



Income Distribution and the Effectiveness of Fiscal Policy: Evidence from some Transitional Economies

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ABSTRACT

The article investigates how effectiveness of fiscal policies can be influenced by the nature of the income distribution of the economy. Time series data are used for a set of recently independent or transitional countries, to verify whether there is a predictable relationship between the degree of income equality and the effectiveness of the government expenditures on the economy.

Keywords: income distribution, fiscal policy, transition economies

JEL classification: D3, E62, H3

INTRODUCTION

Optimal monetary policies or fiscal policies may have different welfare impacts in the economy depending on the underlying conditions and structure of the economy. The nature and the distributions of the disposable income is one of the important ingredient of these conditions and structure. The effect on social welfare of the policy prescriptions may be quite different if the income distribution is highly skewed or is more egalitarian. The extent of taxes levied and/or government revenue generated, depends on the distribution of income. So, the issue of income distribution is an important topic in public economic

literature and its various implications have been examined in great detail there. However, the economic impact of government expenditure (i.e. fiscal policy implication) is likely to be affected by the income distribution and this issue has not been as adequately investigated. Some research works address the theoretical nature of this impact, but there is much less empirical work to assess the actual implications of a nation's income distribution on the power of either fiscal or monetary policies, especially for less developed countries.

In this paper, we intend to fill up this gap by investigating how effectiveness of fiscal policies can be influenced by the nature of the income distribution of the economy. For this purpose, we use time series data for a set of recently independent or transitional countries, to verify whether there is a predictable relationship between the degree of income equality and the effectiveness of the government expenditures on the economy. Thus, our study focuses on two specific relationships:

- the nature of the relationship between a country's income distribution and government expenditures (fiscal policy), and
- the extent to which the income distribution could affect the magnitude of the fiscal policy.

Traditional econometric methodologies based on cross sectional as well as time series analyses are used to isolate statistically significant factors and whether they have the proper sign to ascertain whether a nation's income distribution enhances or detracts from government expenditure-based fiscal stabilization policies. Empirical tests of the reduced form multiple regressions are carried out by using data from ten transitional and developing economies for the years 1991 to 2003.

The cross country evidence over the span of fourteen years suggests that there is a significant link between income distribution and fiscal policy. The results also indicate the impact of income distribution on fiscal policy multiplier is unambiguously negative for this panel of transitional and developing countries. We also find out that more income inequality leads to a need for a higher level of government expenditures than if income is more equally distributed.

BACKGROUND

The important role that income distribution played on the macroeconomics of a country was initially discussed in the seminal study of Kuznets(1955) that sought to establish the relation between economic growth and income

inequality. Since then many empirical studies have examined the hypothesized tradeoff between economic growth and the degree of income equality. Few early studies have resulted in conflicting conclusions as the results in each case are sensitive to sample selection and choices and proxies for the income distribution. More recent studies by Alesina and Rodrik (1991), Perotti (1994) and others, based on the formulation of endogenous growth models, have also concluded that relationship between income inequality and economic growth is not monotonic, rather indeterminate.

Meanwhile, other macroeconomists typically argue that fiscal policy has a procyclical effect on Gross Domestic Product (GDP) in developing countries, whereas in the case of developed or high income countries it is typically acyclical or countercyclical. Estimated fiscal policy multipliers in high income countries, derived from marginal levels of consumption, in general, vary between .52 to 1.29 depending on countries and estimation methods. (Recently Barro(2009) estimated the fiscal policy multiplier of the magnitude of zero for the US economy during the period of 1943-45 fiscal years). WSJ Jan 22, 2009: Government Spending is no free lunch.

Although the importance of the marginal propensity to consume (MPC) by the level of income in formulating fiscal policies and their consequences on national income is well documented, there has not been as thorough an evaluation of the effect of the distribution of income on the impact of fiscal policy in high income countries also. Specifically, the relationship between transaction expenditures and the extent to which the income distribution is skewed has been largely an unobserved and/or unexplored phenomenon. For example, Peter Lambert and Wilhelm Pfähler (1997) analyzed the relationship between market demand and income distribution and concluded the relationship is ambiguous as it depends on a variety of assumptions regarding preference functions and the initial values of the parameters describing the economy. Consequently, they were unable to determine conclusively the effect of income distribution on the effectiveness of monetary or fiscal policy.

Another important aspect that has been explored empirically, focuses on the effect of lags between fiscal policy formulation, implementation and its impact on the economy. For example, is the policy procyclical or expansionary during an economic expansion (and contractionary during a recession) or acyclical or anti-cyclical in relation to the economy? (see for example , Gavin and Perotti (1997), Guerson (2003), Cabeallero and Krishnamurty (2004), Talvi and Vegh (2005), Mendoza and Oviedo 2006 among many others). Most of these researchers concluded fiscal policy is procyclical in developing countries and

acyclical in developed countries. However, none of the above studies examined the role of income distribution in context of the countries' business cycles.

EXTENDING THE RELATIONSHIP BETWEEN FISCAL POLICY AND INCOME INEQUALITY

A nation's income distribution is important for fiscal policy formulation because if the income distribution is highly skewed, the spending by the average (mean) or even median household would not represent the actual fiscal policy effect. The usual assumption, a "Keynes-Dusenberry" demand policy suggests the redistribution of income to low income, with higher 'marginal propensity to consume' households (thus decreasing income inequality) would increase the impact of an expansionary policy on economic activities. Alternatively, as several empirical studies have suggested, supply side economic policy seeks to increase economic growth by fostering a greater degree of income inequality. It is also apparent that currently, there is a renewed interest in the impact on social welfare of income distribution policies in countries across the income level spectrum. This interest is especially timely given the world-wide economic contractions in domestic and export activities.

Our intent is to analyze the implications of a country's income distribution to identify optimal levels of fiscal stabilization, using the traditional approach taken by researchers examining aggregate demand-income inequality relationships. This approach is based on the Baumol-Tobin model to incorporate the income distribution into the demand for money and implemented by Lambert and Pfähler (1997), Pfähler and Wiese (1990), Perry and Hooks (1993), and Das, Das and Fomby (2004). These studies focused on a micro theoretic analysis of money demand which was then generalized for the whole economy. Lambert and Pfähler (1997) and Pfähler and Wiese (1990) incorporating a Lorenz curve variable into their estimation of the aggregate demand for an economy, asserted that aggregate demand will be higher the more equally income (or total transaction volume) is distributed among households. They estimated their model for developed, relatively high income countries. Das et. al. (2004) model the real long term demand for money conditioned on family (household) income and other variables. They provide a theoretical rationale for money demand as an increasing convex function of household income in the long run and short run. Their analysis concludes with an empirical validation using annual data for the U. S. from 1947 to 2001. They report a positive relationship between money demand (both M1 and M2)

and income inequality (Gini coefficients and the income share of the lowest 6 deciles of income distribution for families).

As mentioned earlier, the relationship between growth and income inequality has also been examined extensively. More recently, Garcia-Penalosa and Turnovsky(2005) analyzed the same issue in the context of fiscal policy by incorporating different taxation strategies. They have concluded that fiscal policy does indeed have an effect on the trade off between income growth and inequality.

In this paper we examine the implications of income inequality for fiscal policy formulations and its effectiveness in economies which are very different from the post WWII U. S. and other OECD countries. In reviewing the assumptions of the theoretical model as discussed by earlier authors such as “ a small open economy facing a given price level and a given exchange rate [with] households, all with identical tastes and preferences, but with different income levels and there is one good produced in the economy with constant returns. Labor is the only input. Perfect competition prevails.” It seems that the circumstances of less developed or newly transitional countries more closely approximate the above specifications. Specifically we seek to determine if the positive relationship between income inequality and money demand also applies to the effectiveness of fiscal policy. We want to address the following questions:

- a. Is an increase in income inequality positively related to expansionary fiscal policy formulation?
- b. Is the magnitude of the positive effect of expansionary fiscal policy (i.e. government expenditure multiplier) affected by the income inequality?

DATA AND METHODOLOGY

In order to test for the existence of a long run equilibrium relationship between the fiscal policy and income distribution we employ a data set of annual observations of government spending, business cycles and several control variables for a panel of 10 transitional and developing countries over the period of 1991-2003. These countries are Romania, Slovenia, Bulgaria, Latvia, Macedonia, Moldova, Poland, Ukraine, Lithuania and Belarus.

The following simple functional regression model is specified:

$$Y = g(X) + \varepsilon \quad (1)$$

Y is the vector of the dependent variable and X is a matrix of independent variables including the government spending and control variables: population level, unemployment rate, level of industrial production and the Gini coefficient (as the income inequality measure for country; a low Gini coefficient indicates more equal income or wealth distribution, while a high Gini coefficient indicates more unequal distribution. 0 corresponds to perfect equality (everyone having exactly the same income) and 1 corresponds to perfect inequality), g stands for the functional relationship and ε stands for the white noise error term.

A simplified linear version of (1) can be specified as

$$Y_{1it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon_{it} \quad (2)$$

$i = 1, 2, 3, \dots, n$ and $t = 1, 2, 3, \dots, T$

where Y_1 is a measurement of national income (measured by logarithm of real gross domestic product or real gross domestic product), X_1 is the measurement of government expenditures, X_2 is the measurement of income distribution (measured by the Gini coefficient) and X_3 is an interaction term, i.e., $X_3 = X_1 * X_2$, and ε_{it} is the random error term, where i refers to country and t refers to time period.

The fiscal policy multiplier is represented as the simple government expenditure multiplier, or the ratio between the change in GDP and the change in government spending, i.e. $(\Delta Y_1 / \Delta X_1)$. Ignoring the existence of the country's income distribution, it is measured by the coefficient β_1 in equation (2). However, our hypothesis asserts the government expenditure multiplier is affected by the degree of income inequality or X_2 . Accordingly, in our formulation, the fiscal policy multiplier should be defined as $\Delta Y_1 / \Delta X_1 = \beta_1 + \beta_3 X_2$. If $X_2 = 0$, then it implies (in the absence of income inequality), the multiplier is β_1 , however, $\Delta Y_1 / \Delta X_1$ is now affected by the magnitude of X_2 , as X_2 changes the multiplier changes. Thus the interaction terms controls the magnitude of the fiscal policy multiplier. If the sign of β_3 is positive, that implies fiscal policy becomes more potent if income distribution (as measured by the Gini coefficient) is more unequal. If the sign is negative, that implies that fiscal policy become less effective in the presence of more unequal income distribution.

The second multiple regression equation is specified to express the relation between fiscal policy formulation and the income distribution:

$$Y_{2it} = \alpha_0 + \alpha_1 Z_{1it} + \alpha_2 X_{2it} + \alpha_3 Z_{2it} + \alpha_4 Z_{3it} + u_{it}. \quad (3)$$

where Y_{2it} is the measurement of government expenditure, Z_i s represent the set of possible control variables (such as Z_1 is the level of industrial production, Z_2 is the population level, Z_3 is the unemployment rate) and u_{it} is the random error term. As defined above, X_2 is the Gini coefficient. The sign and significance of α_2 measures the effect of the income distribution on government expenditure. If α_2 is positive, it implies a more unequal distribution of income which leads to a need for more government expenditures to achieve a given increase in GDP; if α_2 is negative, it implies that more income inequality will reduce the level of government expenditures needed to achieve a given increase in GDP.

To estimate equations (2) and (3), we use aggregate annual observations of the above macro variables obtained from the electronic version of International Financial Statistics. Income inequality data (Gini coefficients) are obtained from World Income Inequality Database 2nd revision (WIID2). The Gini coefficients are based on country-specific research conducted by the national statistical agency, international organizations (e.g., World Bank) or independent researchers.

The reliability of the income distribution data for the countries selected as evaluated by the WIID2 places them ahead of income distribution data for other countries or for other data series for the above countries. However, even though the income distribution data are based on consistent data collection and methodology for each country as evaluated by WIID2, the data are not available for the same years for each country resulting in missing observations for several countries.

RESULTS

Summary statistics and the number of missing observations for the panel of countries are shown in Table 1. The estimation results of the regression equations are reported in Tables 2 through 6. The ordinary least squares estimates based on pooled regression model are shown in Tables 2 and 5. These are done for benchmark purposes only. The multiple regression equation specified by equation (2) may suggest simultaneity as equation (3) reveals that government expenditure (X_1) is dependent upon income inequality (X_2). Because ordinary least square equation estimation is not optimal here we have

used a simultaneous equation estimation using two stage least squares estimation techniques. The results are presented in Table 3.

Next, we have utilized a panel regression methodology as there are joint or common properties in the countries that are likely to affect the multiplier. The simultaneous panel estimation results for both fixed effect and random effect are presented in Table 4. These results are conditioned on differences in data reliability across the countries and perhaps over time within particular countries. As specified in section III, equation (3) can be considered as a reduced form multiple regression equation, so traditional ordinary least square estimation or panel estimation technique seems correct to use. Identifying the specific data issues in each country and resolving them has not been undertaken for this exploratory analysis.

From Table 2 we notice the government expenditure multiplier is positive, implying higher government expenditure will lead to larger real gross domestic product. The effect of income inequality seems to be significantly positive in the case of the log of GDP, implying larger income inequality (Gini) leads to more growth of the economy. However, the interaction term is negative and statistically significant which implies the higher the income inequality, the less effective is the fiscal policy multiplier. This result is strongly corroborated in Table 3 where two stage least squares estimation is used. In this table we see that sign of the interaction term is negative and it becomes more significant. Also the magnitude of the estimated coefficients increases from (-4.01 to -6.80 for RGDP and -.13 to -.24 for LGDP).

We arrive at the same conclusion from panel estimation results reported in Table 4. For both fixed effect estimation and random effect estimations, the signs of the interaction terms are negative and highly significant. Thus, the panel regression is consistent with the two-stage results (Table 3) suggesting the more skewed the distribution of income, the lower the effectiveness of the fiscal policy. This holds true for both the real government expenditures and the log of government expenditures models. Moreover, the interaction effect of multiplier and Gini is negative for both models, implying the more unequal the income distribution, the lower is the multiplier effect of fiscal policy.

Tables 5 and 6 report the findings of the effect of income inequality on government expenditures for fiscal policy formulation. The sign of Gini coefficient is positive and the t-statistics imply the coefficients are significantly different from zero for the panel estimation results reported in Table 6. The positive sign indicates a more unequal distribution of income in a country will

necessitate a higher level of more government expenditure than if the income was equally distributed. This is true regardless the type of measurement of the government expenditure: RGCE (real government expenditure in absolute values) or LGCE (a logarithmic transformation of government expenditures), although the log value is more highly significant.

Apart from the Gini coefficient, industrial production and population also have a significant effect on government expenditure. We also have estimated the relation between growth of GDP and growth of government expenditure (not reported here) and we notice that relation is positive which supports the Wagner hypothesis. These estimations imply fiscal policy is procyclical in these transitional countries, consistent with the empirical results for developing countries reported by researches discussed earlier.

Table 7 shows results for seven of the countries included in the panel data of equation (2). Because of missing observations, we can estimate equation (3) only for these countries. For a majority of the countries (Romania, Slovenia, Bulgaria, Poland, and Ukraine), the Gini coefficients interacts negatively with the fiscal multipliers, and are highly significant. Thus, it corroborates the initial findings that more unequal income distribution of income will make fiscal policy less potent for these countries.

CONCLUSIONS

The estimation results reported in this paper indicate that the distribution of income should be treated as an important tool for fiscal policy formulation and its effectiveness. The empirical evidence suggests that the impact of income distribution on fiscal policy multiplier is unambiguously negative for the panel of transitional and developing countries considered in the analysis. Secondly, we also note that more income inequality leads to a need for a higher level of government expenditures than if income is more equally distributed. Moreover, the time period is recent (1991-2003) indicating these finding are relevant to current policy formulation as the countries continue to develop towards more market orientation and private property institutions.

There appears to be a sufficient rationale for the use of fiscal policy based on its procyclicality in transitional and developing countries in conjunction with policies that reduce income inequality. Accordingly, a two stage process or simultaneous policy agenda may be warranted: foster or continued support for greater income equality through institutions of private property, market-based incentives and the rule of law as well as to pursue fiscal policies such as:

- progressive income taxes, consumption taxes as opposed to VAT or flat taxes,
- privatization which re-distributes resources, sources of income rather than substituting oligarchs for government ownership/control
- government expenditures targeted to low income regions/sectors rather than spending predicated on ‘trickle down’ effects
- open economies which encourage exports and imports, but also attract FDI

This last observation provides a hypothesis for subsequent investigation: The ‘penalty’ or offset to social welfare as measured by GDP growth that arises from an unequal income distribution. Depending on the data availability (countries with and without a predetermined level of market-supporting institutions), it may be possible to estimate this penalty econometrically.

Table 1: Summary Statistics

| Variable | Mean | Variance | Skewness | Kurtosis | Maximum | Minimum | Missing observations |
|----------|-------|----------|----------|----------|---------|---------|----------------------|
| Lgdp | 8.598 | 11.869 | -1.23 | 2.40 | 13.64 | 0.39 | 9 |
| Lgce | 6.85 | 12.384 | -1.16 | 1.94 | 11.93 | 0.13 | 8 |
| Lgini | 3.49 | 0.023 | -0.102 | -0.539 | 3.94 | 3.15 | 10 |
| Lip | 5.00 | 0.998 | 1.94 | 2.14 | 7.636 | 3.94 | 38 |
| Lur | 2.19 | 0.88 | -1.31 | 1.76 | 3.60 | -1.20 | 7 |
| Lpop | 2.02 | 1.327 | 0.38 | -1.306 | 3.94 | 0.66 | 2 |

Lgdp=log GDP, Lgce=log government expenditures, Lgini=log Gini, Lip=log industrial production, Lpop=log population, Lur=log unemployment rate

Table 2: Pooled estimation of Income Distribution Effect on the Fiscal Multiplier

| | Real GDP | | Log GDP | |
|-------------------------|---------------------|-------------|-----------------------|-------------|
| | Estimate | T statistic | Estimate | T statistic |
| Constant | -161.09 | -0.42 | -1.25 | -.91 |
| Government expenditures | 5.60 | 107.74* | 1.42 | 7.23* |
| Gini | 68.39 | 0.65 | 0.92 | 2.36*** |
| Interactive | -4.01 | -2.12* | -0.13 | -2.32* |
| r-square | .994 | | .99 | |
| F-statistic | DF(3,105) 6133.1 | | DF(3,110) 3666.25* | |

*Significant at 1%; **Significant at 5%; ***Significant at 10%

Table 3: 2SLS estimation of Income Distribution Effect on the Fiscal Multiplier

| | Real GDP | | Log GDP | |
|-------------------------|----------|-------------|----------|-------------|
| | Estimate | T statistic | Estimate | T statistic |
| Constant | -124.36 | -0.28 | -4.27 | -2.38 |
| Government expenditures | 5.64 | 86.81* | 1.78 | 7.47* |
| Gini | 78.19 | 0.63 | 1.84 | 3.67*** |
| Interactive | -6.80 | -2.35* | -0.24 | -3.57* |

*Significant at 1%; **Significant at 5%; ***Significant at 10%

Table 4: Panel estimation of Income Distribution on the Fiscal Multiplier (Equation 2)

| | Real GDP | | Log real GDP | |
|------------------------------|-----------------------|------------------|-----------------------|-------------------|
| | Estimate | T statistic | Estimate | T statistic |
| Fixed Effects | | | | |
| Government expenditures | 4.24 | 14.37* | 1.51 | 5.82* |
| Gini | -243.07 | -1.02 | 0.66 | 1.66*** |
| Interactive | -0.71 | -0.16 | -0.15 | -2.03** |
| F statistic for Fixed Effect | DF(12,96) 2699.46* | | DF(12,101) 1310.4* | |
| Random Effects | | | | |
| Constant | 1358.71 | 1.72*** | -0.89 | -0.67 |
| Government expenditures | 5.40 | 35.75* | 1.44 | 6.48* |
| Gini | -322.48 | -1.46 | 0.80 | 2.11** |
| Interactive | -7.56 | -1.85** | -0.13 | -2.07** |
| Hausman Test Statistic | 3.32 | p-value: 0.34 | 1.81 | p-value: 0.611 |

*Significant at 1%; **Significant at 5%; ***Significant at 10%

Table 5: Pooled estimation of Income Distribution Effect on the Government Expenditure

| | Real Govt. Expenditures | | Log real Govt. Expenditures | |
|-----------------------|-------------------------|-------------|-----------------------------|-------------|
| | Estimate | T statistic | Estimate | T statistic |
| Constant | 549.46 | 0.52 | 12.30 | 1.63 |
| Unemployment rate | 258.42 | 3.46* | 1.63 | 3.26* |
| Gini | -505.12 | -1.69*** | -3.69 | -1.70*** |
| Industrial Production | 95.31 | 1.53* | 0.89 | 1.99** |
| Population | 186.13 | 5.28*** | 0.114 | 0.44 |
| r-square | .536 | | .69 | |
| F-value | DF(4,76): 9.87* | | DF(4,78) 5.06** | |

*Significant at 1%; **Significant at 5%; ***Significant at 10%

Table6: Panel Estimation of the Effect of Income Distribution on Government Spending (Equation 3)

| | Real Govt. Expenditure | | Log RealGovt. Expenditures | |
|------------------------|------------------------|----------------|----------------------------|------------------|
| Fixed Effect | Estimate | T statistic | Estimate | T statistic |
| Gini | 180.40 | 1.66*** | 8.47 | 6.27* |
| Industrial Production | 250.97 | 4.46* | -0.97 | -1.37 |
| Population | 641.51 | 1.32 | -19.59 | -3.21* |
| Unemployment | 33.60 | 1.46 | 0.29 | 1.08 |
| F-Statistic | DF(13,67) 1916.62* | | DF(12,70) 82.26* | |
| Random Effects | | | | |
| Constant | -2046.75 | - 3.13 * | 2.90 | 0.21 |
| Gini | 158.46 | 1.53*** | 8.84 | 6.80* |
| Industrial Production | 241.95 | 4.48 * | -0.95 | -1.38 |
| Population | 235.68 | 1.15 | -11.58 | - 2.54** |
| Unemployment | 22.74 | 1.19 | 0.52 | 2.21** |
| Hausman Test Statistic | 1.45 | P value:.918 | 3.72 | P value: 0.59 |

*Significant at 1%; **Significant at 5%; ***Significant at 10%

Table 7. Estimation of Income Distribution Effect on the Fiscal Multiplier
Individual Country Estimation

| Country | Real GDP | | | |
|----------|----------------------------------|--------------------------------|---------------------------------|--------------------------------|
| | Constant | Govt Exp | Gini | Interaction |
| Romania | -12.66 (-2.10) ^{***} | 2.28 (5.29) [*] | 606.87 (3.02) [*] | -8.41 (-2.87) [*] |
| Slovenia | -27.69 (0.62) | 12.64 (5.66) [*] | 73.45 (3.95) [*] | -13.03 (-7.78) [*] |
| Bulgaria | 614.17 (1.67) | 2.56 (4.43) [*] | -110.92 (-1.12) | -2.60 (-2.75) [*] |
| Moldova | 385.14 (4.18) [*] | -0.15 (-0.11) | -139.47 (-4.91) [*] | 6.35 (5.45) [*] |
| Poland | 287.03 (2.02) ^{**} | 0.69 (2.87) [*] | -111.71 (-2.83) [*] | -9.46 (-7.57) [*] |
| Ukraine | -55.72 (-2.40) ^{**} | 13.56 (296.72) [*] | 15.22 (2.39) ^{**} | -0.265 (-2.77) [*] |
| Belarus | -74.87 (-0.26) | 4.67 (219.2) [*] | 20.32 (0.26) | 0.21 (0.51) |

t - statistics are given in the parentheses

*Significant at 1%; **Significant at 5%; ***Significant at 10%

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