increase the duration of growth? Are inequality and unsustainable growth two sides of the same coin, or largely unrelated issues?

\* This paper draws on joint work with Andy Berg and Haris Tsangarides, in particular Berg/Ostry (2011) and Ostry et al. (2014).

This paper draws on earlier work (Berg et al. 2012) that looked at growth in a way that emphasizes the turning points in countries' growth trajectories, and especially what determines when a long period of growth – a 'growth spell' – comes to an end. Here the focus is squarely on the relationship between income distribution and the length of growth spells.<sup>1</sup> The main finding is that equality seems to drive more sustainable growth.

Beyond the finding that equality is protective of growth, some recent research (Ostry et al. 2014) suggests that redistribution has a generally benign impact on growth; only in extreme cases is there some evidence that it may have direct negative effects on growth. Given the finding that equality exerts a protective effect on growth duration, the combined direct and indirect effects of redistribution – including the growth effects of the resulting lower inequality – are, on average, pro-growth.

## 2 INCOME DISTRIBUTION AND GROWTH SUSTAINABILITY

To what extent is the duration of growth episodes related to differences in country characteristics and policies, including income distribution? It has long been recognized that the quality of economic and political institutions, an outward orientation, macroeconomic stability, and human capital accumulation are all important determinants of economic growth, and much work has gone into understanding the mechanisms and policy implications of these relationships. This paper argues that income distribution may also – and independently – belong in this 'pantheon' of critical growth determinants.

### 2.1 Why income distribution?

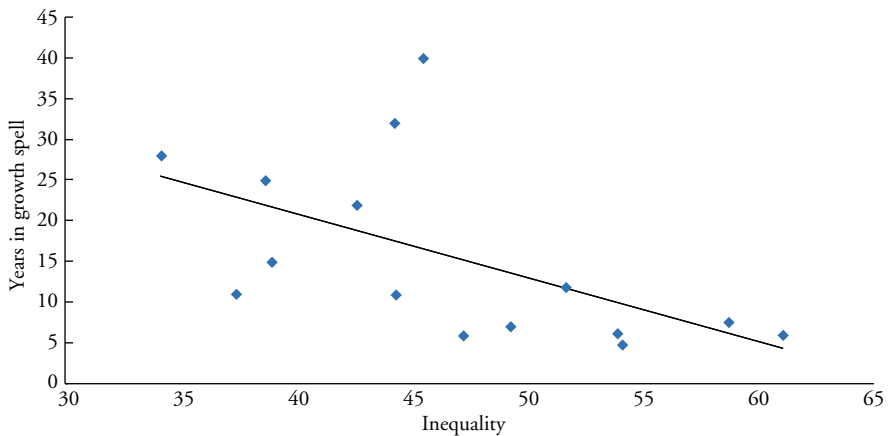
To set the stage, Figure 1 presents a simple correlation between length of growth spells and the average income distribution during the spell for a sample of countries.<sup>2</sup> The measure of inequality is the Gini coefficient, which varies from 0 (all households have the same income) to 100 (all income received by one household).

There is a pattern here: more inequality seems associated with less sustained growth. What are the possible channels through which income inequality affects growth sustainability?

- *Credit market imperfections.* Poor people may not have the means to finance their education. A more equal distribution of income could thus increase investment in human capital and hence growth. In the data used here, there is a negative correlation between some indicators of human capital (notably, secondary education achievement) and income distribution, even controlling for per capita income. This echoes

1. The object of the analysis is a growth spell: the time period between a growth acceleration and deceleration. Accelerations and decelerations are defined according to both statistical structural break tests and economic criteria. Different interstitial periods (minimum number of years between breaks) are considered, the notion being that short-frequency breaks have determinants that differ from those we seek to analyse here (we are not interested in normal business-cycle fluctuations). In essence, a growth spell is a period of time beginning with a statistical upbreak followed by a period of at least  $g$  percent average growth (a range of values of  $g$  are considered, with  $g$  being per capita growth) and ending with a statistical downbreak (complete growth spell) or the end of the sample (incomplete spell). Details are given in Berg et al. (2012).

2. The sample consists of 50 countries, spanning developing, emerging, and advanced countries (the online data appendix of Ostry et al. 2014 gives the details).



*Note:* This figure includes spells that end in-sample (completed spells) only, because the length of incomplete spells is unknown. For this figure, minimum spell length is 5 years.

*Source:* Penn World Tables and Wider World Income Inequality Database.

*Figure 1* Duration of growth spells and inequality

the arguments in Wilkinson/Pickett (2009) that more unequal countries suffer from relatively poor social indicators.

- *Political economy.* In economically unequal countries, political power may be distributed in a more egalitarian fashion than economic power. Efforts to use this political power to effect redistribution, say, through the tax system, may create disincentives to investment and result in lower or less durable growth (Alesina/Rodrik 1994). Meanwhile, efforts by economic elites to resist this redistribution, for example through vote buying and other corrupt behavior, itself could be distortionary and wasteful and thus also detrimental to growth (Barro 2000).
- *Political instability.* Income inequality may increase the risk of political instability, and the resulting uncertainty could reduce incentives to invest and hence impair growth. Rodrik (1999) argues that inequality and political instability may hamper countries' effectiveness in responding to external shocks.

Against the background of these mechanisms (which operate mainly on the 'supply side' – for a survey of demand-side factors, see van Treeck 2014), the question is whether the data lend support to the notion that societies with more equal income distributions have more durable growth.

## 2.2 Many hazards to growth

Many factors are likely to play a role in the duration of growth spells. In this section, the relationship between growth duration and inequality – and other key potential determinants – is examined more systematically. It goes almost without saying, given the nature of statistical relationships, that what follows should be interpreted as highlighting associations rather than causation, suggesting tentative stylized facts that seem to emerge from the data.

The approach here borrows from the medical literature that aims to gauge, for example, how long someone might be expected to live conditional on certain factors, for instance

whether the person is a smoker, his or her weight, gender, and age (time 'in the spell'). In our context, the probability that a growth spell will end depends on its current length and various 'hazards' to growth. The analysis distinguishes between conditions at the onset of a growth spell and changes during the course of it. The latter are most interesting for the question of what policies might be able to extend the life of an ongoing spell.<sup>3</sup>

Unfortunately, there are not nearly enough data to test all the main growth theories – and hence candidate variables – at once. There are simply too few spells and too many candidates to disentangle everything. So the strategy is to look at possible determinants of duration one at a time and then try to synthesize the findings. The variable-by-variable analysis suggests the following are correlated with longer growth spells:<sup>4</sup>

- *Better political institutions.* Many have argued that political institutions that constrain the executive and secure political accountability help to sustain growth. We also find that several measures of better political institutions are correlated with longer spells.
- *Increases in education, health, and physical infrastructure.* One strong effect is of within-spell improvements in primary education. In addition, both the initial level and increases in child mortality reduce the expected duration of a spell, though with mixed significance and magnitude.
- *Financial development.* In line with conventional wisdom, increases in the ratio of bank deposits to GDP during the spell seem to have a protective effect.
- *Trade liberalization.* There is a significant and large effect of trade liberalization, consistent with the notion that mechanisms such as increased market size, promotion of competition, and transmission of know-how may link trade openness and growth and make growth more durable.
- *International financial integration,* depending on the nature of the capital flow. Foreign direct investment (FDI) seems to help duration, whereas growth of external debt seems to hurt (consistent with the findings in Ostry et al. 2010).
- *Competitiveness and export structure.* Avoidance of exchange-rate overvaluation, high shares of manufacturing exports in total exports, and various measures of the 'sophistication' of export structures (Hausmann et al. 2006; 2007) are all correlated with longer growth spells.
- *Macroeconomic volatility.* Increasing rates of currency depreciation and inflation both reduce the expected length of spells.
- *External shocks.* Reductions in the terms of trade and increases in US interest rates, in particular, are associated with shorter spells.
- *Inequality.* There is indeed a large and statistically significant association between low income inequality and growth duration. Inequality is among the variables with the economically strongest effect on predicted spell duration. It is also among the most robust variables, in that it remains statistically significant across samples.

3. Many of the spells have not ended and their eventual length is unknown. However, the statistical techniques used in this section take these incomplete spells into account. If some factor is common to long incomplete spells but absent in short complete spells, a protective effect on duration can be identified.

4. Even these 'bivariate' estimations include initial income, in addition to the variable of interest, to avoid misattributing to another variable the effects of underdevelopment itself, with which that variable might be correlated. It turns out that low initial income is independently a significant predictor of longer spells. The estimations can also shed some light on whether the length of the spell itself is a risk factor, which it appears to be (the hazard is increasing in the time spent in the spell), even after including the other potential determinants.

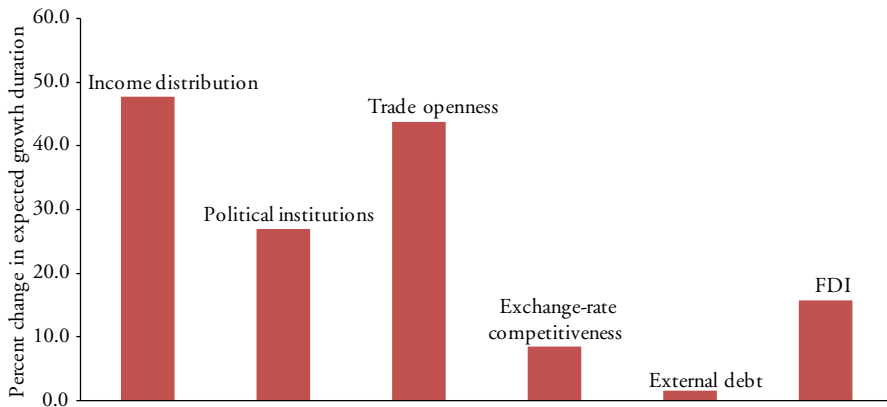
Overall, the results of the analysis have the flavor of some interpretations of the East Asian ‘miracle’: growth is most enduring in countries that maintain outward orientation, have inward FDI but perhaps not much external debt or deficits, maintain macro stability, and have relatively equal income distribution. Given this, it is worth noting that overall results hold up even when Asia is excluded from the sample.

### 2.3 Putting the hazards together

So far, we have looked one by one at the possible factors influencing the duration of growth spells. It is possible that many of the identified determinants of spell duration are themselves correlated with one another. For example, perhaps inequality is only indirectly capturing the effects of poor institutions, poor health or education, or other factors that might be the true drivers of growth duration.

To address this possibility, we now examine the joint effect of the above factors. Many potential determinants of duration remain important in this multivariate analysis, though their statistical and economic significance varies substantially depending on the exact sample, whether or not other potentially important variables are also included, and so on. Several variables are significant in at least some samples and specifications.

Figure 2 presents the results from the preferred multivariate specification in Berg et al. (2012). To give a feeling for the importance of each variable, the figure reports the increase in expected spell duration for a given increase in the variable in question, keeping other factors constant. Doing so requires first calculating expected duration when all variables are at the median for the sample (the 50th percentile). The expected duration is then recalculated when the variable in question improves by 10 percentiles.<sup>5</sup> The main results are as follows:



*Note:* For each variable, the height of the figure shows the percentage increase in spell duration resulting from an increase in that variable from the 50th to the 60th percentile, with other variables at the 50th percentile. For trade, the figure shows the benefits of having an open instead of a closed regime, using the Wacziarg/Welch (2008) dichotomous variable. For autocracy, the figure shows the effects of a move from a rating of 1 (the 50th percentile) to 0 (the 73rd percentile).

*Sources:* Berg et al. (2012) and author's calculations.

*Figure 2* Effect of increase of different factors on growth spell duration

5. To take the Gini as an example, the median in the sample is 40. A 10-percentile improvement takes the Gini to 37, which represents more equality than 60 percent of the Gini observations in the sample.

- *Better political institutions* – measured by ‘autocracy’ according to the Polity IV database – are correlated with longer spells: a reduction in autocracy from a rating of 1 (which corresponds to the sample median) to 0 on the 10-point scale is associated with a 25 percent longer spell.
- *Liberalized trade* – measured with the Wacziarg/Welch (2008) dichotomous variable that takes a value of 1 when trade has been liberalized and 0 otherwise – is associated with a 45 percent longer spell.
- *A smaller real exchange-rate overvaluation* is associated with more durable growth. A decrease in overvaluation by 10 percentage points of the real exchange rate – measured as a deviation from purchasing power parity, after adjusting for per capita income – is associated with an 8 percent increase in expected spell length.
- *The effects of financial globalization* again depend on the nature of the capital flow. Higher FDI inflows are associated with longer spells, with an increase from 8 to 12 percent of GDP in FDI liabilities associated with an expected spell duration that is 15 percent longer. Lower external debt is associated with longer spells; a decrease from 44 to 39 percent in the ratio of external debt to GDP suggests an increase in the duration of the growth spell of about 2 percent.

A number of other variables that work one by one do not remain significant in the joint analysis. This may reflect the difficulty in identifying many different effects in a limited sample of spells, but possibly also that they are – at least in part – not independent drivers of duration but rather manifestations of the underlying forces captured by some of the above variables.<sup>6</sup>

#### 2.4 Inequality: a significant hazard to growth sustainability

The key result from the joint analysis is that income distribution survives as one of the most robust and important factors associated with growth duration. As Figure 2 demonstrates, a 10-percentile decrease in inequality – the sort of improvement that a number of countries have experienced during their spells – increases the expected length of a growth spell by 50 percent. Remarkably, inequality retains a similar statistical and economic significance in the joint analysis despite the inclusion of many more possible determinants. This suggests that inequality seems to matter in itself and is not just proxying for other factors. Inequality also preserves its significance more systematically across different samples and definitions of growth spells than the other variables. Inequality is thus a more robust predictor of growth duration than many variables widely understood to be central to growth.

The estimates of the effects of inequality mainly rely on cross-country variation, because generally inequality is fairly stable through time for a given country. But sometimes income distribution does change dramatically, as in the United States, China, and a number of developing countries over the past few decades. And the estimates suggest that such changes may have significant effects on expected growth duration. To take one example, Brazil has complemented market-oriented reforms with progressive social policies aimed directly at poverty reduction (Ravallion 2009). The multivariate estimates

6. Lack of significance of manufactured exports may reflect the notion that these operate mainly by creating stronger institutions and reform constituencies, as suggested by Johnson et al. (2007). Macro stability variables are also not terribly robust, possibly reflecting the idea that inflation indicates deep distributional conflicts (Taylor 1991).

would suggest that the resulting decline in Brazil's Gini would, other things equal, increase the expected length of a growth spell by some 40 percent.

Income distribution is only one measure of social heterogeneity. Several authors have argued that ethnic or religious fractionalization plays a similar role to inequality in making a country more vulnerable to shocks or more unstable.<sup>7</sup> Anecdotally, there are clearly times when ethnic fractionalization seems to be associated with political and economic instability. And it seems plausible that ethnic and other sorts of fractionalization are correlated with and indeed interact with income distribution in complex ways. We find some evidence to support the idea that higher ethnic fractionalization is associated with shorter growth spells, but the effect varies substantially across samples and is often not statistically significant. For growth spells, at least, the evidence seems firmer on the importance of income inequality.

### 3 REDISTRIBUTION AND GROWTH

Some companion work using data from Solt (2009) that is presented in Ostry et al. (2014) looks at the relationship between growth duration on the one hand and inequality and redistribution on the other.

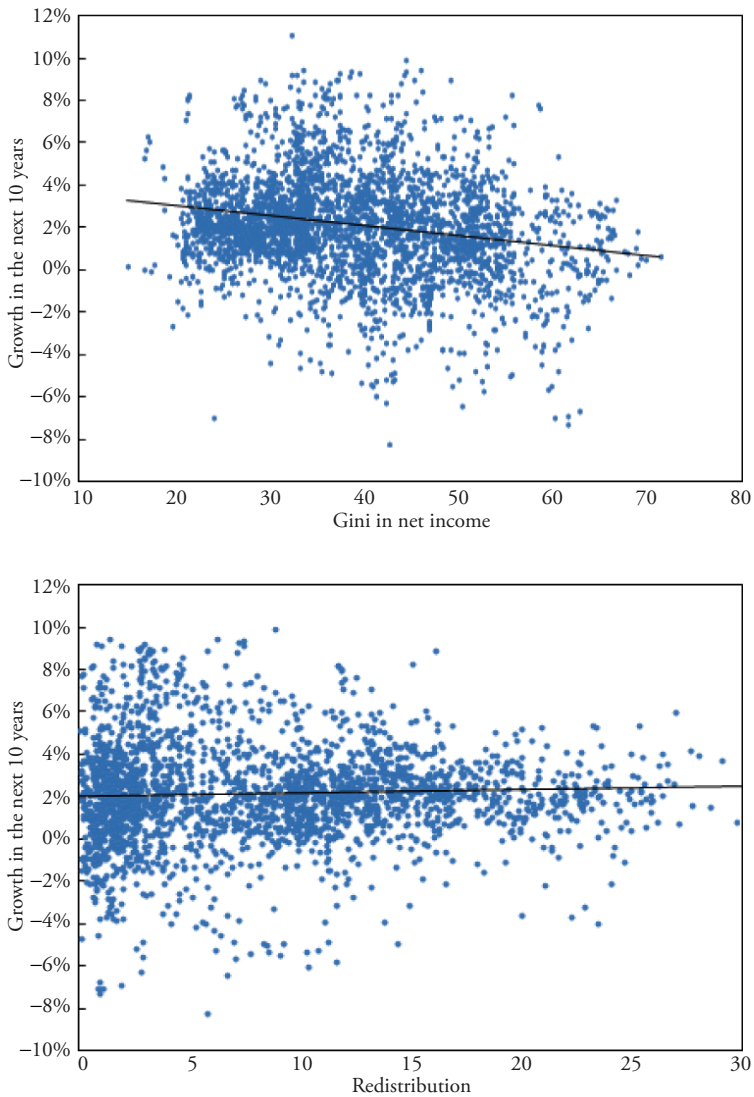
Before giving a flavor of the empirical results from this research, we can observe in Figure 3 that there is a strong negative relation between the level of net inequality and growth in income per capita over the subsequent period (top panel), and there is a weak (if anything, *positive*) relationship between redistribution and subsequent growth (bottom panel). We can observe roughly similar simple correlations for spell length (Figure 4), with a strong negative relationship between the level of net inequality and the duration of growth spells and a weak (in this case slightly negative) relationship between redistribution and the duration of growth.

The empirical findings in Ostry et al. (2014) suggest that when redistribution is already high (above the 75th percentile), there is evidence that further redistribution is indeed harmful to growth. When it is below that level, however, there is no evidence that further redistribution has any effect on growth.

These findings suggest that, contrary to Okun's (1975) big trade-off hypothesis – which stipulates that the capacity of economies to generate economic prosperity and growth is compromised when fiscal policy is redistributive – the overall effect of redistribution is actually pro-growth, with the possible exception of extremely large redistributions (Ostry/Berg 2014). There is no negative direct effect (no 'leaky bucket' on average, in Okun's language), and the resulting lower inequality seems to be associated with longer growth spells (Ostry 2014). For very large redistributions, the point estimate of the effect of redistribution on growth is negative and somewhat larger in absolute value than the estimated (positive) effect of inequality on growth, but this difference is statistically insignificant. This means that even in the case of large redistribution, there is little evidence of an overall adverse effect on growth, since the pro-equality and disincentive effects of the transfers roughly balance one another out. For smaller transfers, those of less than 13 Gini points, the evidence suggests that the overall effect of redistribution would be growth-positive (though not statistically significant): roughly neutral, but imprecisely estimated, direct effects of redistribution, and a statistically significant protective effect of the resulting reduction in inequality.

7. Easterly/Levine (1997), for example, attribute differences in a number of important public policy and economic indicators such as low schooling, political instability, and macroeconomic mismanagement to high ethnic fractionalization. However, they do not also control for income distribution.



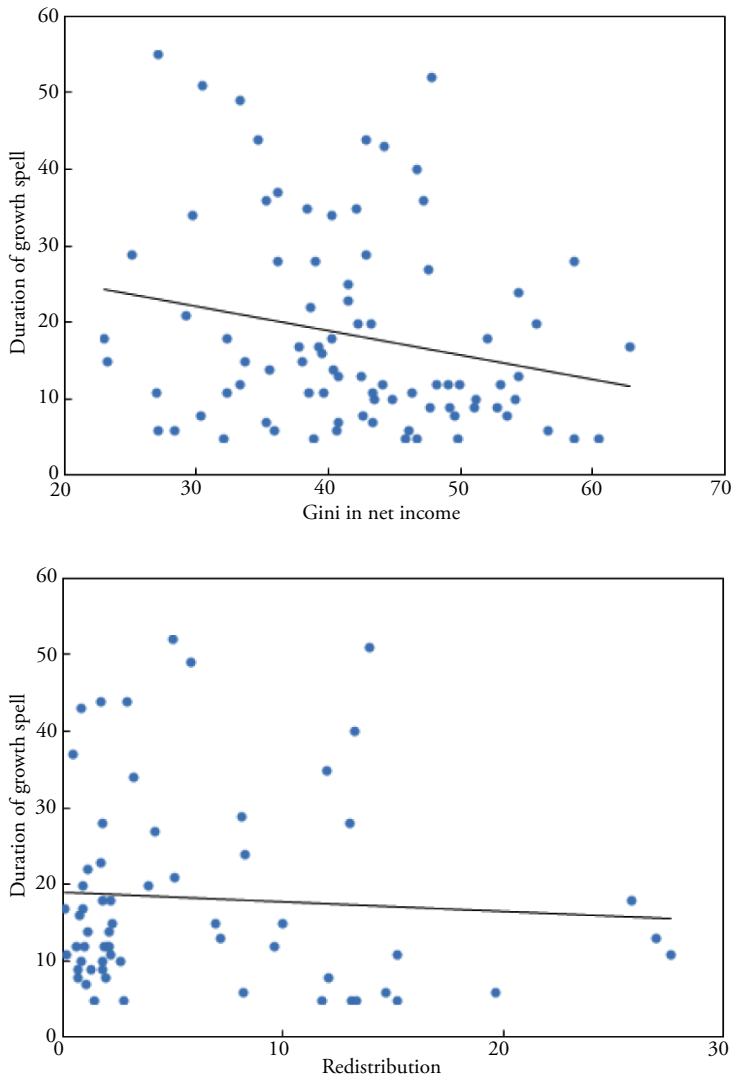


*Note:* Simple correlations between growth in the next 10 years, and the average net income inequality and transfers for a sample of countries.

*Source:* Penn World Tables version 7.1, SWIID 3.1, and authors' calculations.

*Figure 3 Growth, inequality, and redistribution*

The results in Ostry et al. (2014) on the effects of redistribution seem to hold also when controlling for a number of other potential determinants of spell duration. Additional controls preserve the results related to inequality. The results with respect to redistribution are more fragile, however. In particular, the negative effect of very large transfers seems to disappear when certain other factors are controlled for, such as exogenous shocks, institutions, debt liabilities, and openness.



*Note:* Simple correlation between length of growth spells, and the average net income inequality and transfers during the spell. Spells that end in-sample are included; minimum spell length is 5 years.  
*Source:* Penn World Tables version 7.1, SWIID 3.1, and authors' calculations.

*Figure 4 Duration of growth spells, inequality, and redistribution*

#### 4 CONCLUSION

The policy conclusions of this paper hark back to an earlier emphasis on poverty and inequality. The 1980s debt crises and the resulting difficult period of structural adjustment programs brought home the fact that sustainability of adjustment was possible only when the benefits were widely shared. As a result, substantial attention was focused

on how to achieve adjustment and growth with equity. Many analysed the relationship between fiscal and other macroeconomic policies and equity.

After many years of 'great moderation,' some of these lessons may have been forgotten. In the face of the current global economic turmoil and the need for difficult adjustment in many countries, it would be useful if these lessons could be remembered rather than relearned. It will remain the case that the policy considerations on the ground are complex. The main contribution of this paper may be to push slightly the balance of considerations towards the view that attention to inequality may serve both equity and growth at the same time.

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