Wage Increases, Transfers, and the Socially Determined Income Distribution in the USA

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Abstract

This paper is based on a social accounting matrix (SAM) which incorporates the size distribution of income based on data from the BEA national accounts, the widely discussed 2012 CBO distribution study, and BLS consumer surveys. Sources and uses of incomes are disaggregated by household groups including the top 1%. Their importance (including saving rates) differs markedly across households. The SAM reveals two transfer flows exceeding 10% of GDP via fiscal (broadly progressive) and financial (regressive) channels. A third major flow over time has been a ten percentage point increase in the GDP share of the top 1%. A simulation model is used to illustrate how "reasonable" modifications to tax/transfer programs and increasing low wages cannot offset the historical redistribution toward the well-to-do.

This paper is about severe limitations to reducing income inequality in the USA. In model simulations, when they are applied at politically "reasonable" levels standard policy tools such as increased taxes on high income households, higher transfers to people with low incomes, and raising wages at the bottom do not reduce rich vs. poor inequality by very much.

The basic reason is that consistent macroeconomic accounting shows that there are three income redistribution flows on the order of 10% of GDP. The first two are fiscal tax/transfer payments (broadly progressive) and financial transactions (regressive). The last is an increase over two decades by 10% of GDP in the share of primary incomes expropriated by the top 1% of income recipients. In a macroeconomically consistent framework incorporating the size distribution of income we show that policy interventions such as those mentioned above cannot reverse this historically large and unrequited income transfer.

For ease in presentation the household size distribution is rescaled to the national income and product accounts (NIPA). It is summarized by a metric (the "Palma ratio") which as opposed to the standard Gini coefficient emphasizes the disparity in incomes between the "poor" (say households in the bottom one or two quintiles of the size distribution of income) and the "rich" (the top decile or top percentile). The ratio has trended strongly upward over time.

To trace macroeconomic and distributive linkages through, we use a simple, static demand-driven macro model based on a social accounting matrix (SAM) which enfolds meso-level data on key distributive variables (types of income including transfers received, taxes paid, consumption, saving) for swaths of the size distribution into the NIPA system. Basically, we rescaled available data to fabricate a representation of the size distribution consistent with the NIPA from the US Bureau of Economic Analysis (the BEA accounts are themselves a

fabrication). The numbers provide a broad brush representation of the distributive situation for the period 1986-2009. For the model simulations we focused on 2008, a relatively "normal" year for the economy.

We begin the presentation with a review of the US size distribution in the context of the SAM, shedding light on how relatively large fiscal and financial transfer payments and unequal income flows fit into the macro system. Then we go on to simulation results. Appendix I reports details on how we put the accounting together and Appendix II sets out the specification of the model. An Addendum briefly discusses the Republican "Path to Prosperity" budget proposal in the House of Representatives.

The US Economy as a Transfer Union

To borrow a phrase from Europe, the US economy is a "transfer union" (though of modest proportion in comparison to European practice). Through both financial and fiscal channels, money flows of well over 10% of GDP (or $1.5 trillion) are transferred among different groups of economic actors. The SAM in Figure 1 illustrates the magnitudes scaled to GDP in 2008. The accounting rules are straightforward. Sums of corresponding rows and columns should be equal; the sums of "institutional" sectors' levels of saving and investment toward the bottom (saving with a positive sign and investment negative) are equal at 18.1% of GDP as the condition for overall balance.

The sectors included are households and non-profit institutions, corporate business (non-financial and financial), the overall government sector (Federal, state, and local), and the rest of the world. For accounting purposes a fictional financial sector also appears. It collects interest

and dividends disbursed by the other sectors as sources of income in a row and redistributes them in the corresponding column.[1]

<div align="center">

Figure 1

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UNITED STATES, CONSOLIDATED (AGGREGATE) SOCIAL ACCOUNTING MATRIX (AS PERCENTAGE OF GDP)										
2008		Current Expenditure					Capital Expenditures			Total
		HOU & NPINST	BUS	GOV	ROW	INT & DIVID	HOU	BUS	GOV	
Uses of Total Supply		70.22%		16.66%	12.92%		3.70%	10.90%	3.48%	117.89%
Households and NPI	67.82%		0.26%	12.89%	0.00%	15.15%				**96.12%**
Wages and Salaries	45.80%									
Employer Contributions	10.65%									
Proprietor's and Rental Income	9.30%									
CCA	2.06%									
Transfers			0.26%	12.89%						
Interest-Dividends received						15.15%				
Business	23.22%				1.89%	19.22%				**44.33%**
Surplus plus stat discrepancy	14.48%									
CCA	8.73%									
Transfers					1.89%					
Interest-Dividends received						19.22%				
Government	8.96%	17.58%	2.67%		0.13%	0.81%				**30.16%**
Net Indirect Taxes and Operating Surplus	6.79%									
CCA	2.18%									
Direct Tax, Transfers, Misc etc		10.64%	2.67%		0.13%					
Contributions Received		6.94%								
Interest-Dividends received						0.81%				
Rest of World	17.89%	0.46%	0.63%	0.43%		4.42%				**23.83%**
Imports	17.89%									
Transfers		0.46%	0.63%	0.43%						
Interest-Dividends received						4.42%				
Interest and Dividends Disbursed		1.80%	30.90%	2.80%	4.10%					**39.60%**
TOTAL EXPENDITURES		90.07%	34.47%	32.78%	19.04%	39.60%	3.70%	10.90%	3.48%	**234.04%**
Levels of Net Lending										
HOUSEHOLDS & NONPROFIT INSTITUTIONS		6.05%					-3.70%			2.35%
BUSINESS			9.87%					-10.90%		-1.04%
GOVERNMENT				-2.62%					-3.48%	-6.10%
REST OF THE WORLD					4.78%					4.78%
INTEREST AND DIVIDENDS						0.00%				0.00%
TOTAL	117.89%	96.12%	44.33%	30.16%	23.83%	39.60%				**0.00%**
GDP		14291.5								

The first column gives a cost breakdown of total supply, or GDP plus imports. Supply amounts to 117.9% of GDP of $14.2915 trillion. The first row shows how it is split among

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[1] In principle the national accounts can always be formulated as a SAM. In practice they are rarely if ever set out in matrix form. We constructed Figure 1 from the accounts published by the BEA.

current and capital expenditures (the latter show that households, business, and government all invest in inventories and/or physical capital). Imports are included in the first column as opposed to the first row (with a negative sign) because their costs when they cross the frontier are incorporated into the value of total supply. The other columns and rows respectively present sectoral uses and sources of incomes.

In the first column the "CCA" entries stand for capital consumption allowances or depreciation by sector. They have to be included on the cost side because depreciation makes up part of the investment outlays in the first row.

For the household sector, wages and salaries and employer contributions (to insurance and pension funds) are usually lumped together as "labor compensation". Sleight of hand, however, is involved. As highlighted in purple, the contributions paid as a cost of employment amount to 10.7% of GDP, but then 6.9% is passed back to the government (essentially as an employment tax) in its row for contributions received. Wages and salaries alone give a better measure of take-home pay before direct taxes. They make up only 45.8% of GDP.

Second, besides the employee contributions other main sources of government income are indirect taxes (plus minor surpluses of government enterprises) and direct taxes including 10.6% from households (green highlight). But then in the column for government outlays households receive 12.9% of GDP as transfers (also green). Although 12.9% is small by the European standard of roughly 20% it does signal that a substantial share of GDP is recycled through the direct tax/transfer system. The other major outlay is 16.7% of GDP ($2.387 trillion) for government purchases of goods and services.

Third, the business sector (including financial business) pays 30.9% of GDP to the fictional financial sector as interest and dividends (red highlight). Reflecting the volume of

transactions among US financial firms it gets 19.2% back (also red). The corresponding numbers in 1986 were 27.3% and 17.1%, with the increase over 22 years indicating the increasing role of finance in the economy.

A yellow highlight shows that the household sector is the other main recipient of financial flows at 15.2% (it has a 1.8% outlay, also yellow). In effect there is a net financial transfer from business to households of the same magnitude as the fiscal transfer. As will be seen the impact of these transfers on the economies of households differs markedly across the size distribution of incomes.

Total government expenditures are 32.8% of GDP, while revenues are 30.2%, i.e. the overall government sector dissaves 2.6% of GDP in its row for net lending. Negative government saving is reported as the *current* deficit in the simulations below. Adding investment expenditure of 3.5% boosts government net borrowing or the overall deficit to 6.1% of GDP or $872 billion on the BEA's reckoning.

The rest of the world's income from US imports is 17.9%; its purchases of exports are 12.9%. After taking transfers and financial flows into account "foreign saving" (or the US current account deficit) is 4.8% of GDP or $686 billion.

Looking at the overall picture of net lending flows, the household sector saved more than it invested in 2008 (although the pattern varied notably across the size distribution). Business was a net borrower of 1% of GDP.

Size Distribution and the Role of the Top 1%

Figure 2 gives a broad brush picture of the US size distribution of income for 2008, scaled to fit the NIPA numbers in Figure 1.[2] We split households into four groups – those in the bottom two quintiles of the size distribution with a mean income per household of $42,850 (right-hand scale); those between the 41st and 90th percentiles with a mean income of $106,590; the 91st to 99th percentiles with $278,320; and the top percentile at $2,140,460. Sources of incomes are as in Table 1, i.e. wages and salaries, social contributions received, transfers received, and "other" (including interest and dividends, proprietors' and rental incomes, and CCA).

Figure 2

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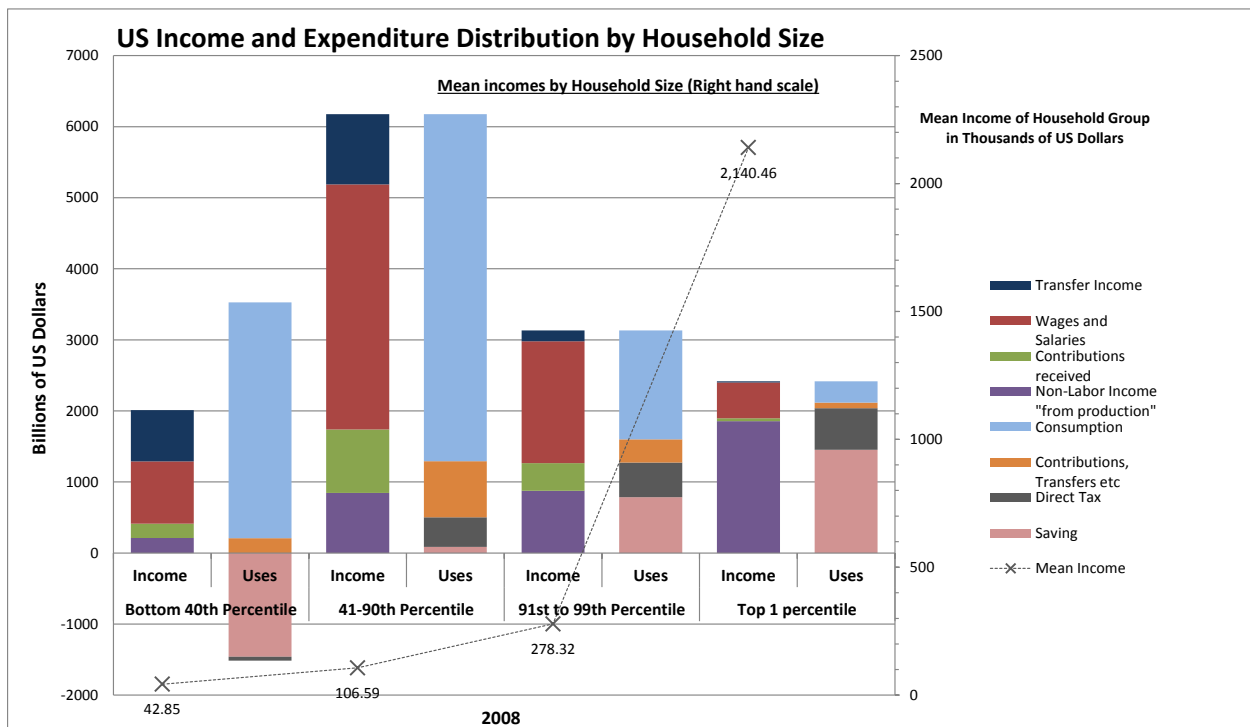
[2] As discussed in Appendix I, we used data from the Congressional Budget Office (2012) report on the size distribution and the Bureau of Labor Statistics (2009) Consumer Expenditure Survey to put together the estimates in the diagram.

These income flows do *not* include capital gains, which do not figure in the NIPA system.[3]   For the top two groups they generated substantial incomes -- $337,700 for the top 1% and $61,600 for the next group down. Other groups on average received less than $1,000 (around $100 at the bottom). In more prosperous years the top 1% got over $500,000 from this source.

One way of thinking about the degree of inequality in the USA is in terms of a "Palma ratio" of the mean incomes of the top 1% to the bottom 40%.[4] Figure 3 shows the ratio for disposable income (total income minus social contributions to the government, interest paid out, and direct taxes) on the right-hand scale. The other curves are shares of the four income groups in GDP (left-hand scale).

Figure 3

Share of Disposable Income for Household Groups

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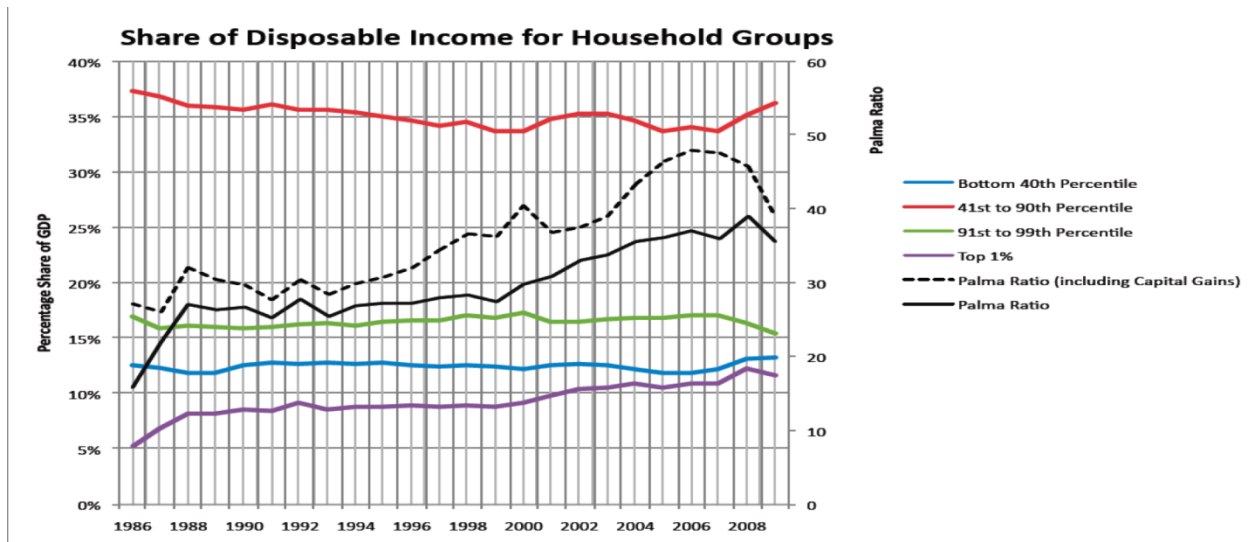
[3] Capital gains can be inferred from changes of wealth over some period in the flow of funds accounts or directly from income tax data.
    [4] In fact Palma (2011) suggests using the income of the top 10% in the numerator but we chose the top percentile to underline the large degree of inequality in the USA.

Note that the top 1% steadily increased its GDP share from 5% to nearly 15% over two decades – the third major transfer mentioned above -- while shares of the other groups have been stable or declined.

The Palma ratio (solid black line) nearly doubled. If 80% of capital gains ("post-tax") are added to disposable income, the ratio reached a level of nearly 50 before the financial crisis; it dropped off somewhat thereafter.

Pointing out that income inequality has increased markedly in the USA is scarcely novel. How the current situation fits into national accounting, however, is of considerable interest.

Sources and Uses of Incomes

Returning to Figure 2, for each group the left-hand bars show sources of incomes (again, these estimates are consistent with the totals in Figure 1). The ones to the right indicate how incomes are used. There are striking differences across income groups.

The 46.9 million households in the bottom two quintiles spend more than they receive. This extra outlay is represented by the segments of their right-hand bar below the horizontal axis, which signal *dis*saving and negative direct taxes. In the BLS consumer expenditure data the bottom two quintiles have had consistently negative saving levels for two decades. There are many plausible explanations – clandestine payments, defaulted personal debt, family support, etc. – but the pattern is clear in available data. Above the axis, the two outlays are for consumption and social contributions sent to the government in line with Figure 1.

On the income side to the left, poor households receive modest social contributions and non-labor income. The big items are labor income and transfers. Transfers are a bit smaller than wages. Both series have run closely together since 1986 (transfers were larger until 1995).

The pattern for the top 1% (1.1 million households) is entirely different. Transfers and employer contributions make a minimal contribution to income. Wages and salaries are a significant source (approaching $500,000 per year) but the lion's share comes from proprietors' incomes and interest and dividends. Both check in at around $800,000. Uses of income include consumption, social contributions, and direct taxes of $585,000. Saving of roughly 10% of GDP accounts for the rest.

In passing, note that there are about 43 times as many low as high income households while the relatively rich have 50 times the average income of the poor. The share of GDP of the top 1% is higher than the share of the bottom 40%.

For the middle-class 58 million households between the 41st and 90th percentiles, income from labor (wages and contributions) is the dominant source. They also receive transfers (the total is about the same as for the bottom two quintiles) and non-labor incomes. The bulk of their income is devoted to consumption, with modest direct taxes and very low but positive saving.

The pattern for the 91st and 99th percentiles is transitional between the groups on either side. Wages and salaries are their major source of income. Transfers are less important than for the middle class, while non-labor income has a higher share. These 11.3 million households pay more in direct taxes than the middle class and have positive saving but consumption still accounts for roughly half of their income.

Model Simulations

A simple comparative static macro model at best gives a bird's eye view of possible impacts of policy changes, especially since the US tax and transfer system is extremely complicated (in Europe transfers are typically directed routed through the public sector as opposed to an ad hoc maze of specific programs). Nevertheless some insights can be gleaned.

Table 1 presents macro level impacts of shocks to the system.[5] Table 2 shows distributive implications for disposable incomes and numbers of households. We consider the impacts of fiscal expansion (without and with higher taxation), higher taxes linked with increased transfers, and wage increases for low income groups.

As emphasized in connection with Figure 2, there are big differences across the size distribution in household saving behavior – average rates are negative at the bottom and positive at the top. The simulations reported here are all based on average saving rates. Modifications such as setting the marginal saving rate to zero at the bottom do not affect the results very strongly.

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[5] Recall from the discussion above that the numbers in Table 1 report the *current* fiscal deficit at a level of 374.6 in the base year. Adding investment spending of 497.2 sets overall government borrowing to 871.8 or 6.1% of GDP.

Table 1

	Policy	Real GDP (Billions of		GDP Deflator		Govt Deficit		Current Account	
	Macroeconomic Impacts of Policy Shifts (Level Changes)								
A	Initial Level	14291.5		1		374,56		683.778	
B	Govt Spending Increase by 100	102.2	(0.72%)	0	(0.00%)	90.45	(24.15%)	18.279	(2.67%)
C	Govt Spending Increase by 250, Increase Tax by 100 and 150 for top two	161.5	(1.13%)	0	(0.00%)	-13.67	(-3.86%)	28.879	(4.22%)
D	Increase Tax by 50 on top two groups and transfer to bottom	154.7	(1.08%)	0	(0.00%)	-13.58	(-3.63%)	27.664	(4.05%)
E	Raise wage by 10% for bottom 20% and by 5% for next 20%	79.2	(0.55%)	0.0071	(0.71%)	-10.65	(-2.84%)	16.625	(2.43%)
F	Wage Increase with a 30% marginal tax rate on low incomes	39.4	(0.28%)	0.0071	(0.71%)	-27.32	(-7.29%)	9.468	(1.38%)
G	Wage increase and 30% marginal tax rate with an employment elasticity, pf = -0.5	5.1	(0.04%)	0.0127	(1.27%)	-19.36	(-5.17%)	4.68	(0.68%)
H	Wage Increase with a falling markup	80.9	(0.57%)	0.00678	(0.68%)	-11.05	(-2.95%)	16.911	(2.47%)
I	Wage increase and falling markup with a 30%marginal tax rate on low incomes	41.1	(0.29%)	0.00678	(0.68%)	-27.72	(-7.40%)	9.756	(1.43%)
J	Wage increase, falling markup, 30% marginal tax and employment elasticity of -0.5	18.9	(0.14%)	0.01035	(1.04%)	-22.64	(-6.04%)	7.029	(1.03%)

Table 2

	Policy	Bottom 40 Percentile				41-90th Percentile				91-99th Percentile				Top 1 Percentile				Palma Ratio (Mean Disposable Income of Top 1 v/s Bottom 40)	
		Mean Disposable Income of Group (Thousands of USD)		Household Size (Millions of Households)		Mean Disposable Income of Group (Thousands of USD)		Household Size (Millions of Households)		Mean Disposable Income of Group (Thousands of USD)		Household Size (Millions of Households)		Mean Disposable Income of Group (Thousands of USD)		Household Size (Millions of Households)			
A	*Initial Level*	39.41		46.93		86.11		57.95		206.29		11.26		1538.17		1.13		39.03	
B	Govt Spending Increase by 100	-0.26	(-0.66%)	0.34	(0.72%)	-0.57	(-0.67%)	0.41	(0.71%)	-1.29	(-0.63%)	0.08	(0.72%)	-5.15	(-0.33%)	0.01	(0.72%)	0.13	(0.33%)
C	Govt Spending Increase by 250, Increase Tax by 100 and 150 for top two	-0.41	(-1.04%)	0.53	(1.13%)	-0.90	(-1.05%)	0.65	(1.13%)	-10.81	(-5.24%)	0.13	(1.13%)	-139.37	(-9.06%)	0.01	(1.13%)	-3.16	(-8.10%)
D	Increase Tax by 50 on top two groups and transfer to bottom	1.71	(4.35%)	0.51	(1.08%)	-0.83	(-0.96%)	0.60	(1.04%)	-6.34	(-3.07%)	0.12	(1.08%)	-51.54	(-3.35%)	0.01	(1.08%)	-2.88	(-7.38%)
E	Raise wage by 10% for bottom 20% and by 5% for next 20%	1.23	(3.12%)	0.26	(0.55%)	-0.36	(-0.42%)	0.32	(0.55%)	-1.05	(-0.51%)	0.06	(0.55%)	-2.32	(-0.15%)	0.01	(0.55%)	-1.24	(-3.17%)
F	Wage Increase with a 30% marginal tax rate on low incomes	0.91	(2.30%)	0.13	(0.27%)	-0.31	(-0.36%)	0.16	(0.28%)	-0.55	(-0.27%)	0.03	(0.28%)	-0.33	(-0.02%)	0.00	(0.28%)	-0.88	(-2.27%)
G	Wage increase and 30% marginal tax rate with an employment elasticity, pf = -0.5	1.08	(2.75%)	0.02	(0.04%)	0.13	(0.15%)	0.02	(0.04%)	-0.15	(-0.07%)	0.00	(0.04%)	2.73	(0.18%)	0.00	(0.04%)	-0.98	(-2.50%)
H	Wage Increase with a falling markup	1.22	(3.10%)	0.27	(0.57%)	-0.37	(-0.43%)	0.33	(0.57%)	-1.07	(-0.52%)	0.06	(0.57%)	-2.47	(-0.16%)	0.01	(0.57%)	-1.23	(-3.16%)
I	Wage increase and falling markup with a 30% marginal tax rate on low incomes	0.90	(2.27%)	0.13	(0.29%)	-0.15	(-0.17%)	0.17	(0.29%)	-0.57	(-0.28%)	0.03	(0.29%)	-0.48	(-0.03%)	0.00	(0.29%)	-0.88	(-2.25%)
J	Wage increase, falling markup, 30% marginal tax and employment elasticity of -0.5	1.01	(2.56%)	0.06	(0.13%)	0.02	(0.02%)	0.08	(0.13%)	-0.31	(-0.15%)	0.01	(0.13%)	6.54	(0.43%)	0.00	(-0.19%)	-0.81	(-2.08%)

Levels changes in Distribution from Policy Shifts

Row B in the tables shows the effects of an increase of 100 (billion dollars) of government purchases of goods and services from an initial level of 2381. GDP increases by 102, signaling a modest multiplier for GDP (the multiplier for total supply is 1.2). Both the fiscal and foreign deficits go up. On the distributive side, numbers of households in all groups increase – this response is a proxy for higher employment generated by fiscal spending. An increase in

"*G*" of 4.1% generates a rise of 0.7% in "employment," again a modest increment. The model specification treats direct taxes and transfers as lump-sum, fixed in real terms. Hence the percentage increases in mean disposable incomes for each group are less than total incomes, leading to a modest average income loss across the board.[6]

The highest income households and the group just below pay direct taxes of 586 and 490 respectively (a total of 1076). Suppose that their (lump-sum) direct taxes are increased by 20+% to 150 and 100, "offset" by an extra 250 in government spending (a 10.5% increase). Row C in Table 1 shows that GDP expands and the fiscal deficit decreases. In Table 2, employment rises while mean disposable income goes down for all four income groups (in part for the reasons discussed above). The decrease of 9% for the richest group is especially visible and the Palma ratio falls by 8%.

This simulation focuses on reducing inequality by cutting disposable incomes at the top. A 20% tax hike, however, may well be politically out of bounds as of 2014, even though it could readily be based on wealth, capital gains, or the large financial flows illustrated in Figure 1. On the other hand, a 9% reduction in income due to the tax increase does not go very far toward offsetting the 300% increase in real average income that the top 1% enjoyed between 1986 and 2008.

Row D shows the effects of a more modest tax increase at the top combined with higher transfers to low income groups, i.e. taxes are raised on high savers transfers increased for a group with negative saving This package is expansionary, raises disposable incomes at the bottom, and reduces incomes at the top. It cuts the fiscal deficit. A larger version would cut

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[6] The specification is not unreasonable. Many households in the bottom two quintiles rely on pre-fixed income transfers such as Social Security. Over time, presumably disposable income would rise more or less in line with GDP as transfers ratchet up.

further into the Palma ratio by reducing the numerator and raising the denominator. Taxing the rich with offsetting transfers to the poor looks like an effective means to ameliorate inequality overall. Nevertheless, the Palma metric does not fall by very much. Raising transfers to the bottom from 708 toward a "European" level of 1100 would require a 50% tax hike at the top, imposition of a value-added tax, or perhaps a combination thereof.

In contrast, row E concentrates on the denominator by raising money wages for the bottom two quintiles (by 10% at the bottom and 5% for the second quintile), broadly in line with the minimum wage increases analyzed by the Congressional Budget Office (2014). In Table 1 there is a 0.55% increase in real GDP owing to higher consumption demand and the GDP deflator goes up by 0.7%. Table 2 reports a 3% increase in disposable income for the bottom two quintiles, with the other groups decreasing slightly. The Palma ratio falls from 39 to bit less than 38.

Potential offsets to the wage increase should also be considered.

The US transfer system effectively "taxes" income increases at the bottom of the size distribution by reducing benefits. A rough estimate of the tax rate is 30% (CBO, 2014). Row F in the tables shows that the low income wage increase is less expansionary and redistributive when this limitation is taken into account.

The usual objection to a minimum wage increase is that firms will cut back on employment (or raise labor productivity) in response. Row G shows that bringing this possibility into play reduces increases in GDP and employment. Because of the latter effect, average disposable income of the bottom group goes up.

Firms might also adjust to the wage increase by reducing mark-ups. Row H shows stronger expansion, less inflation, and stronger real income gains.

All effects are combined in row J. Raising low income wages appears to be beneficial, but in overall macroeconomic terms the changes are minimal, in the range of a few percent of initial levels of the relevant variables.

Bottom Line

This last observation illustrates the fundamental message of this paper. Policy initiatives within "feasible" limits will not strongly affect distribution in the US economy. Modifying taxes and transfers within the 10% of output that could be manipulated by the government or increasing wages at the bottom by 10% (or even 20%) simply cannot offset the shift of 10% of GDP toward the top income group that occurred after the 1980s.[7] Only major social changes – expropriating the expropriators in the ancient phrase – could begin to accomplish that task.

Addendum: "The Path to Prosperity"

Row D in the tables illustrates the effects of raising taxes on high savers at the top of the size distribution and transferring money to low savers at the bottom. The Republican 2015 budget proposal in the House of Representatives follows the opposite course. On an annual basis the basic idea is to cut transfers across the board by about 500 (billion) and to cut taxes for the top two groups by 50 each. The transfer reduction is impressive at 27% of the initial level; the tax cuts are around 10%.

No surprise, in a demand-driven model GDP falls by about 5%. The current government deficit drops from 374.6 to 38. To get to a "balanced budget" or zero government net borrowing (= current saving minus investment) there would have to be a reduction of 690 (29%) in current government spending. GDP would end up falling by 9%.

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[7] This observation is *not* model-specific. Given the accounting underlying Figures 1-3, even a highly neoclassical model would give outcomes similar to those reported here.

These numbers show that the "Path to Prosperity" leads toward Depression, as it must in an economy in which expenditure determines income. Presumably prosperity could be created if reduced net borrowing by the government were to flow automatically into higher capital formation and growth. Despite the House majority's faith in Say's Law, capitalist economies don't work that way.

Appendix I: National Accounting and Size Distribution of Income

Based on the sources summarized in Table 3 below, the construction of a data set that integrates the size distribution into the NIPA took place in seven steps.

1. Annual data from the NIPA system were restated as social accounting matrixes (or SAMs). In principle it should be straightforward to restate national accounts in the form of a SAM, but this step is not normally taken by the Bureau of Economic Analysis.

2. The CBO definitions of income flows were adjusted for rough consistency with the definitions in NIPA (the major arbitrary assumption was to assign one-half each of "other income" flows to financial incomes and wages).

3. For each year in the sample, shares of total incomes (including transfers) and taxes for the seven household categories were calculated as ratios of flows at the group level to the corresponding totals in the CBO data set.

4. These income shares were then applied to each year's NIPA totals of wages, transfer, financial, and proprietors' incomes to estimate flow levels for the seven income groups. A NIPA-consistent distribution of total income across groups also came out of this calculation.

5. CBO-based shares were used to distribute total NIPA outlays for direct taxes, social insurance, and finance across all seven groups.

6. Shares of total consumption by quintile (adjusted to be consistent with NIPA definitions) from the BLS data were calculated, and then applied to NIPA total consumption. Saving flows by quintile could then be calculated as the differences between income levels and outlays for consumption, finance, and taxes.

7. Saving data by quintile were extrapolated to estimate levels for the 81-90%, 91-99%, and top 1% income groups. Consumption levels for these groups followed residually.

Table 3

	Abbreviation	Source	Web-Link
	CBO	Congressional Budget Office Report (2012 "The Distribution of Household Income and Federal Taxes, 2008 and 2009"	http://www.cbo.gov/publication/43373
	NIPA	US Bureau of Economic Analysis: NIPA Annual Tables (2009)	http://www.bea.gov/iTable/index_nipa.cfm
	BLS	US Bureau of Labor Statistics: BLS Consumer Expenditure Survey 2009 (by quintiles)	http://www.bls.gov/cex/csxstnd.htm#2009

Appendix II: Model Specification

We put together a simple comparative static simulation model to examine how distributive changes and the macroeconomy interact.

The basic set-up makes output a function of effective demand, with the price level determined by costs. We begin with on the side of costs, starting with labor. For the USA, one has to deal with the vagaries of labor taxation. The "basic" wage flow for household group i is $\widetilde{W}_i$, the sum of "wages and salaries" and "employer contributions to employee…funds" from the SAM. If Φ_i is the ratio of that group's "Employer contributions for government social insurance" to $\widetilde{W}_i$ then $W_i = (1 + \Phi_i)\widetilde{W}_i$ is total labor cost for group i.

The corresponding "wage" or labor payment (total payments received divided by number L_i of households in the group) is $w_i = W_i/L_i$ and $b_i = L_i/X$. All of this abstracts from household structure, participation rates, etc. but is a place to start. The groups are defined by the base year levels of income that define boundaries between boxes such as quintiles, deciles, etc. Tax/transfer policies would shift incomes up or down in the boxes, with repercussions on the level of economic activity. Individual households of course may move into or out of a box when their income levels change. Our simulations focus on changes of income levels within boxes, ignoring possible movements across boundaries.

In an alternative specification adopted when low income w_i change, we allow for "substitution" among different types of labor, so

$$b_i = \gamma_i[w_i/Z]^{-\sigma}$$

with Z set by a CES cost function

$$Z = [\textstyle\sum \gamma_i[w_i]^{1-\sigma}]^{1/(1-\sigma)}.$$

In most simulations we assume that the elasticity of substation is zero, $\sigma = 0$. In this case, total per unit labor cost faced by business becomes $Z = \sum w_i \, b_i$ with b_i constant.

With P is the price of output (not quite equal to the GDP deflator) the overall cost decomposition is

$$PX = \tau PX + eaP^*X + \Xi PX + ZX + \Pi PX$$

in which τ is the ratio of the sum of non-labor indirect taxes (minus subsidies), government CCA, and surplus of government enterprises to output. The exchange rate is e, a is the import/output ratio, and P^* is a price index for the rest of the world. The term ΞPX is the sum of household proprietors' income, rental income, and CCA. Indirect taxes, imports, and proprietors' incomes, etc. are assumed to be proportional to output. Total profits are ΠPX.

For the baseline scenarios (with zero elasticity of substitution), this formulation leads naturally to a mark-up equation for P, based on per unit costs of labor and imports

$$P = (Z + eaP^*)/[1 - \tau - \Xi - \Pi) \ .$$

If $\rho = eP^*/P$ is an index of the real exchange rate we add a constant elasticity function for price dependency of the import coefficient

$$a = \alpha \rho^{-\gamma}$$

with $\gamma > 0$ which can be solved jointly with the cost function to determine the price level in the economy (in the simulations discussed below, $\gamma = 0.75$). Econometric evidence of minimum wage increases on the aggregate price level suggests very small effects (as compared to price levels of goods of low-wage industries). To capture this low (minimum) wage elasticity of the GDP deflator, the mark-up is endogenized in some simulations by assuming $\Pi = Z_0 Z^{\psi_1}$ with $\psi_1 = -0.1$.

With prices specified, now look at income-expenditure accounts, omitting various small items that might be included on one side of the accounts as "other" net (positive or negative) income or expenditure O_i.

Begin with households. Total household income is

$$Y_H = \sum Y_i$$

with income for group i as

$$Y_i = w_i b_i X + \xi_i P X + P Q_i + U_i + O_i \, .$$

That is, besides "wages" $w_i b_i X$, household income includes proprietors' (plus rental and CCA) income $\xi_i P X$, the value of "real" government transfers $P Q_i$, financial receipts (interest and dividends) U_i, and other net receipts O_i (from the business and ROW sectors). The condition $\sum \xi_i = \Xi$ applies.

Uses of income for group i are

$$Y_i = P C_i + \Gamma_i \widetilde{W}_i + P T_i + R_i + S_i$$

with C_i as consumption, $\Gamma_i \widetilde{W}_i$ as the sum of "contributions" (for social insurance) and transfers to government , $P T_i$ as direct taxes (so that T_i is a "real" tax level), R_i as financial payments, and S_i as saving.

We note that transfers, financial receipts, direct taxes, and financial payments are all treated as lump-sum flows. This is the simplest way to build them in and allows us to emphasize the shifts in income distribution.

We need consumption functions for the C_i. The main argument is disposable income,

$$D_i = Y_i - \Gamma_i \widetilde{W}_i - P T_i - R_i$$

which will be affected by taxes and transfers along with wage levels.

Of course,

$$C = \sum C_i \quad .$$

We set up consumption functions in the form

$$PC_i = A_i + (1 - s_i)D_i$$

with the s_i as the group marginal saving rates. The A_i and s_i parameters were adjusted to "calibrate" consumption levels to those in the SAM. In the standard specification, marginal saving rates are set to equal average rates. For the bottom two quintiles, where consumption exceeds income, this implies negative autonomous consumption. In a second specification, a non-negativity constraint is imposed on these A_i.

Business derives income from profits and interest to give

$$Y_B = \Pi PX + U_B \quad .$$

Net operating surplus is

$$N_B = Y_B - P\Delta_B$$

with Δ_B as real capital consumption plus the statistical discrepancy. Spending is

$$Y_B = N_B + P\Delta_B = PT_B + R_B + S_B + O_B$$

with T_B as direct tax, R_B as financial payments, and O_B as omitted smaller payments. Saving S_B will be the balancing item.

We use an investment function linear in output, output growth, and net operating surplus.

$$I_B = \iota_1 X + \iota_2 N_B$$

with $\iota_1 = i_X + \iota_g g_X$ capturing the effects of the level and growth of output on business investment described in Fazzari et al. (2008).

Government's income is

$$Y_G = \tau PX + \sum \Gamma_i \widetilde{W}_i + P[\sum T_i + T_B] + U_G$$

with Δ_G including the CCA and profits of enterprises. Its uses of income are

$$Y_G = PG + \sum PQ_i + R_G + S_G + O_G$$

with R_G as interest payments and O_G omitted flows. Saving S_G or the fiscal surplus is the

balancing item.

Rest of world income is

$$Y_R = eaP^*X + U_R \ .$$

with the payment U_R coming from the financial sector. Its income uses are

$$Y_R = PE + R_R + S_R + O_R$$

with R_R as payments to the financial sector, O_R omitted flows, and S_R as "foreign saving" or the

current account deficit. Exports E are a constant elasticity function of unit labor cost Z

(following Storm and Naastepad, 2012, we set the elasticity to -0.12).

For the financial sector we have

$$\sum R_i + R_B + R_G + R_R = \sum U_i + U_G + U_R + S_F.$$

In equilibrium the sum of omitted flows has to add to zero,

$$\sum O_i + O_B + O_G + O_R + O_F = 0.$$

To solve the model we need the macro balance relationship

$$\sum C_i + (I_H + I_B + I_G) + G + E - X = 0$$

incorporating behavioral relationships for household consumption levels, business and household

investment, imports and exports.

It is simplest to treat G and I_G (but not government dis-saving S_G) as exogenous policy

variables. Multipliers with respect to G are output, 1.20; fiscal deficit, 0.90; trade deficit, 0.18.

All values are in the conventional range for simple demand-driven models.

Nominal GDP can be defined as

$$VQ = (P - eP^*a)X = (P - a)X$$

with V as the GDP deflator; X, P, and a as levels of output, price, and the import/output

coefficient in any simulation; and $e = P^* = 1$ initially. Real GDP is

$$Q = (1 - a)X$$

so the deflator becomes

$$V = (P - a)/(1 - a) \qquad .$$

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