

POLICYNOTE

THE VAST MAJORITY INCOME (VMI): A NEW MEASURE OF GLOBAL INEQUALITY

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MEASURES OF INCOME AND INEQUALITY ON A WORLD SCALE

GDP per capita is the most popular measure of international levels of development. It is fairly well understood and widely available across countries and time.¹ It is also recognized that GDP per capita is an imperfect proxy for important factors such as health, education, and well-being.² Therefore, an alternative approach has been to work directly with the variables of concern, as in the UNDP Human Development Index, which combines per capita income with life expectancy and schooling into a single composite index.³ The Human Development Index, however, is difficult to compile and is only available for recent years. Moreover, because it is an index, it cannot tell us about the absolute standard of living of the underlying population; it can only provide rankings of nations at any moment in time and changes in these rankings over time. In any case, it turns out that the rankings produced by per capita income and the Human Development Index are quite highly correlated.⁴

Given that GDP per capita also provides an absolute measure of income, it is understandable that it remains so popular.⁵ But both GDP per capita and the Human Development Index suffer from that fact that "they are averages that conceal wide disparities in the overall population."⁶ As a result, it becomes necessary to either supplement these measures with information on distributional inequality (such the Gini coefficient), or to directly adjust per capita income and other variables for distributional variations.

THE VAST MAJORITY INCOME: COMBINING INCOME AND INEQUALITY

GDP per capita has the great virtue of being an absolute measure of average national income; however, because the distribution of income and consumption can be highly skewed

within countries, we cannot use average income as representative of the income of the vast majority of the population. This is particularly true in the developing world, where a rise in per capita income can be attended by a worsening in the distribution of income, so that the standard of living of the vast majority of the population may actually decline even as per capita income rises.

Consider an example in which there are five people with incomes of \$5, \$10, \$15, \$20, and \$50, respectively. The per capita income of the vast majority (i.e. the first 80 percent of the population) is the average of the first four incomes, which is \$12.5 per person. By comparison, the overall average is \$20. Their ratio is 0.625 (= \$12.5/\$20), which tells us that in actual data per capita income would be a poor proxy for the vast majority income (VMI). Moreover, if their ratio varied over time, the trend of per capita income would also be an unreliable guide to the progress of the VMI.

What we need, therefore, is a direct measure of the standard of living of the vast majority. In the paper on which this policy note is based, we develop a new measure called the Vast Majority Income (VMI), which represents the average income of first 80 percent of the population. Data on the distribution of income allows us to directly calculate the ratio of the VMI to the average. Multiplying this ratio by a measure of average income per capita then gives us the level of the VMI.⁷

INTERNATIONAL VARIATIONS IN ABSOLUTE VAST MAJORITY INCOMES (VMI)

Figure 1 shows that national real VMIs in 2000 encompass a great range: in rounded figures, at one end of the scale are Luxemburg (\$30,000), Norway (\$22,000) and the U.S. (\$21,000), and at the other end are Ethiopia (\$500) and Cambodia (\$300). In this chart, the countries are ranked in terms of their real Net National Income per capita (NNIpc).⁸ Thus Luxemburg is first, the U.S. second, Norway third, and so on.

When we look at VMI rather than Net National Income per capita, the picture changes significantly. In Figure 2, one can see that Norway's VMI is larger than that of the U.S. Thus in terms of VMI, Norway moves up to second place, while the U.S. falls to third place. This is because income inequality is considerably higher in the U.S. than it is in Norway. Chile provides an even more striking example of the negative effects of inequality: in terms of the conventional measure of Net National Income per capita, Chile is similar to Hungary; but in terms of the VMI, it is similar to Venezuela.

Figure 1: Real VMI Per Capita Across Countries, 2000
(Incomes converted to US-\$ using PPP-exchange rates)

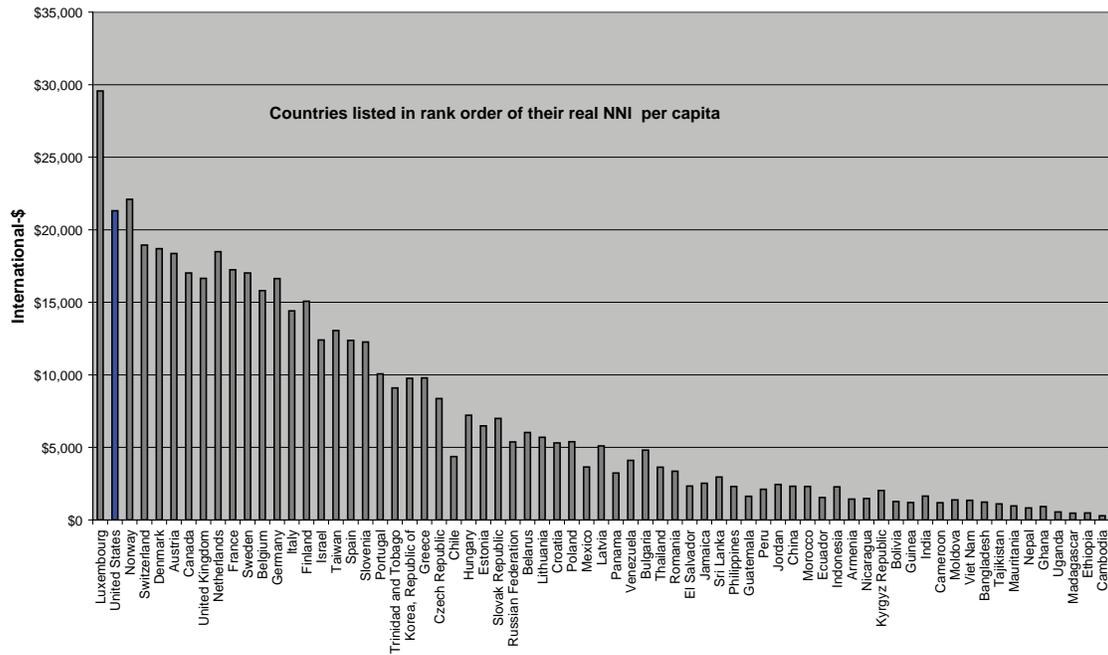


Figure 2: Change in rank from using VMI in place of NNI

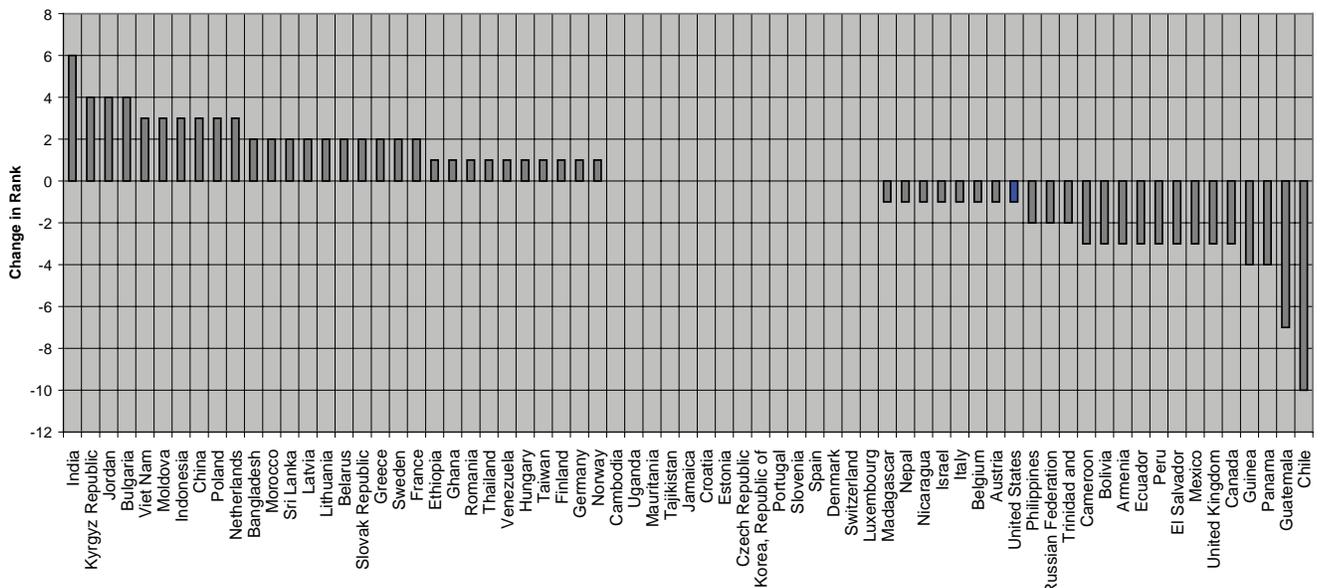


Table 1 shows the VMI, Net National Income per capita, and a measure of the relative per capita income of the top 20 percent of the population, which we call the Affluent Minority Income (AMI). It also displays national rankings by Net National Income per capita and VMI, and the difference between these two rankings (NNIpc rank – VMI rank), shown in the last column. Countries are listed in

order of this ranking difference. India appears at the top of this list because it moves up six places; Jordan and Bulgaria each move up four places; and Vietnam, the Netherlands, and China each move up three places. At the other end, Mexico, the UK, and Canada each fall three places,⁹ Panama falls four places, Guatemala seven places, and Chile appears at the bottom of the list because it falls 10 places.

Table 1: Per Capita VMI and NNlpc, and Country Rankings by Each Measure							
Country	Real Per Capita (International-\$)				Rank		Rank Difference
	Gini	NNI	VMI	AMI	NNI	VMI	
India	36.00	\$2,371	\$1,651	\$5,247	57	51	6
Kyrgyz Republic	37.00	\$2,886	\$2,039	\$6,275	54	50	4
Jordan	36.30	\$3,526	\$2,449	\$7,833	47	43	4
Bulgaria	30.70	\$6,282	\$4,809	\$12,175	38	34	4
Viet Nam	37.30	\$1,993	\$1,359	\$4,531	60	57	3
Moldova	39.55	\$2,021	\$1,379	\$4,590	59	56	3
Indonesia	36.50	\$3,308	\$2,277	\$7,434	51	48	3
China	40.30	\$3,478	\$2,320	\$8,111	48	45	3
Poland	32.45	\$7,228	\$5,390	\$14,579	33	30	3
Netherlands	25.50	\$22,404	\$18,483	\$38,087	9	6	3
Bangladesh	35.85	\$1,768	\$1,227	\$3,930	61	59	2
Morocco	39.20	\$3,436	\$2,306	\$7,954	49	47	2
Sri Lanka	27.60	\$3,767	\$2,965	\$6,971	43	41	2
Latvia	34.30	\$7,034	\$5,100	\$14,772	35	33	2
Lithuania	33.00	\$7,742	\$5,702	\$15,904	31	29	2
Belarus	30.75	\$7,979	\$6,035	\$15,755	30	28	2
Slovak Republic	26.15	\$8,651	\$6,999	\$15,262	28	26	2
Greece	32.30	\$12,847	\$9,796	\$25,052	23	21	2
Sweden	28.20	\$21,892	\$17,023	\$41,369	11	9	2
France	28.20	\$22,248	\$17,242	\$42,271	10	8	2
Ethiopia	36.15	\$697	\$484	\$1,546	68	67	1
Ghana	33.90	\$1,290	\$932	\$2,723	65	64	1
Romania	29.85	\$4,374	\$3,358	\$8,437	40	39	1
Thailand	44.60	\$5,893	\$3,630	\$14,944	39	38	1
Venezuela	45.80	\$6,666	\$4,113	\$16,878	37	36	1
Hungary	30.30	\$9,464	\$7,216	\$18,455	26	25	1
Taiwan	31.55	\$17,463	\$13,059	\$35,083	17	16	1
Finland	25.98	\$18,754	\$15,069	\$33,490	15	14	1
Germany	27.60	\$21,078	\$16,641	\$38,825	13	12	1
Norway	27.40	\$28,153	\$22,092	\$52,394	3	2	1
Cambodia	44.50	\$494	\$295	\$1,288	69	69	0
Uganda	46.90	\$963	\$559	\$2,580	66	66	0
Mauritania	38.90	\$1,432	\$974	\$3,263	63	63	0
Tajikistan	33.30	\$1,511	\$1,104	\$3,142	62	62	0
Jamaica	43.30	\$4,013	\$2,528	\$9,953	42	42	0
Croatia	33.95	\$7,278	\$5,310	\$15,154	32	32	0
Estonia	36.50	\$9,227	\$6,489	\$20,178	27	27	0
Czech Republic	25.90	\$10,487	\$8,370	\$18,956	24	24	0
Korea, Republic of	36.90	\$13,371	\$9,765	\$27,792	22	22	0
Portugal	34.70	\$13,894	\$10,073	\$29,178	20	20	0
Slovenia	25.15	\$15,079	\$12,267	\$26,329	19	19	0
Spain	32.48	\$16,694	\$12,370	\$33,989	18	18	0
Denmark	24.85	\$22,900	\$18,702	\$39,693	5	5	0
Switzerland	35.90	\$26,246	\$18,949	\$55,431	4	4	0
Luxembourg	28.25	\$37,736	\$29,560	\$70,438	1	1	0
Madagascar	48.50	\$814	\$464	\$2,214	67	68	-1
Nepal	42.55	\$1,337	\$832	\$3,357	64	65	-1
Nicaragua	55.50	\$2,913	\$1,478	\$8,651	53	54	-1
Israel	38.05	\$17,779	\$12,405	\$39,277	16	17	-1
Italy	33.80	\$19,366	\$14,407	\$39,203	14	15	-1
Belgium	31.33	\$21,381	\$15,804	\$43,689	12	13	-1
Austria	26.45	\$22,733	\$18,362	\$40,217	6	7	-1
United States	39.75	\$31,283	\$21,309	\$71,178	2	3	-1
Philippines	44.15	\$3,752	\$2,316	\$9,496	44	46	-2
Russian Federation	42.50	\$8,265	\$5,374	\$19,825	29	31	-2
Trinidad and Tobago	40.20	\$13,445	\$9,094	\$30,850	21	23	-2
Cameroon	50.80	\$2,145	\$1,193	\$5,952	58	61	-3
Bolivia	58.05	\$2,642	\$1,273	\$8,118	55	58	-3
Armenia	56.05	\$2,923	\$1,443	\$8,844	52	55	-3
Ecuador	58.80	\$3,310	\$1,548	\$10,354	50	53	-3
Peru	46.50	\$3,553	\$2,115	\$9,307	46	49	-3
El Salvador	53.45	\$4,372	\$2,333	\$12,526	41	44	-3
Mexico	54.20	\$7,115	\$3,653	\$20,962	34	37	-3
United Kingdom	33.05	\$22,454	\$16,645	\$45,689	8	11	-3
Canada	32.40	\$22,655	\$17,021	\$45,192	7	10	-3
Guinea	55.10	\$2,384	\$1,200	\$7,122	56	60	-4
Panama	57.80	\$6,728	\$3,236	\$20,696	36	40	-4
Guatemala	59.80	\$3,614	\$1,631	\$11,547	45	52	-7
Chile	58.20	\$9,512	\$4,371	\$30,077	25	35	-10

POLICY IMPLICATIONS

Income levels and income inequality tend to be treated separately, the former through average per capita income measures such as GDP per capita, and the latter through inequality measures such as the Gini coefficient. Our research demonstrates that the per capita income of any fraction of the population combines these two aspects in an intuitively useful manner. Of particular interest is the real per capita income of the vast majority (the first 80 percent) of any nation. The size and temporal evolution of this measure, which we call the Vast Majority Income (VMI), has obvious significance in modern democracies.

The ratio of VMI to per capita income varies considerably across countries, which means that average income measures are not good proxies for vast majority incomes. Indeed, ranking nations by the latter rather than the former can give rise to substantial differences in ranking. For instance, while Norway's real Net National Income per capita in 2000 is 10 percent lower than that of the U.S., the real per capita disposable income of Norway's vast majority is four percent higher. An even greater contrast exists between Mexico and Venezuela: Venezuela's real per capita income is six percent lower than that of Mexico, but its VMI is 13 percent higher. Our data also allows us to measure the per capita incomes of the top quintiles, which we call the Affluent Minority Income (AMI). One interesting finding is that the incomes of rich are more equal across nations than are the incomes of the vast majorities.

A particularly striking finding is that in every nation the VMI is about 1.1 times the nation's per capita income multiplied by $(1-Gini)$. This empirical rule holds equally well for Denmark and Guatemala, as well as for all the other 66 countries in our sample. We show that a similar empirical rule holds for any given fraction of the population, the only difference being that a different constant is involved: thus the per capita income of the first 70 percent of the population in any given country is equal to the country's inequality-discounted real GDP per capita. We not only demonstrate this empirically, but also derive it theoretically from an "econophysics" approach to income distribution.

These results give rise to two broad policy conclusions and a question for further research. First, it is important to conduct international comparisons in terms of the VMI or some similar measure such as the inequality-discounted real GDP per capita, because such measures usefully combine the level of income and the degree of inequality. Second, since the gross per capita income of any fraction of the population (except the very rich) depends directly on the product of per capita income and $(1-Gini)$, both growth and greater equality contribute equally to improving standard of livings. Taxation and subsidies are additional means of adjusting the income distribution. This immediately gives rise to a perennial question: what is the relationship between economic growth and changes in inequality? Our measures and our theoretical results provide us with the means for taking a fresh look at this important debate.

International comparisons tend to focus on either per capita income or the incomes of the very poor (e.g. those living on less than \$2 per day). The VMI adds a new dimension, because it combines information on income levels and their distribution into a single measure of per capita income of the vast majority of the population. We believe

that this broadens the discussion of international inequality, and will ultimately shed new light on several important issues in the development literature such as the relationships between inequality and development; trade liberalization; gender; and political instability.

NOTES

1. Frumkin, Norman. (2000). *Guide to Economic Indicators*. Armonk, New York: M.E. Sharpe.
2. Cowen, Tyler. (2007). "Incomes and Inequality: What the Numbers Don't Tell Us," *The New York Times*. New York.
3. UNDP. (1990). "Human Development Report 1990," New York: United Nations Development Programme.
4. Kelley, Allen C. (1991). "The Human Development Index: Handle with Care." *Population and Development Review*, 17(2), pp. 315-324.
5. *Ibid.*
6. *Ibid.*
7. Our distribution data is derived from the World Income Inequality Database published by the United Nations University and the World Institute for Development Economics Research. The data is quite mixed, and has uneven temporal coverage for earlier years and for most non-OECD countries. In the paper we use the largest consistent data subset we were able to construct (643 observations), which is for the distribution of Personal Disposable (PD) income.
8. We use Net National Income per capita (NNIpc) rather than GDPpc as the appropriate measure of average national income per capita. NNI is more appropriate because it includes the factor income accruing from the rest of the world but excludes depreciation (which should not enter into personal income). Further details are in our paper.
9. For instance, Canada is ranked 7th in the world in terms of NNIpc, but 10th in the world in terms of VMI. Thus it falls 3 places when we go from the former measure to the latter.