



Human Development
Research Paper
2010/36
**The Declining Labor
Share of Income**

Francisco Rodriguez
and Arjun Jayadev





United Nations Development Programme
Human Development Reports
Research Paper
November 2010

Human Development
Research Paper
2010/36
**The Declining Labor
Share of Income**

Francisco Rodriguez
and Arjun Jayadev



The Declining Labor Share of Income

*Francisco Rodriguez
and Arjun Jayadev¹*

Francisco Rodriguez is Head of the Research Team of the Human Development Report Office of the United Nations Development Programme. E-mail: francisco.rodriguez@undp.org.

Arjun Jayadev is Assistant Professor at the University of Massachusetts Boston. E-mail: arjun.jayadev@umb.edu.

Comments should be addressed by email to the author(s).

¹ The authors would like to thank, without implicating, Zachary Gidwitz, Mark Purser and Martin Heger for research assistance, Arindrajit Dube, Ethan Kaplan, Jeni Klugman, Sanjay Reddy and participants at Workshop on Inequality at the Human Development Report Office for comments and suggestions.

Abstract

We use two distinct panel datasets to extract and examine data on the labor share of output. From the first, we examine trends in the economy-wide labor share and from the second, we examine trends in the labor share of the manufacturing sector over the last three decades. Both datasets show that labor shares have decreased, starting from about 1980, in most regions of the world. This finding is robust to adjustments for self-employment as well as adjustments for unbalanced panel structure. Furthermore, we present evidence that as a first approximation, this decrease is driven by declines in intra sector labor shares as opposed to movements in activity towards sectors with lower labor shares.

Keywords: Factor Shares, Human Development, Human Development Index, Labor Shares, Self-Employment

JEL classification: E25, J64, O15, O47

The Human Development Research Paper (HDRP) Series is a medium for sharing recent research commissioned to inform the global Human Development Report, which is published annually, and further research in the field of human development. The HDRP Series is a quick-disseminating, informal publication whose titles could subsequently be revised for publication as articles in professional journals or chapters in books. The authors include leading academics and practitioners from around the world, as well as UNDP researchers. The findings, interpretations and conclusions are strictly those of the authors and do not necessarily represent the views of UNDP or United Nations Member States. Moreover, the data may not be consistent with that presented in Human Development Reports.

Section 1: Introduction

In recent years, there has been growing interest in understanding not only aggregate trends in incomes but also how societal income and output is distributed. Most efforts in this regard focus on examining interpersonal inequality among individuals or households, and this has been the subject of a great deal of recent work (see Milanovic 2002, 2005a for a particularly extensive study).¹ Another (far less adopted) approach is to examine the functional distribution of income or the distribution of output between the labor share of income and the capital share of income. The lesser attention devoted to this phenomenon is somewhat surprising, given that there are several reasons why an empirical examination of the functional distribution of income between capital and labor is merited and indeed critical to understanding the dynamics of the economy. First, as with examinations of interpersonal inequality, we may care normatively about how different types of economic activity are rewarded. Looking at factor shares involves comparing returns to the activity of labor (an important and primary source of income for the vast majority of the population) versus returns to ownership (a more important source of income for the wealthy). This categorization provides another perspective on the ways in which the benefits of economic growth and the losses from stagnation are distributed. Second, many standard macroeconomic models economic theories have implicit or explicit predictions about the factor share of income. Most famously, the Cobb-Douglas production function implies constant factor shares under competitive factor markets and the historically stable factor shares in the US and UK have led economists to consider the Cobb-Douglas production function as being a useful approximation to the aggregate

¹ Appendix 1 provides an overview of the findings of this literature.

production function. Relatedly, factor shares of income are critical variables in the measurement of the productivity of economies as seen in growth accounting exercises (see Caselli 2005 for an extensive discussion). Knowing whether labor shares are stable or declining is therefore critical to determine the plausibility of the theories that we use to measure and understand macroeconomic dynamics. Third, examining the functional distribution of income as a way to assess distributional concerns also has distinct empirical advantages. In contrast to the case of data derived from household surveys, data on the functional distribution of income is available with higher frequency (typically annually) for many countries. Given that consumption and income surveys often systematically omit sources of income for the very wealthy, the functional distribution of income provides a usefully corrective to this bias. Examining how income has been shared between capital and labor can therefore help to provide a more comprehensive picture of the evolution of income inequality over time. Finally, by assessing changes in the capital and labor shares, a researcher can begin to understand some of the structural and political economy factors that contribute to changes in interpersonal inequality.

It should also be noted that the functional distribution of income has been a subject of interest in economics—particularly classical economics—for a considerable period of time. A long line of distinguished economists, beginning with Adam Smith ,1776 and continuing through David Ricardo, 1817, Karl Marx, 1861, John Maynard Keynes, 1939, Simon Kuznets 1933, 1959,1966, D. Gale Johnson, 1954, Robert Solow, 1957, 1958, Nicholas Kaldor, 1961, Irving Kravis 1962, 1966 and through to more recent times has noted that the income of the country can be divided into return to activities and has

analyzed the functional distribution to provide insights into the nature of production and distribution of output in the country. The focus of Marxian and post-Marxian economics on the distribution of income between capital and labor is of course well-known, for example in Kalecki, (1948). In more recent times, there has been renewed interest in the subject, especially with regard to correctly assessing the labor or capital share of income from available data (Gollin, 2002, Bentolila and St Paul 2003, Bernanke and Gurkanayak, 2000, Ortega and Rodriguez, 2006) and to examining the impact of globalization on the functional distribution (Harrison 2004, Ortega and Rodriguez 1999, Jayadev 2007, Guscina 2007).

Our purpose in this paper is in line with the latter strand of research and seeks to present new evidence on a stylized feature of the labor share of income over the last three decades across the world. We find that this has been subject to a consistent decline over the last two decades, contrary to the (earlier) received wisdom of a constant labor share across most regions in the world. The evidence comes from two datasets: the United Nations Industrial Development Organization (UNIDO) database of industrial surveys designed to measure economic activity in the corporate manufacturing sector and the United Nations (UN) national accounts surveys which provide data on the labor share both of the economy as a whole and of its constituent sectors. We show that a statistically significant negative time trend in the labor share is present in both data sets. This decline is not limited to any particular set of countries and appears to be a general phenomenon. We show further that as a first approximation, there is a decline in labor shares within sectors and that the decline in the overall labor share has not occurred simply due to shifts

of production to sectors that have lower average labor shares. Having established this persistent decline in the labor share, we speculate as to some of the potential causes of this shift.

This paper is divided into three sections to follow. In the first we discuss the labor share of income and the data that we use to examine trends in labor share. In the second we examine trends in the labor share. In the final section we provide some reflections by way of conclusion.

Section 2: The Functional Distribution of Income: Data and Trends

We turn now to a consideration of the global trends in the functional distribution of income. Any empirical exercise that examines the labor share needs to obtain a measure of the overall wage bill and the total value added in any period. In order to assess the trends in the labor share of income here, we obtain data from two different sources that provide information about the functional distribution of income at different levels of aggregation—first at the economy wide level and second for the manufacturing sector. To the best of our knowledge, this is the only study that uses both of these data sources, which are by far the most comprehensive in terms of geographical and time coverage. Other work (for e.g. Guscina 2007) has tended to focus on the OECD or limited itself to an examination of only one dataset without cross-checking with any other source (e.g. Harrison 2004).

A. The UN National Accounts Data

The United Nations collects a regularly published and consistent time series on cost components of gross domestic product based on the system of national accounts 1968 and, more recently, on the revision to the system of national accounts in 1993.² These series are estimated on the basis of surveys of enterprises or establishments and government accounts. Labor shares in this dataset can be derived as the ratio of compensation of employees to gross value added. We are able, using this definition, to obtain a dataset of over 2000 country year observations for 129 countries from 1950-2005 of the main aggregates and detailed statistics of national accounts. Additionally, the System of National Accounts collects the same data for eleven subsectors of the economy (agriculture, mining, manufacturing, electricity, construction, trade, transportation, FIRE (Fire, Insurance, Real Estate and other Services), education, public and private unincorporated). This allows us to examine the trends in labor shares within sectors as well.

B. The UNIDO database

Since 1977, UNIDO has collected yearly country-level data on industrial aggregates by industry for 181 countries.. The data is collected through annual

² It is important to note a few issues with the data. While, in theory, the informal sector is to be included in the data, in practice, by their very nature, enterprises from this sector may not be. Gollin (2002), Bernanke and Gurunayak (2002) and Krueger (1999) flag another connected problem. They note that the earnings of self-employed persons are not included in the series and, as such, their earnings are falsely considered as accruing to capital.

questionnaires that are sent to the statistical offices of countries with an industrial level survey or census. The data is then checked for consistency and errors by UNIDO and supplemented with national and international statistical sources as well as data collected by statisticians engaged by UNIDO to work in specific countries.

The UNIDO database includes measures of aggregate value added and wages and salaries for 136 countries, thus allowing us to form estimates of labor shares, defined as the ratio of wages and salaries to value added.³

Appendix 2 provides a more complete description of the variables used and their construction.

C. Trends

Figures 1a and 1b depict the time trend in the labor share of income for the economy as a whole using SNA 1993 and the UNIDO data at the 3 digit level. The figures depict the coefficient from a regression of the labor share on a time dummy for each panel dataset. The upper and lower lines in each graph show the 95 % confidence intervals for the coefficients. What is evident from both figures is a relatively constant or even slightly increasing labor share until around 1980 followed by a consistent and long term decline since then.

³ For more details about this dataset and its appropriateness for examining cross national differences in factor shares, see Ortega and Rodriguez, 2006.

Table (1) provides a more rigorous confirmation of what is visible in the figures. It shows the coefficient for a regression of the labor share on the overall time trend for the UN SNA 1993 data set and the UNIDO dataset as well. There is a statistically significant negative coefficient on the time trend for both datasets, and this is driven by the decline in labor shares in the period following 1980 for which the coefficient is larger, negative, and statistically significant. We use 1980 as a very rough breakpoint (as the 1970s peak is evident in the graphs). The choice is not, however, entirely arbitrary, since this breakpoint arguably marked the beginning of many important changes in the degree of state intervention, monetary, and fiscal policy stance, etc. in many Western economies, and these institutional changes can be expected to have an effect on labor shares.

One may be concerned about two additional issues with respect to the UN dataset. First, as Gollin (2001) has argued, national accounts inappropriately consider the operating surplus of unincorporated enterprise as accruing to capital share as opposed to labor share. In order to correct for this we add the operating surplus from the private unincorporated sector in the SNA data to the overall labor share (where available) and examine the trend.⁴ As is evident, there is still a strong negative trend in labor shares once this adjustment is undertaken.

A second concern is about the fact that the panel is unbalanced. It may be that the negative trend can be attributed to countries with lower labor shares enter the dataset later, rather than to a decrease in the labor share within countries. We correct for this by adopting a method suggested by Wooldridge (2007). The adjustment utilizes probability weights to reweight the selected sample so as to correct for attrition bias. In order to

⁴ This adjustment assumes that the entire operating surplus in unincorporated enterprises is wage income. The correlation is still present when one uses other adjustments as well.

generate the probability weights, we create a dummy for when labor shares are missing and regress this dummy on a trend variable using a probit estimation. We use this method to predict the probability that a country is selected in any given year. We then create an inverse probability weight (the idea is that countries more likely to be selected in earlier years are weighted less in those years and those which are more likely to be selected in later years are weighted less in those years) and run the trend regression using these weights. As is evident, the story does not change.⁵

Tables 2 and 3 show this decline in the labor share by region and period dummies for the UN SNA 1993 dataset and the UNIDO dataset respectively. Table 2 shows that with the exception of East Asia, every region of the world for which there is adequate data has experienced a decline in the labor share of income. For the most part, declines are concentrated in the latter periods. A similar pattern is evident in the UNIDO dataset too. Table 3 shows that the decline in the labor share of income appears to be a secular phenomenon, with only one region—this time Central Asia, showing an increasing trend.

Tables 4 and 5 then repeat this exercise, dividing the data into quartiles of per capita income for each dataset. The purpose here is to examine whether there is a systematic relationship between levels of development and labor shares over time and if the declines in labor share have occurred at higher or lower levels of average income. One may expect

⁵ A simpler but slightly more arbitrary technique is to restrict the panel to a period in which most of the countries have entered the dataset. As it turns out, if we restrict our panel to years after 1990, we have a far more balanced panel (90% of all countries have entered and have data for more or less every year). The trend regression in this sub-sample also shows a strong negative trend (results available on request).

to see higher labor shares in richer countries for several reasons. Kravis (1962) and Kuznets (1966) emphasize the process of development and structural change as the major reason behind the increase in wage income to GDP ratios. Among the important structural shifts that occur with increased income are a movement of labor away from agriculture into a position of organized wage labor, demographic changes and urbanization (which increase the average age of retirement and women's participation in the paid labor force). Ortega and Rodriguez (2006) finds that manufacturing labor shares increase with the level of income of a country, and Jayadev (2007) finds that labor shares economy-wide do so as well.

While there is a discernible negative time trend, there is no pattern evident across groupings in both datasets. As table 4 shows the poorest quintile of income has experienced sharper declines than the next three, though all quartiles have experienced declines in the labor share. Such a pattern is evident in the UNIDO dataset as well, since all quintiles have seen sharp declines (table 5).

Tables 6 and 7 repeat the exercise with Human Development Index (HDI) quintiles instead of per capita income levels or regional designations. Just like with the other regressions in our analysis, it is clear that for all quintiles that there is a negative relationship, though this relationship is not always statistically significant. The decline in labor shares is a secular phenomenon in this decomposition as well.

To this point we have only dealt with the aggregate manufacturing and economy wide labor shares. Each of these, in turn, is can be seen as comprising the sum of the weighted labor shares of all sub-sectors.. Given this, it is possible that the decline in labor shares observed in the aggregate data is not due to lower labor shares within each sub-sector but rather the consequence of structural change in which there is more economic activity and greater employment in sectors that have lower labor shares because of technological or other reasons. In order to examine the relative contribution of each effect, a further assessment is needed.

There are at least two ways to assess the contribution of structural change (resource reallocation within different sectors in manufacturing or sectors contributing to overall GDP) to the growth or decline of the aggregate labor share. One common approach is to carry out a shift-share decomposition.⁶ However, given the fact that the data are uneven and that observations are missing for countries and sectors in the earlier years in particular, interpretation of the result of such an exercise is difficult. Instead we adopt a very simple regression based test as a benchmark to compare the contribution of labor share declines or increases that are due to changes intra-sector (i.e. growth or decline in aggregate labor shares that occurred within all branches of manufacturing or the economy) relative to what may be termed a static shift (i.e. growth or decline in labor shares due to movements of economic activity into sectors that have higher or lower labor

⁶ The interested reader can see Syrquin (1984) or Timmer and Szirmai (2000) for a detailed exposition of methodology. Those papers deal with a shift share analysis of labor productivity changes, but the analysis can be carried over directly into an analysis of the labor share by simply changing labels.

shares). We limit our attention to the latter half of the dataset because it is in this period when the most extensive changes in the labor share have occurred.

The regression involves estimating two equations for each dataset where the data is in a panel form of country ($i=1\dots n$), sector ($j=1\dots n$) and year ($T=1\dots t$). We keep only two years for comparison of the effect ($T=1,2$). We then run the two following regressions weighting each sector j by its weight of its wage bill in the overall wage bill for each country-year.⁷

$$LS_{ij} = \beta_{0ij} + \beta_i T_{ij} + \varepsilon \quad (1a)$$

$$LS_{ij} = \beta_{0ij} + \beta_i T_{ij} + c_j + \varepsilon \quad (1b)$$

The coefficient β_i in (1a) gives the average overall change in labor shares between the first and second periods. The coefficient β_i in (1b) by contrast gives the average overall change in labor shares between the two periods that is due to changes purely within sectors (intra sector change), since we are absorbing the sector dummies and sweeping out cross-sector variation). The difference between the two coefficients is a combination of the static shift and what may be termed a dynamic shift (a combination between intra and intra sector shifts).

Table 8 shows the coefficient on β_i for each regression using the UN and UNIDO datasets. In between 1980 and 2000, within sector declines accounted for 80% (-0.056/-

⁷ We chose the wage bill as the weighting variable rather than value added to avoid negative weights that occur when value added is negative for some sectors.

0.070) of the overall average decline in labor shares in the UN dataset. The within sector effect drove about 51% $(-0.024/-0.047)$ of the effect between 1980 and 1990 and more than 100 percent $(-0.028/-0.023)$ in between 1990 and 2000, suggesting that there was a movement of weights towards sectors with higher labor shares in this period so that the between sector or static shift effect was positive. In the UNIDO dataset, within sector declines accounted for more than 100 percent of the overall decline throughout this period.⁸ This finding suggests something quite strong. To a first approximation, labor shares, when they are falling, are falling across most or all sectors.

Section 3: Some notes by way of conclusion

Classical economics has long placed substantial interest in the functional distribution of income. In the last few decades, however, the neoclassical approach has eschewed this approach and focused instead almost exclusively on the study of the personal distribution of income. Studies of factor shares serve as a useful complement to evidence on the personal distribution of income for at least two reasons. First, income and expenditure surveys may not do a good job of capturing income in the upper tail of the distribution and thus underestimate true inequality. Second, understanding what drives changes in factor shares sheds light on the channels through which the personal distribution of

⁸ Another point of evidence for the dominance of within sector effects is given by an examination of the trends for each subsector. In the UN dataset 7 out of 11 subsectors show statistically significant time trends for labor share in the period, and 2 out of 11 subsectors show statistically significant positive time trends. In the UNIDO dataset 7 out of 29 subsectors show statistically significant negative time trends for labor share in the period, and only 1 out of 29 subsectors show statistically significant positive time trends.

income is determined. The recent growth in the availability of cross-national data on factor shares provides us with new opportunities to study these patterns.

This paper has examined trends in the labor share in the economy as a whole and in the manufacturing sector using two large cross national datasets with extensive coverage. In doing so, it has documented a very persistent decline in the labor share across countries in both datasets. This decline appears to be a secular phenomenon. An examination of the trend in labor share by region, income levels, and HDI levels suggest that the decline in the labor share has been observed across the board. Using a simple regression based test, we find strong evidence that the declines are primarily driven by decreases in intra-sector labor shares.

Recent attempts at linking inequality and growth have ignored factor shares. However, the functional distribution of income is likely to be important if interest groups organize along class lines and if changes in institutions and in policies affect these relationships. The labor share is an indicator of the returns to the majority of the population, and our results suggest a significant decline in the power of one group (owners of labor) relative to another (owners of capital). Finally, labor shares have implications for our understanding of such variables as Total Factor Productivity and the findings of changing labor shares through time clearly imply the need to revise existing work that assumes constant factor shares. Further research will hopefully clarify the importance of these altered relationships for growth and human development. In addition, several interesting hypotheses (e.g. globalization, changes in political power) have been suggested as to the causal factors for these changes (Ortega and Rodriguez, 2000,

Jayadev 2007, Guscina 2007). A natural way for future work to proceed would be to seek to assess the relative importance of these explanations.

Bibliography

Anand, Sudhir, and Paul Segal. 2008. "What Do We Know about Global Income Inequality?" *Journal of Economic Literature*, 46(1): 57–94. DOI:10.1257/jel.46.1.57 .

Bhalla, Surjit (2002), *Imagine There is No Country*, Washington, D.C: Institute for International Economics.

Bentolilla, Samuel and Gilles Saint-Paul (2003) Explaining Movements in the Labor Share.” *Contributions to Macroeconomics*, 3(1): Article 9.

Bernanke, B. S. and Gürkaynak, R. S. (2002), “Is Growth Exogenous? Taking Mankiw, Romer, and Weil Seriously”, in B. S. Bernanke and K. Rogoff (eds.) *NBER Macroeconomics Annual 2001* (Cambridge, MA: MIT Press), 11-57.

Bigsten, A, and A. Shimeles (2003) *Prospect for pro-poor growth strategies in Africa*, WIDER Research Paper 42/2004, Helsinki: WIDER.

Lopez-Calva, L and N Lustig (2009) “The recent decline of inequality in Latin America: Argentina, Brazil, Mexico and Peru” mimeo. Available at <http://www.ecineq.org/milano/WP/ECINEQ2009-140.pdf>

Chotikapanich, D., Valenzuela, R. and Rao, D.S.P. 1997. “Global and regional inequality in the distribution of income: estimation with limited and incomplete data.” *Empirical Economics*, vol. 22, pp. 533-546.

Economic Commission for Africa (2004) *The challenges and prospects of achieving MDGs in Africa*, mimeo, ESPD.

Gollin, D. 2002. Getting income shares right, *Journal of Political Economy*, Vol., 110, no.2 458–74

Glyn Andrew 2006 *Capitalism Unleashed* Oxford University Press, UK (2006) 234 p

Guscina A , 2007. “The effect of globalization on the labor share of income” IMF working paper available at: <http://www.imf.org/external/pubs/ft/wp/2006/wp06294.pdf>

Harrison, A. E. 2004. ‘Has Globalization Eroded Labour’s Share’ mimeo, University of California Berkeley

Jayadev, Arjun 2007 Capital Account openness and the Labor Share of Income *Cambridge Journal of Economics* 2007 31(3):423-443; doi:10.1093/cje/bel037

Johnson, D.G. 1954. The functional distribution of income in the United States,

1850–1952. *Review of Economics and Statistics* 36, 175–82.

Kaldor, N. 1961. Capital accumulation and economic growth. In *The Theory of Capital*, ed. F. Lutz. London: Macmillan, 1961.

Keynes, J.M. 1939. Relative movements of real wages and output. *Economic Journal* 49(193), 34–51.

Kravis, I. B. 1962. *The Structure of Income: Some Quantitative Essays*, Philadelphia, PA, University of Philadelphia Press

Kravis, I. B., 1968. Income distribution. I Functional share, pp. 132–45 in Sill, D. L. (ed.), *International Encyclopaedia of Social Sciences*, Vol. 7, New York, Macmillan Free Press

Krueger, A. B. 1999. ‘Measuring Labour’s Share’, NBER Working Paper, no. 7006

Kuznets, S. 1933. National income. In *Encyclopedia of the Social Sciences*, vol. 11. New York: Macmillan. Repr. in *Readings in the Theory of Income Distribution*, selected by a committee of the American Economic Association. Philadelphia: Blakiston, 1946.

Kuznets, S. 1959. Quantitative aspects of the economic growth of nations IV: distribution of national income by factor shares. *Economic Development and Cultural Change* 7(3,Part II), 1–100.

Kuznets, S. 1966. *Modern Economic Growth. Rate, Structure, and Spread* New Haven, CT Yale University Press

Milanovic, Branko (2002), “True world income distribution, 1988 and 1993: First calculations based on household surveys alone”, *Economic Journal*, vol. 112, No. 476, January, pp. 51-92.

Milanovic, Branko (2003), “The Ricardian vice: Why Sala-i-Martin’s calculations of world income inequality are wrong”, mimeo. Available on www.ssrn.com.

Milanovic, Branko (2005), *Worlds Apart: Global and International Inequality 1950-2000*, Princeton University Press.

Milanovic, Branko (2005b) *Global Income Inequality: What It Is And Why It Matters* Mimeo

OECD (2008) *Growing Unequal? Income Distribution and Poverty in OECD Countries*. OECD

Ortega, D. and Rodriguez, F. 1999. ‘Openness and Factor Shares’ mimeo

Ortega, D. and Rodriguez, F. 2006 'Are capital shares higher in poor countries? Evidence from Industrial Surveys'

Quah, Danny (1999), "6 x 10⁹: Some dynamics of global inequality and growth", typescript, December 1999, available from <http://econ.lse.ac.uk/staff/dquah/p/9912sbn.pdf>

Ricardo David, 1817 Principles of Political Economy and Taxation

Sala I Martin, X. (2006) "The World Distribution of Income: Falling Poverty and... Convergence, Period", *Quarterly Journal of Economics*, Vol. 121, No. 2: 351-397, May 2006

Schultz, T. P. (1998). "Inequality in the distribution of personal income in the world: how it is changing and why." *Journal of Population Economics*, vol. 11, No. 3, pp. 307-344.

Smith, A. 1776. *The Wealth of Nations: Books I– III*. Harmondsworth: Penguin Books, 1986.

Solow, R.M. 1957. Technical change and the aggregate production function. *Review of Economics and Statistics* 39, 312–20.

Solow, R.M. 1958. A skeptical note on the constancy of relative shares. *American Economic Review* 48, 618–

Sudjana, Brasukra and Mishra, Satish. 2004. *Growth and Inequality in Indonesia Today: Implications for Future Development Policy*. Jakarta. UNSFIR Discussion Paper Series No. 04/05.

Syrquin, M., 1988. *Patterns of structural change*. In: Chenery, H.B., Srinivasan, T.N. (Eds.), *Handbook of Development Economics*. North-Holland, Amsterdam, pp. 203–273.

Timmer Marcel P. and Adam Szirmai (2000) Productivity growth in Asian manufacturing: the structural bonus hypothesis examined. *Structural Change and Economic Dynamics* 11 (2000) 371–392

Wan, Guanhua (ed) (2008) *Inequality and Growth in Modern China* UNU Wider, Oxford University Press, Oxford UK.

Wooldridge, Jeff (2007) What's New in Econometrics? Lecture 12 Missing Data; Available at http://www.nber.org/WNE/Slides8-1-07/slides_12_missingl.pdf

Table 1: Labor Share Trends Overall for UN and UNIDO datasets

	Trend	Trend Pre 1980	Trend Post 1980	Trend Post 1990
UN 1993	-0.00127***	0.00113	-0.00173***	-0.00241***
N	2755	493	2262	1710
Countries	135	57	130	122
Gollin Adjustment	-0.000593	0.00268***	-0.000830	-0.00126*
N	877	163	714	483
Countries	59	25	54	46
Wooldridge Adjustment	-.00121***			
N	2731			
UNIDO	-.0012*	.0001	-.0046*	
N	2937	1247	1690	
Countries	136	101	131	

***denotes statistical significance at the 1% level. The dependent variable is compensation of employees/gross value added for the UN dataset and wages and salaries/gross value added for the UNIDO 3 digit dataset.

Table 2: Labor Share Trends for UN SNA 1993 data by country grouping

	OECD	Sub-Saharan Africa	South Asia	Europe/Central Asia	Latin America/Caribbean	Arab States	East Asia/Pacific
Trend	-0.00051 (-0.000429)	-0.00234 (-0.000706***)	0.00133 (-0.00214)	-0.00258 (-0.00149*)	-0.00167 (-0.000775**)	-0.0018 (-0.00104)	0.000966 (-0.00254)
Constant	0.552 (-0.019***)	0.461 (-0.0312***)	0.313 (-0.108)	0.602 (-0.0791***)	0.460 (-0.0362***)	0.423 (-0.0502***)	0.333 (-0.12**)
Observations	987	421	67	409	504	231	212
R-squared	0.026	0.199	0.093	0.069	0.091	0.12	0.025
Number of countries	31	25	3	24	23	17	11

	OECD	Sub-Saharan Africa	South Asia	Europe/Central Asia	Latin America/Caribbean	Arab States	East Asia/Pacific
1960-1964	-0.0137 (-0.00522**)						
1965-1969		0.0132 (-2.31E-09***)					
1970-1974	0.0161 (-0.0124)	0.0274 (-0.00648***)		0.0240 (-6.25E-10***)		0.0124 (-0.0319)	
1975-1979	0.0396 (-0.0128***)	0.0133 (-0.0119)			-0.0126 (-0.0109)	0.00821 (-0.0209)	-0.0304 (-0.0537)
1980-1984	0.0242 (-0.014*)	0.0287 (-0.0137**)		-0.0254 (-0.0225)	-0.0116 (-0.0116)		0.0154 (-0.0536)
1985-1989	0.00365 (-0.0133)	0.00198 (-0.0137)	0.00927 (-0.00219*)	-0.00869 (-0.0124)	-0.0325 (-0.0202)	-0.00904 (-0.022)	0.0251 (-0.0489)
1990-1994	0.0152 (-0.0124)	-0.00406 (-0.00573)	0.0129 (-0.00879)	0.0366 (-0.0204*)	-0.0198 (-0.0238)	-0.00665 (-0.02)	0.0299 (-0.0684)
1995-1999	0.0089 (-0.0138)	-0.0419 (-0.0068***)	0.0300 (-0.00231***)	-0.00985 (-0.00775)	-0.0345 (-0.0216)	-0.00639 (-0.0273)	0.0299 (-0.0849)
2000-2004	0.00958 (-0.0147)	-0.0445 (-0.0144***)	0.027 (-0.0304)	-0.0265 (-0.00837***)	-0.0410 (-0.0236*)	-0.0349 (-0.0281)	0.0247 (-0.0927)
2005-2009	-0.00121 (-0.0148)	-0.0555 (-0.0178***)	0.0307 (-0.0471)	-0.0213 (-0.0126)	-0.0682 (-0.0268**)	-0.0500 (-0.0266*)	0.0212 (-0.0946)
Constant	0.516 (-0.0116***)	0.368 (-0.000648***)	0.360 (-0.0111***)	0.474 (-0.00463***)	0.412 (-0.0162***)	0.351 (-0.021***)	0.360 (-0.0675***)
Observations	987	421	67	409	504	231	212
R-squared	0.118	0.263	0.105	0.142	0.113	0.188	0.069
Number of countries	31	25	3	24	23	17	11

Table 3: Labor Share Trends for UNIDO data by country grouping

	East Asia/Pacific	Sub-Saharan Africa	South-Central Asia	OECD	Europe/Central Asia	Latin America	Middle East/North Africa
Trend	-0.0010 (-4.17***)	-0.0026 (-6.63***)	-0.0034 (-5.76***)	-0.0014 (-6.04***)	0.0012 (2.63***)	-0.0015 (-3.35***)	0.0001 (0.31)
	3128 observations. R-squared: 0.0442						
	Dependent variable is labor shares. Regression is fixed effects with robust standard errors. Trend is the coefficient of the separate trend variable for each region of countries in a single regression.						
1965-69	-0.0433 (-1.55)	-0.0172 (-0.92)	-0.0179 (-1.55)	-0.0042 (-0.35)	0.0419 (1.54)	-0.0169 (-0.78)	-0.0056 (-0.24)
1970-74	-0.0598 (-2.15**)	-0.0645 (-3.46***)	-0.0012 (-0.09)	0.0006 (0.05)	0.0192 (0.76)	-0.0031 (-0.15)	0.0029 (0.12)
1975-79	-0.0572 (-2.07**)	-0.0606 (-3.25***)	-0.0071 (-0.9)	0.0266 (2.26**)	0.0158 (0.57)	-0.0200 (-0.96)	0.0297 (1.19)
1980-84	-0.0485 (-1.77*)	-0.0487 (-2.64***)	-0.0239 (-2.58**)	0.0161 (1.38)	0.0306 (1.21)	0.0053 (0.25)	0.1138 (4.44***)
1985-89	-0.0527 (-1.92*)	-0.0713 (-3.65***)	-0.0360 (-4.1***)	-0.0251 (-2.16**)	0.0104 (0.38)	-0.0238 (-1.14)	0.0470 (1.83*)
1990-94	-0.0591 (-2.18**)	-0.0853 (-4.1***)	-0.0560 (-3.5***)	-0.0170 (-1.35)	0.0556 (2.02**)	-0.0557 (-2.68***)	-0.0012 (-0.05)
1995-99	-0.0811 (-2.99***)	-0.1148 (-5.45***)	-0.1244 (-6.93***)	-0.0509 (-3.61***)	0.0878 (2.85***)	-0.0514 (-2.13**)	-0.0073 (-0.29)
2000-04	-0.0830 (-2.91***)	-0.1957 (-4.42***)	-0.1466 (-4.35***)	-0.0528 (-3.42***)	0.0471 (1.4)	-0.0173 (-0.68)	0.0008 (0.03)
obs	354	630	127	736	268	607	406
R-sq	0.0995	0.1210	0.4440	0.1287	0.0955	0.0603	0.1672
	Dependent variable is labor shares with dummy variables for each five-year period. All regressions are fixed effects with robust standard errors. Reported are the coefficients of the dummy variables for each period with an individual regression for each region.						
	Labor shares data from UNIDO database. T-statistics reported in parentheses. Asterisks denote level of significance = *-10%, **-5%, ***-1%.						

Table 4: Labor Share Trends for UN SNA 1993 data by income quintile

UN Data SNA 1993	GNI Q1	GNI Q2	GNIQ3	GNI4	GNI5
Trend	-0.000969 (-0.000687)	-0.00338 (-0.00194*)	-0.00151 (-0.000974)	-0.000957 (-0.000713)	-0.000873 (-0.000447*)
Constant	0.356 (-0.0309***)	0.504 (-0.0948***)	0.466 (-0.0454***)	0.477 (-0.0345***)	0.566 (-0.0201***)
Observations	192	331	489	611	1024
R-squared	0.033	0.183	0.061	0.034	0.06
Number of countries	15	21	22	33	36

Table 5: Labor Share Trends for UNIDO data by income quintile

	First Quintile	Second Quintile	Third Quintile	Fourth Quintile	Fifth Quintile
Trend	-0.0026 (-8.78***)	-0.0026 (-8.13***)	-0.0037 (-9.53***)	-0.0039 (-11.69***)	-0.0033 (-8.16***)
	1988 observations. R-squared: 0.0883				
	Dependent variable is labor shares. Regression is fixed effects with robust standard errors. <i>Trend</i> is the coefficient of the separate trend variable for each group of countries separated by quintile of per capita GDP adjusted to PPP in a single regression (e.g. one trend variable represents the first quintile, which includes the richest fifth of countries in each year, whereas another trend variable represents the fifth quintile, which includes the poorest fifth in each year).				
1980-84	-0.0015 (-0.13)	-0.0043 (-0.27)	0.0267 (1.74*)	0.0292 (2.60***)	0.0105 (1.21)
1985-89	-0.0394 (-3.59***)	-0.0396 (-2.38**)	0.0019 (0.10)	-0.0270 (-2.22**)	0.0010 (0.10)
1990-94	-0.0252 (-2.34**)	-0.0446 (-2.43**)	-0.0316 (-1.82*)	-0.0747 (-6.77***)	-0.0299 (-2.36**)
1995-99	-0.0606 (-5.87***)	-0.0533 (-2.62***)	-0.0289 (-1.20)	-0.0921 (-7.42***)	-0.0627 (-5.22***)
2000-2004	-0.0733 (-6.09***)	-0.0725 (-3.35***)	-0.1517 (-2.46**)	-0.0706 (-5.69***)	-0.0400 (-2.44**)
obs	397	398	397	398	398
R-sq	0.1417	0.0566	0.0976	0.2774	0.0948
	Dependent variable is labor shares with dummy variables for each five-year period. All regressions are fixed effects with robust standard errors. Reported are the coefficients of the dummy variables for each period with an individual regression for each quintile (each quintile as described above except sample separated into five-year periods).				
	GDP per capita data from the World Bank's World Development Indicators. Labor shares data from UNIDO database. T-statistics reported in parentheses. Asterisks denote level of significance = *-10%, **-5%, ***-1%.				

Table 6: Labor Share Trends for UN data by HDI quintile

	HDI1970 Q1	HDI1970 Q2	HDI1970 Q3	HDI1970 Q4	HDI1970 Q5
Trend	-0.00281 -0.00189	-0.00133 -0.000855	-0.00178 -0.00125	-0.00126 -0.00092	-0.0009** -0.000405
Observations	200	346	435	517	826
R-squared	0.127	0.084	0.096	0.031	0.096
Number of countries	15	18	21	26	26

Table 7: Labor Share Trends for UNIDO data by HDI quintile

	Lowest HDI Quintile	2nd Quintile	3rd Quintile	4th Quintile	Highest HDI Quintile
Trend	-0.006 (0.003**)	-0.007 (0.002***)	-0.004 (0.004)	-0.001 (0.002)	-0.006 (0.001***)
N Countries	37 18	58 23	46 23	60 28	49 19

Table 8 Contribution of Intra-Sector Declines to Overall Decline in Labor Share

UN	1980-2000	1980-1990	1990-2000
Average overall decline	-0.07072***	-0.04757***	-0.02315***
Average Decline from Intra Sector Effect	-0.05623***	-0.02474***	-0.02879***
UNIDO	1980-2000	1980-1990	1990-2000
Average overall decline	-0.05711***	-0.01503***	-0.04208*
Average Decline from Intra Sector Effect	-0.06202***	-0.01789**	-0.04355***

Figure 1a : Labor Share Trend: UN SNA 1993.

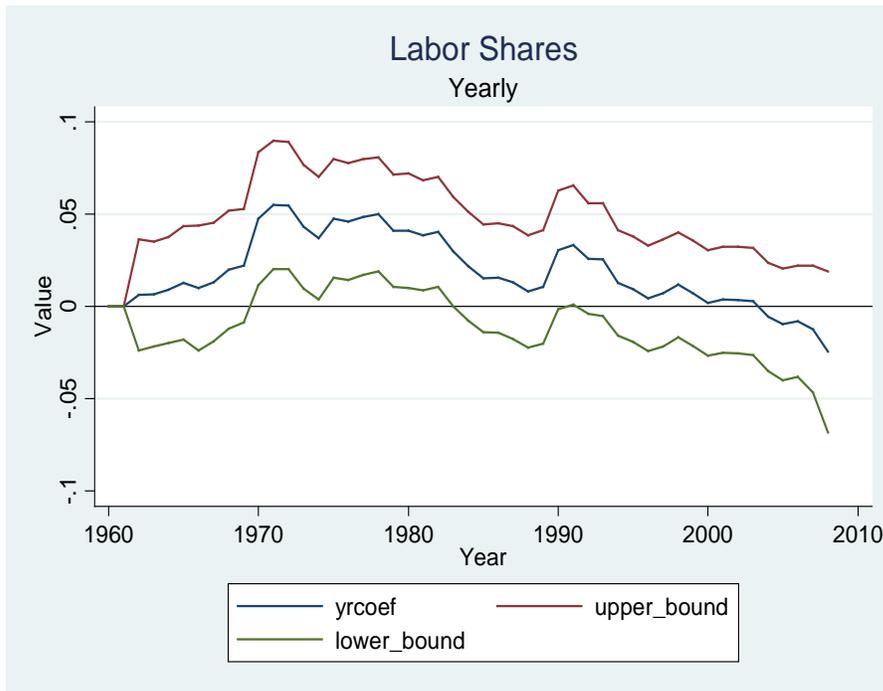
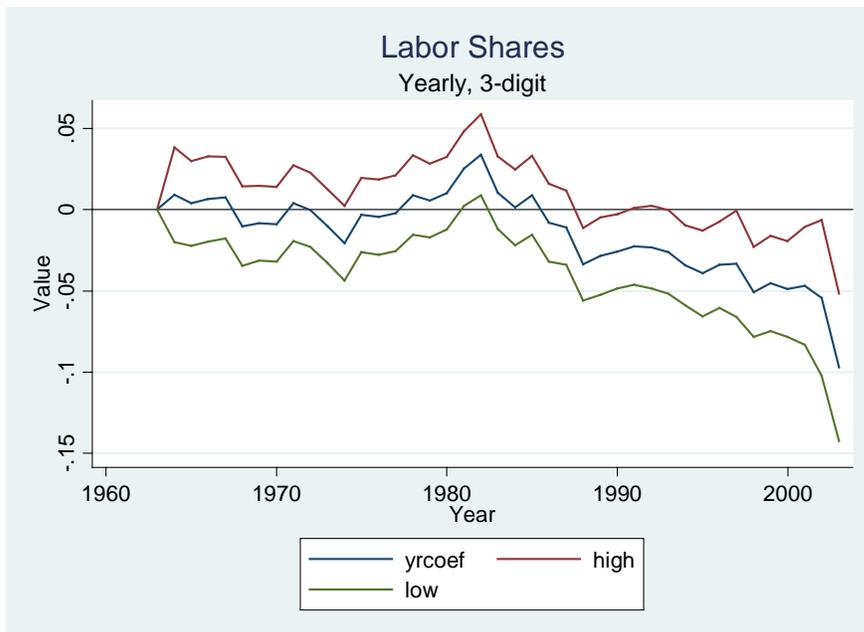


Figure 1 b : Labor Share Trend: UNIDO 3 digit data.



Appendix 1: What is happening to interpersonal inequality across the globe?

As noted in the introduction, there is a great deal of interest in the patterns of global inequality. It is by now widely agreed that within country interpersonal inequalities have been growing over the last two decades in the majority of countries in the world.

Analyses of the OECD (OECD 2008) show that income inequality has risen within the OECD over the last two decades. Studies using household surveys in several large economies show similar patterns. Thus in China (Wan 2008), India (Himanshu, 2006) and Russia and the former Eastern Europe, there have been unambiguous increases in the levels of interpersonal inequality.⁹ There have been fewer studies of regions for which there have been data limitations because of less frequent household surveys. In such areas, (Oceania, Sub Saharan Africa), it is very difficult to make strong conclusions. Bigsten and Shimeles (2003) report significant variation in interpersonal inequality for 17 African countries for which adequate data is available. Another cross-country study (ECA, 2004) finds similarly ambiguous results.

Then as a very broad, and certainly not universal, sketch, one can suggest that interpersonal inequality within countries has increased in a plurality of countries, or at least that there is no evidence that inequality within countries is decreasing. This general finding has corroboration in the form of novel sources such as looking at tax returns. Atkinson et al (2009) examines the top income shares for more than 20 countries and

⁹ An important exception appears to be Latin America in the recent past in which growth and more expansive government intervention into basic education has reduced poverty and inequality from very high initial levels (Lopez-Calva and Lustig 2009). Another large country, Indonesia, has seen rises and falls, with current levels slightly higher than in the mid 1980s (Sudjana and Mishra 2004)

finds that *"over the last 30 years, top income shares have increased substantially in English speaking countries and in India and China but not in continental Europe countries or Japan."* This increase is due in part to an unprecedented surge in top wage incomes.

While it may be widely agreed that inequality within countries has been rising, it is not entirely obvious what has been happening to global inequality as opposed to inequality within most of the countries in the globe. Milanovic (2005) makes a useful distinction between three notions of inequality, which are often conflated in the debate on global income and wealth inequalities. Type 1, or inter-country inequality, refers to inequality between the mean incomes of countries. Type 2, by contrast refers, to the inequality between mean incomes where each country is weighted by its population size. Finally, Type 3, or global interpersonal inequality, refers to inequality between individuals wherever they happen to be around the world.

In the recent past, a more substantial discussion of global interpersonal inequality has developed. Given that household surveys are few and far between, sometimes of questionable validity, and difficult to obtain, most studies have tried to estimate the distributions using imaginative techniques. For the most part, empirical studies have relied on using national accounts data to obtain the mean income of the country in question and combine this information with data on distribution, using the assumption that within national income distributions are usually log normally distributed. Several studies (Quah 1999; Schultz 1998; Chotikapanich et al. 1997) have used variations on this approach to derive estimates of the global distribution. Studies such as that of Sala-i-

Martin (2006) and Bhalla (2003) have used quintile data from surveys to get closer to the actual national distribution. Such an approach however can be problematic.¹⁰ Milanovic (2005a) uses household surveys only to construct the world income distribution (see Milanovic, 2005a). While this is certainly the gold standard in terms of maintaining a consistent and common sample, Anand and Segal (2008) note certain, clear weaknesses with the methodology employed, including issues with inappropriate Purchasing Power Parities, differing numbers of income groups in the different benchmark years, and so on, which make the estimates less reliable. They conclude their exhaustive investigation by suggesting that the state of knowledge on the world income distribution is decidedly uncertain.¹¹

¹⁰ As Milanovic (2005b) notes: “...it is often the numerous assumptions, piled up one upon another, that drive the results rather than the data. A lot of assumptions are made simultaneously (e.g. that each country’s distribution is lognormal; that GDP per capita gives the correct mean income and that its under- or overestimation compared to household surveys is constant across poor and rich alike) and it is quasi impossible to tell the impact which each of the assumptions separately has on the results.”

¹¹ In their words “Given the diversity of estimates and various sources of uncertainty, including gaps and errors in the underlying data, we conclude there is insufficient evidence to determine the direction of change in global interpersonal inequality in recent decades”. Anand and Segal (2008)

Appendix 2: Variables used

1. Labor Share UN SNA 1993: Defined as compensation of employees/gross value added. The data was obtained from the detailed aggregates table of the UN national accounts, table 203 using SNA 1993 methodology. Where multiple series were available (since UN collected data using multiple methods), we applied the growth rate of labor share from later series to the labor share derived from earlier series. For the shift-share decomposition, the 12 sectors available from the table were used.
2. Labor Share UNIDO: Defined as wages and salaries/gross value added. The data is obtained from the UNIDO industrial statistics database, using the 3 digit classification.