

An Empirical Study About the Relationship Between Labor Share and Spending Shares of National Income

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Abstract. The main objective of the paper is to analyze and evaluate the relationship between labor share and spending shares of national income globally. The labor share, also called the wage share, refers to the percent of economic output classified in the labor wage. Besides, the spending share of the national income is mainly focused on the portion of the amount of consumption, investment, government spending, exports, imports, or net exports in actual economic output. We conduct a correlation and regression analysis and conclude that all the spending shares are significantly associated with labor share. Some are positive (consumption, investment, imports), and some are negative (government spending, exports, and net exports).

Keywords: Labor share; Spending shares of national income; global analysis; Government spending; Consumption spending; Exports; Imports, Investment; OLS regression.

1. Introduction

This paper uses an annual cross-country dataset to investigate the empirical relationship between labor share of income and spending shares, the shares of consumption, government spending, investment, exports, imports, and net exports in income. Our analysis reveals that the spending shares are generally significantly associated with labor income. However, different spending components have another sign of correlation with labor share.

Our paper is related to several existing documents in the literature. In one such article titled ‘‘The Global Decline of the Labor Share’’, Karabarbounis and Neiman (2013) describe the stability of labor income shares and the related underlying components in macroeconomic models. The decline in the global labor share has led to a reduction in the prices of investment goods in most countries and industries, and these are due to the advent of the information technology and technology era. The article explains the macroeconomic implications of this labor share.

In another relevant and related paper, Bentolila and Saint-Paul (2003) examines the development and evolution of the relationship with the capital-output ratio concerning the labor share. Differences between labor shares and real income arise due to the price of imported materials and advances in technology. The paper also presents the data for industries and countries in a given year.

Next, in yet another paper, Schneider (2011) describes the labor theory of value and argues that if two goods embody the same labor time, they will trade at the same price. Otherwise, they will exchange at a rate fixed by the relative difference between the two labor times. Also, this theory is argued through relevant formulas.

Finally, in another research, Karabarbounis and Neiman (2014) illustrate the relationship between labor shares and labor compensation, but net labor shares are different. By documenting the between aggregate labor share and net labor share for several countries over time, it is found that the two usually fall together. Similarly, a decline in capital leads to a change in the labor share. The labor share has a significant impact on wealth.

To the best of our knowledge, the current paper is novel in the size of the dataset it uses and its attempt to establish a correlation between all spending shares (not just one) and labor income shares.

The rest of the paper is organized as follows. In the next section, this paper describes the data and its sources and explain the methods in the analysis. Then in section three, this paper presents the results of the statistical analysis. Here, it also provides a discussion of the results. Finally, in the last section, it offers some concluding remarks.

2. Data and Methods

2.1 Data

We use several data series in our analysis. First, as well known, GDP (Y) can be written as a sum of labor and capital income as follows:

$$Y = \text{GDP} = \text{Labor Income} + \text{Capital Income}$$

From here, we define labor share as follows:

$$\text{Labor Share} = \text{Labor Income} / \text{GDP}$$

Moreover, from the expenditure method of measuring and defining GDP, we also know that the following equation must be satisfied:

$$Y = C + I + G + X - M$$

Here, the letters have the following meanings, and spending shares can be defined accordingly.

C = private consumption, C/Y = consumption share of GDP

I = investment expenditures, I/Y = investment share of GDP

G = government expenditures, G/Y = government share of GDP

X – M = exports-imports = net exports, X/Y = exports share of GDP, M/Y = imports share of GDP

We obtain all of our data series on labor income share and spending shares from the Penn World Tables edition 10.0. Specifically, we get real GDP per capita, labor share, consumption share, investment share, government spending share, and export and import share data series for all countries and years. In addition, we use an annual cross-country panel dataset that includes 183 countries between 1950 and 2019.

Table 1. Descriptive Summary Statistics

	GDP per capita	Labor Share	Consumption Share	Investment Share	Government Spending Share	Export share	Import share	Net Export Share
Mean	14176.60	0.53	0.64	0.22	0.19	0.23	0.30	-0.07
Median	7438.34	0.54	0.64	0.21	0.17	0.14	0.20	-0.03
Std. ev	18769.48	0.12	0.19	0.12	0.11	0.26	0.45	0.29
Minimum	233.94	0.09	0.03	-0.10	0.01	0.00	0.00	-15.37
Maximum	204345.40	0.90	3.00	3.17	2.11	3.52	23.24	0.98

Table 1 above summarizes the critical statistic characteristics among all relevant variables about their mean, median, standard deviation, minimum and maximum. The performance of the Table 1 could provide a precise viewpoint to see the individual outcome of each variable. However, their correlation cannot be reflected without a further OLS regression model analysis.

2.2 Empirical Methods

As well known, a correlation coefficient between any two variables takes values between -1 and 1. Therefore, when the correlation coefficient is negative, it suggests that the two variables generally move in the opposite direction. If it is positive, the two variables usually move in the same direction. This paper first calculates the correlation coefficient and illustrates it using scatter plot diagrams. We put one variable on the x-axis and the other one on the y-axis.

Moreover, we also conduct a regression analysis, where we estimate the following regression equation using an ordinary least squares (OLS) regression:

$$\text{Labor Share} = a + b * \text{Spending Share} + c * \text{GDP per capita} + d * \text{Year} + \text{Error Term}$$

We estimate six different versions of this equation and use an additional spending share in each of them. As evident from the above equation, in addition to the specific spending share on the right-hand side, we also use GDP per capita and year as control variables. In the next section, we report the estimated coefficients of a, b, c, and d.

3. Results of the Statistical Analysis

Table 2. Correlation table

	GDP per capita	Labor share	Consumption Share	Investment Share	Government Spending Share	Export Share	Import share	Net Export Share
GDP per capita	1.00							
labor share	-0.11	1.00						
Consumption Share	-0.45	0.23	1.00					
Investment Share	0.26	0.01	-0.35	1.00				
Government Spending Share	-0.12	-0.03	-0.15	0.01	1.00			
Export Share	0.47	-0.13	-0.26	0.27	-0.06	1.00		
Import share	0.18	0.02	0.11	0.48	0.24	0.65	1.00	
Net Export Share	0.15	-0.16	-0.49	-0.39	-0.37	0.04	-0.73	1.00

The significant correlations are colored red.

Table 2 above illustrates the correlations of variables in the correlation analysis. It can be seen that the variable of labor share has shown to have a negative correlation with the GDP per capita, which is almost the same as the factor of government spending share. However, other economic indicators such as investment share, export share, import share, and net export share positively connect with GDP per capita. More importantly, labor share is negatively correlated with exports, and net exports positively correlate with consumption share. The correlation of the labor share with investment, government spending, and import shares is not statistically significant.

Next, we present scatter plots between labor share and the three spending shares (consumption, export, and net exports). We only plot three figures because we only offer the three significant correlations and do not exhibit the insignificant correlations.

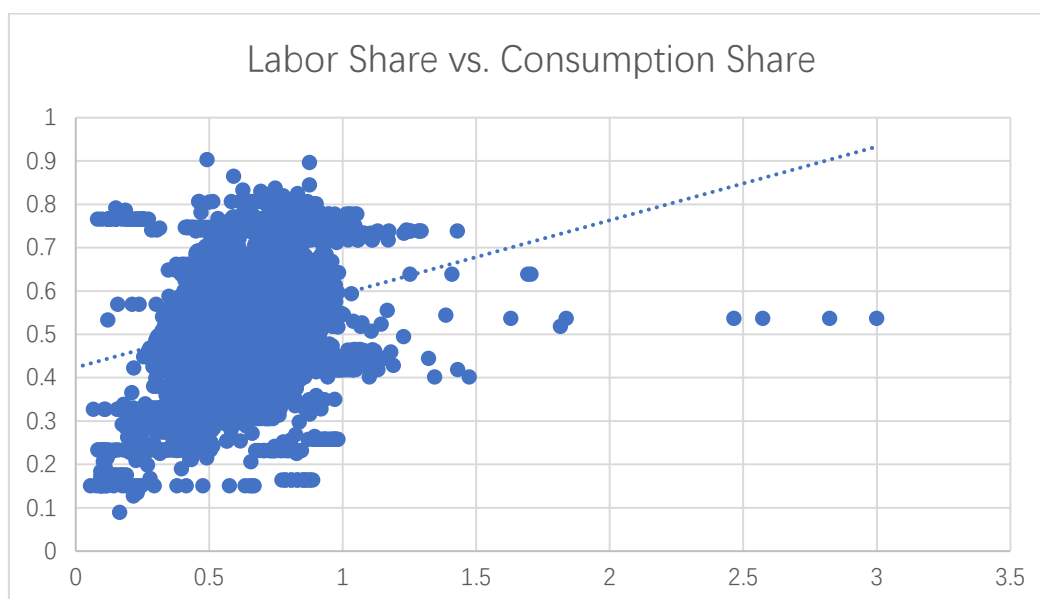


Figure 1. Labor Share vs. Consumption Share of Income

Figure 1 above exhibits the statistical correlation between labor share and consumption share. Notice that the correlation is 0.23 according to Table 2, which is a significant correlation. That is why the technical regression line drawn by MS Excel illustrates a positively sloped linear line to represent the relationship between labor share and consumption share.

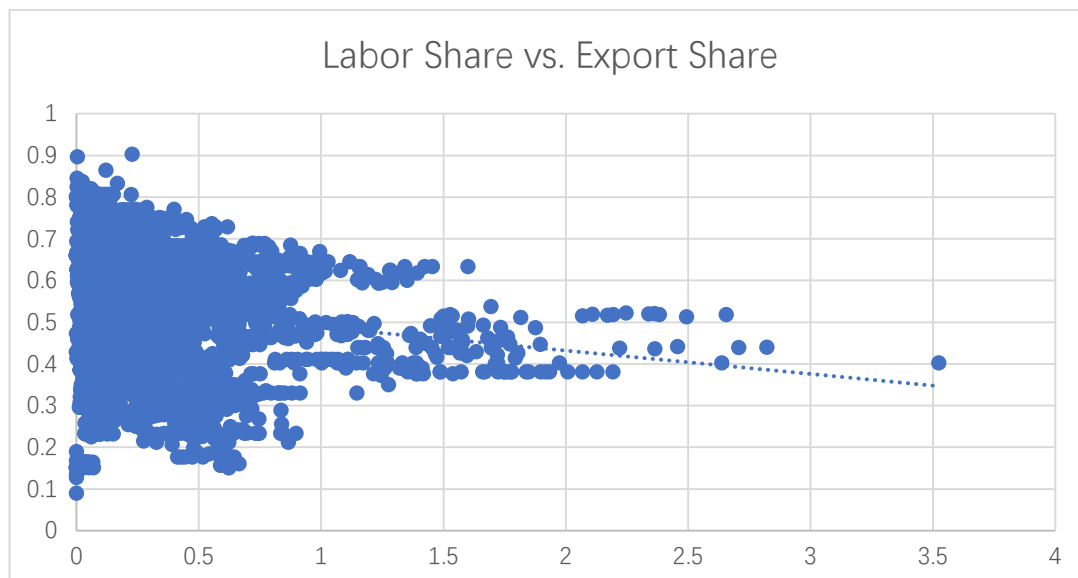


Figure 2. Labor Share vs. Export Share of Income

Figure 2 above shows the scatter plot between labor and export income shares. Unfortunately, the scattered layout of the data sources cannot provide a clear image of the two variables’ relationship. In other words, although Figure 2 has tried to estimate the negatively linear relationship between two variables, it can still be visualized that the extent of the correlation seems to be low (-0.13 according to Table 2).

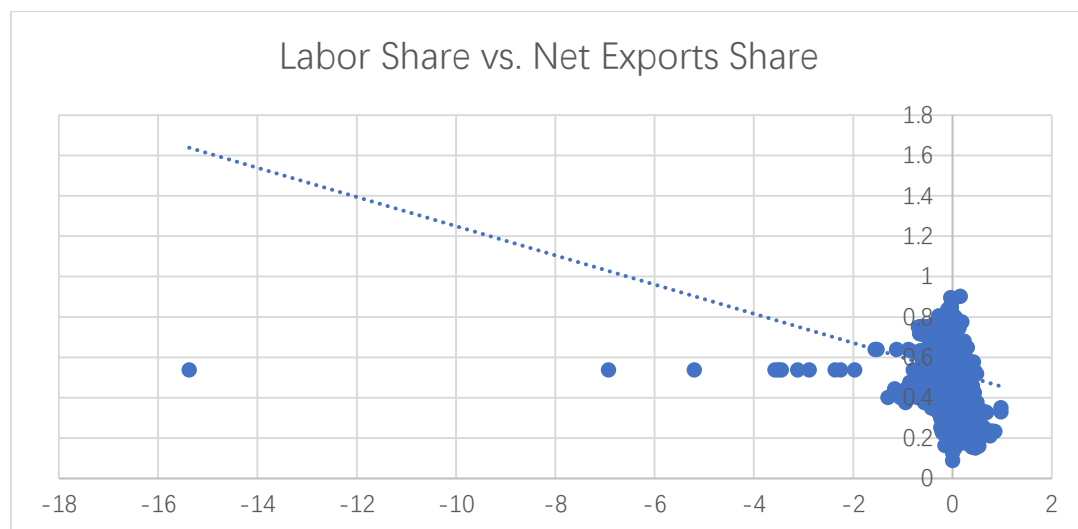


Figure 3. Labor Share vs. Net Export (Export-Import) Share of Income

Figure 3 summarizes the correlation between the labor share and the Net Export Share of Income. It can be seen that all original data sources are gathered in a small zone, which is closed to zero. The firmly closed outcomes between two variables show the less evident results of their relationship. Therefore, it would be hard to say the relationship between labor share and net export share of income based on the result shown in Figure 3 above. The calculated correlation coefficient according to Table 2 is -0.16.

Leaving the correlation analysis behind, we now proceed to the regression analysis. The estimations of the coefficients in the following six equations are presented in Table 3.

$$\text{Regression 1: Labor Share} = a + b * \text{Consumption Share} + c * \text{GDP per capita} + d * \text{Year} + \text{Error Term}$$

$$\text{Regression 2: Labor Share} = a + b * \text{Investment Share} + c * \text{GDP per capita} + d * \text{Year} + \text{Error Term}$$

Regression 3: Labor Share = a + b * Government Spending Share + c * GDP per capita + d * Year + Error Term

Regression 4: Labor Share = a + b * Exports Share + c * GDP per capita + d * Year + Error Term

Regression 5: Labor Share = a + b * Imports Share + c * GDP per capita + d * Year + Error Term

Regression 6: Labor Share = a + b * Net Exports Share + c * GDP per capita + d * Year + Error Term

Table 3. Regression Results

Estimated Coefficient →	a	b	c	d
Regression 1	2.53***	0.17***	0.002**	-0.001***
Regression 2	2.54***	0.04***	-0.005***	-0.001***
Regression 3	2.54***	-0.03**	-0.005***	-0.001***
Regression 4	2.51***	-0.04***	-0.001	-0.001***
Regression 5	2.64***	0.02***	-0.005***	-0.001***
Regression 6	2.66***	-0.07**	-0.003**	-0.001***

*** indicates 1% level of significance, ** indicates 5% level of significance

Here, we obtain several results. For example, according to the first row of the table, where we present the results of the first regression, we observe that the estimated coefficient, b, is significantly positive. This suggests that the higher the consumption share of GDP, the higher the labor share, even after controlling for the association between labor share and GDP per capita and labor share and time. This result is also in line with Figure 1 and the significant correlation (0.23) reported in Table 2.

In the next row, we present the results of the second regression. Here, the estimated coefficient of investment share is significantly positive. This again means that the higher the investment share of GDP, the higher the labor share, even after controlling for the association between labor share and GDP per capita and labor share and time. This is somewhat different from the results reported in Table 2 because the simple correlation analysis reported in Table 2 does not allow for the controlling of GDP per capita and time, which the regression analysis does. Therefore, we can conclude that after controlling for the potential effects of GDP per capita and time, the relationship between labor share and investment share turns out to be significantly positive, even though it was not significant as a direct correlation back in Table 2 (0.01).

In the third regression, we observe another significant coefficient, b, where the correlation between government spending share and labor income share turns out to be negative, even though the direct correlation in Table 2 was not significant. A similar result also applies to the positive and significant coefficient of the import share reported in regression 5.

Finally, exports and net exports have a negative coefficient, generally in line with the results reported in Table 2.

Overall, we can conclude that all the spending shares have a significant association with labor share. Some are positive (consumption, investment, imports), and some are negative (government spending, exports, and net exports).

4. Conclusion

The paper's primary purpose is to analyze and evaluate the relationship between labor share and spending shares of national income globally in the global market. Based on the six results shown from the regression model, it can be argued that all the spending shares have shown a clear connection with labor share in the global economy. Specifically, consumption, investment, and imports have shown a positively correlated relationship with labor share. On the contrary, government spending, exports, and net exports have been negatively associated with labor share. Overall, we can imply that labor share plays an essential role in the global economic performance and strongly affect other economic indicators' changes.

In addition, it can be seen that the current paper still has some drawbacks or limitations as the paper has only focused on the study of the labor share and spending shares of national income in the

global market with limited use of control variables of GDP per capita and time only. We could introduce more economic indicators such as average income among households and the population in the international realm that are potentially in association with spending shares of national income.

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