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World Profit Rates, 1960-2019

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Abstract

In this paper we present estimates of the world profit rate using country-level data from the Extended Penn World Table 7.0 and industry-level data from the World Input Output Database. The country-aggregated world profit rate series spans the period from 1960 to 2019, and the industry-aggregated world profit rate series runs from 2000 to 2014. The country-aggregated world profit rate series displays a strong negative linear trend for the period 1960-1980 and a weaker negative linear trend from 1980 to 2019. A medium run decomposition analysis reveals that the decline in the world profit rate is driven by a decline in the output-capital ratio. The industry-aggregated world profit rate shows a negative linear trend for the period 2000-2014, which, once again, is driven by a fall in the output-capital ratio. We have created a World Profitability Dashboard to allow researchers to freely access profit rate series and the underlying data at country, industry, country-group and world levels of aggregation.

JEL Codes: B51.
Keywords: profit rate, profit share, output-capital ratio, profitability decomposition.

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1 Introduction

This paper presents estimates of world profit profit rates since 1960. Two important facts motivate the research reported in this paper. First, capitalism is an inherently global system and needs to be studied as such. Second, capitalism is a system of social production that is governed by the generation and realization of profit. Hence, the rate of profit is one of the key parameters that captures the dynamics of capitalism. Bringing these two insights together suggests the importance of estimating and studying global or world profit rates.

Even as scholars realize the importance of global profit rates, data difficulties and methodological issues have prevented previous studies from estimating world profit rates for a large group of countries. One of the first studies to report a world profit rate was Li et al. (2007). In this study, the authors attempted to estimate a world profit rate going back to the nineteenth century using data from various national sources. While the time span of their study is long, the countries included in their sample is small, varying between 3 (for the nineteenth century) and 6 (after 1963). Roberts (2012) presents estimates of a world profit rate using 11 major countries, the G7 countries and the 4 BRIC countries. Roberts (2012) used data from the Extended Penn World Tables and presents both weighted and unweigheted averages of country-level profit rates as the estimate of the world profit rate, a method that is common in the literature. Maito (2014) presents estimates of a world profit rate by aggregating data from national sources for 14 large capitalist countries. Roberts (2015) revisits his previous calculations, extends his sample of countries and time period and re-estimates a world profit rate for the G20 group of countries using data from the Penn World Tables. Building on this previous work, Maito (2018) presents estimates of a world profit rate by aggregating 14 countries, both core and peripheral. He presents both weighted and unweighted averages of country-level profit rates as his estimate of the world profit rate.

We extend the existing literature on world profit rates in several ways. First, we derive

a simple formula to aggregate country-level profit rates into a world profit rate. Using this formula, we see that the world profit rate is a weighted average of country-level profit rates with a country's share in the world capital stock being the weight. This implies that earlier studies like Roberts (2012) and Maito (2018) that have used GDP to weight country-level profit rates have used an incorrect aggregation methodology.

Second, we use two different data sources: the latest version of the Extended Penn World Tables (EPWT 7.0) and the Socio Economic Accounts of the World Input-Output Database. Hence, our basic sample of countries is much larger than all existing studies and our data set covers the period from 1960 to 2019.

Third, we use two different exchange rates to convert national level variables expressed in local currency units into a common unit: current PPP exchange rates and nominal exchange rates. The use of exchange rates allows us to properly compute world profit rates by ensuring that we add commensurate quantities.

Fourth, we have created a World Profitability Dashboard to accompany this paper. Researchers can use the dashboard to view time series plots and medium run decompositions of profit rates at different levels of aggregation, starting from country level or industry level to country-group levels to the world level. The full data set used to construct these plots and tables are available for download in a variety of formats.

Taking account of limitations arising from availability of data on profitability variables and exchange rates, we construct two different world profitability series. Our first measure aggregates country-level profit rates using PPP exchange rates; our second measure uses nominal exchange rates for aggregation. We compute each of these two measures on country and industry-level data using all observations and a balanced panel.

All our measures of the world profit rate display similar trends. Over the whole sample period, 1960-2019, there is negative linear trend in the world profit rate series. Thus, there is an unconditional decline in the world profit rate over the past 60 years. A medium run

decomposition of the change in the rate of profit shows that the decline in the profit rate has been driven by the fall in the output-capital ratio, while the profit share increased.

When we break up the sample period into two sub-periods, 1960-1980 (regulated capitalism) and 1981-2019 (neoliberal capitalism), we see the same basic trend, though with different degrees of decline. In the regulated period, the rate of profit fell sharply, driven by the fall in the output-capital ratio. In the neoliberal period, the world profit rate recovered for a few decades before declining once again. Over the whole neoliberal period, the world profit rate has a weak negative linear trend, i.e. the world profit rate declined. The decline is, once again, driven by the fall in the output-capital ratio.

The rest of the paper is organized as follows. In the next section we discuss our data sources; in the following section discuss our methodology for constructing world profit rates; in the next section, we present estimates of world profit rates, discuss its temporal evolution and report the results of a medium run decomposition of the profit rate into the profit share and the output-capital ratio; in the penultimate section, we introduce the World Profitability Dashboard and provide links to access it; in the final section, we conclude the paper with some thoughts about future research.

2 Data

The world profit rate measures presented in this paper are are derived from two main datasets:

- the Extended Penn World Table 7.0 (EPWT7) [1] and
- the Socio Economic Accounts from the World Input-Output Database (SEA-WIOD).[2]

[1] For details see Marquetti et al. (2012)

[2] A detailed description of data sources and estimation methods is given in Timmer et al. (2015).

For global and by-group aggregation, the World Bank's July 2015 country classification supplied by the World Bank[3] and the OECD's exchange rates and PPP estimates[4] were used.

2.1 The EPWT7

The EPWT is a data set on economic growth assembled and maintained by Adalmir Marquetti. The data series in the EPWT come from the Penn World Tables and some other sources. Data in the EPWT are recorded at an annual frequency. Several versions of the EPWT are available and we use the latest version that is currently under construction, version 7.0.[5] The subset of the EPWT7 used here contains complete annual data (8,116 observations) on

- gross domestic product (current national prices)
- capital stock (current national prices), and
- labor share

for 170 countries [6] over (at most) 70 years (1950-2019).

[3]For details, see WB (2021).

[4]For details, see OECD (2021).

[5]We would like to thank Adalmir Marquetti for providing us access to an advance version of EPWT 7.0. For details, see Marquetti et al. (2012).

[6]Aruba, Angola, Albania, United Arab Emirates, Argentina, Armenia, Australia, Austria, Azerbaijan, Burundi, Belgium, Benin, Burkina Faso, Bangladesh, Bulgaria, Bahrain, Bahamas, Bosnia and Herzegovina, Belarus, Belize, Bermuda, Bolivia (Plurinational State of), Brazil, Barbados, Brunei Darussalam, Bhutan, Botswana, Central African Republic, Canada, Switzerland, Chile, China, Côte d'Ivoire, Cameroon, D.R. of the Congo, Congo, Colombia, Comoros, Cabo Verde, Costa Rica, Cayman Islands, Cyprus, Czech Republic, Germany, Djibouti, Dominica, Denmark, Dominican Republic, Algeria, Ecuador, Egypt, Spain, Estonia, Ethiopia, Finland, Fiji, France, Gabon, United Kingdom, Georgia, Ghana, Guinea, Gambia, Guinea-Bissau, Equatorial Guinea, Greece, Guatemala, China, Hong Kong SAR, Honduras, Croatia, Hungary, Indonesia, India, Ireland, Iran (Islamic Republic of), Iraq, Iceland, Israel, Italy, Jamaica, Jordan, Japan, Kazakhstan, Kenya, Kyrgyzstan, Cambodia, Republic of Korea, Kuwait, Lao People's DR, Lebanon, Liberia, Saint Lucia, Sri Lanka, Lesotho, Lithuania, Luxembourg, Latvia, China, Macao SAR, Morocco, Republic of Moldova, Madagascar, Maldives, Mexico, North Macedonia, Mali, Malta, Myanmar, Montenegro, Mongolia, Mozambique, Mauritania, Mauritius, Malawi, Malaysia, Namibia, Niger, Nigeria, Nicaragua, Netherlands, Norway,

The gross domestic product statistics are drawn from the original Penn World Table 10, while capital stocks are estimated anew using a Perpetual Inventory methodology. We aggregate country-level profit rates to compute the world profit rate series. We discuss the details of our aggregation methodology in the next section.

2.2 The SEA-WIOD

The WIOD covers 43 countries and 56 sectors classified according to the International Standard Industrial Classification revision 4.[7] The SEA is a part of the WIOD and contains industry-level data on employment, capital stocks, gross output and value added at current and constant prices. The subset of the SEA-WIOD data set used in this work contains complete annual data (564,240 observations) on

- gross value added (current national basic prices)
- capital stock (current national basic prices), and
- labor share of gross value added

for 56 sectors/industries in 42 countries [8] over (at most) 15 years (2000-2014). We aggregate the SEA-WIOD data in two steps, first across countries and then across industries. We discuss the details of our aggregation methodology in the next section.

Nepal, New Zealand, Oman, Panama, Peru, Philippines, Poland, Portugal, Paraguay, State of Palestine, Qatar, Romania, Russian Federation, Rwanda, Saudi Arabia, Sudan, Senegal, Singapore, Sierra Leone, El Salvador, Serbia, Sao Tome and Principe, Suriname, Slovakia, Slovenia, Sweden, Eswatini, Syrian Arab Republic, Chad, Togo, Thailand, Tajikistan, Turkmenistan, Trinidad and Tobago, Tunisia, Turkey, Taiwan, U.R. of Tanzania: Mainland, Uganda, Ukraine, Uruguay, United States, Uzbekistan, Venezuela (Bolivarian Republic of), British Virgin Islands, Viet Nam, Yemen, South Africa, Zambia, Zimbabwe

[7] For details, see `https://www.rug.nl/ggdc/valuechain/wiod/`

[8] Australia, Austria, Belgium, Bulgaria, Brazil, Canada, Switzerland, China, People's Republic of, Cyprus, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Croatia, Hungary, Indonesia, India, Ireland, Italy, Japan, Republic of Korea, Lithuania, Luxembourg, Latvia, Mexico, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Sweden, Turkey, United States

3 Construction of the World Profit Rate

We construct world profit rate series in two ways. First, we use country-level data from the EPWT7 and aggregate over countries, using either PPP or nominal exchange rates, to construct a world profit rate series. Second, we use country-industry level data from the SEA-WIOD and construct world profit rate series in two steps. In the first step, we aggregate across countries for each industry to compute world profit rates for each industry. In the second step, we aggregate across all industries to compute a world profit rate series.

3.1 Aggregating Country Data from EPWT7

Let $j = 1, 2, \ldots, N$ index the countries in our sample. Using country-level data on profit income and capital stock, we want to compute a world profit rate. In year t, the world profit rate is defined as

$$r_t^w = \frac{\Pi_t}{K_t} \tag{1}$$

where Π_t and K_t are the world profit income and world capital stock, respectively, in year t. World profit income and capital stock, Π_t and K_t, are, in turn, the sum of the corresponding country-level variables,

$$\Pi_t = \sum_{j=1}^{N} \Pi_{jt} \tag{2}$$

and

$$K_t = \sum_{j=1}^{N} K_{jt} \tag{3}$$

where $j = 1, 2, \ldots, N$ indexes the countries in the sample.

We use two different ways of aggregating country-level variables into a measure of the variable at the world level. First, we use PPP exchange rates to convert all country-level variables measured in local currency units into current PPP dollars. Second, we use nominal exchange rates to convert all local currency variables into US dollars. In both cases, we are able to meaningfully add the profit income and capital stock across countries and arrive at world profit income Π_t, and the world capital stock K_t.

3.1.1 World Profit Rate as a Weighted Average of Country Profit Rates

We can relate the world profit rate to country-level profit rates as follows:

$$r_t^w = \frac{\Pi_t}{K_t} = \frac{\sum_{j=1}^{N} \Pi_{jt}}{K_t} = \sum_{j=1}^{N} \frac{\Pi_{jt}}{K_t} = \sum_{j=1}^{N} \frac{\Pi_{jt}}{K_{jt}} \frac{K_{jt}}{K_t} = \sum_{j=1}^{N} \alpha_{jt} r_{jt}$$

where $\alpha_{jt} = (K_{jt}/K_t)$ is the share of country j in the world capital stock, and $r_{jt} = (\Pi_{jt}/K_{jt})$ is the rate of profit in country j in year t. Hence, the world profit rate is a weighted average of country-level profit rates, where a country's share in the world capital stock is used as weights. This shows that it is incorrect to aggregate country-level profit rates using the gross domestic product (GDP) as weights. Hence, previous studies like Roberts (2012) and Maito (2018), which have used GDP to compute weighted averages of country-levle profit rates have used an incorrect weighting scheme.

3.1.2 Decomposition of World Profit Rate

The world profit rate can be decomposed into two components,

$$r_t^w = \frac{\Pi_t}{K_t} = \frac{\Pi_t}{Y_t} \frac{Y_t}{K_t},$$

where the first component, Π_t/Y_t, is the world profit share and the second component, Y_t/K_t, is the world output-capital ratio. Over any time period, the growth rate of the profit rate, $g_{\Pi/K}$ is, therefore, the sum of the growth rate of the profit share, $g_{\Pi/Y}$, and the growth rate of the output-capital ratio, $g_{Y/K}$, i.e.

$$g_{\Pi/K} = g_{\Pi/Y} + g_{Y/K}. \tag{4}$$

This is a useful decomposition of the change in the rate of profit over any time period and has been widely used in the Marxian literature. It conveniently decomposes the growth rate of the profit rate into a component that captures the distribution of income between labor and capital, the profit share, and another that captures technological factors, the output-capital ratio. We will use this decomposition below when we report our results.

Each of the two components of the profit rate can be seen, in turn, to be weighted averages of corresponding country-level variables. The world profit share can be expressed as

$$\frac{\Pi_t}{Y_t} = \frac{\sum_{j=1}^{N} \Pi_{jt}}{Y_t} = \sum_{j=1}^{N} \frac{\Pi_{jt}}{Y_t} = \sum_{j=1}^{N} \frac{\Pi_{jt}}{Y_{jt}} \frac{Y_{jt}}{Y_t} = \sum_{j=1}^{N} \beta_{jt} s_{jt}$$

where $\beta_{jt} = (Y_{jt}/Y_t)$ is the share of country j in world output, and $s_{jt} = (\Pi_{jt}/Y_{jt})$ is the profit share in country j in year t. Hence, the world profit share is a weighted average of country-level profit shares, where a country's share in world output is used as weights. The world output-capital ratio can be expressed as

$$\frac{Y_t}{K_t} = \frac{\sum_{j=1}^{N} Y_{jt}}{K_t} = \sum_{j=1}^{N} \frac{Y_{jt}}{K_t} = \sum_{j=1}^{N} \frac{Y_{jt}}{K_{jt}} \frac{K_{jt}}{K_t} = \sum_{j=1}^{N} \alpha_{jt} \sigma_{jt}$$

where $\alpha_{jt} = (K_{jt}/K_t)$ is the share of country j in world capital stock, and $\sigma_{jt} = (Y_{jt}/K_{jt})$ is the output-capital ratio in country j in year t. Hence, the world output-capital ratio is a

weighted average of country-level output-capital ratios, where a country's share in the world capital stock is used as weights.

3.2 Aggregating Country-Industry Data from SEA-WIOD

Aggregation of the country-industry data proceeds in two steps. In the first step we aggregate across countries to generate world industry-level profit rates; in the second step, we aggregate the industry-level world profit rates across all industries to compute the world profit rate.

Let $i = 1, 2, \ldots, H$ index industries and $j = 1, 2, \ldots, N$ index the countries in the sample. Using data on profit income and capital stock at the industry-level in each country, we want, in the first step, to compute a global or world profit rate for each industry. In year t, the world profit rate for industry i is computed as

$$r_{it}^{w} = \frac{\Pi_{it}}{K_{it}} \tag{5}$$

where Π_{it} and K_{it} are the world profit income and world capital stock, respectively, in year t for industry i. World profit income and capital stock in industry i, Π_{it} and K_{it} are defined as the sum across all countries of profit income in that industry

$$\Pi_{it} = \sum_{j=1}^{N} \Pi_{ijt} \tag{6}$$

and the sum across all countries of the capital stock in that industry

$$K_{it} = \sum_{j=1}^{N} K_{ijt} \tag{7}$$

where $j = 1, 2, \ldots, N$ indexes the countries in the sample. As before, for each country, the profit income and capital stock in industry i, Π_{ijt} and K_{ijt}, are measured either in current

PPP dollars (when PPP exchange rates are used for conversion) or in current US dollars (when nominal exchange rates are used for conversion). This allows us to meaningfully add the profit income and capital stock across countries for industry i and arrive at global profit income Π_{it}, and the global capital stock K_{it} for industry i.

In the second step, we aggregate across industries to compute the world profit rate as

$$r_t^w = \frac{\Pi_t}{K_t} = \frac{\sum_i \Pi_{it}}{\sum_i K_{it}}.$$

Using an argument that is similar to the one used in the previous sub-section, we can see that the world profit rate is a weighted average of industry-level profit rates, where an industry's weight is its share in the world capital stock. Medium run decomposition analysis of this world profit rate works out exactly as before, with the growth rate of the profit rate being equal to the sum of growth rates of the profit share and the output-capital ratio.

4 Country-Level Profit Rates: Distribution and Aggregation

4.1 Trends in the Distribution of Country-Level Profit Rates

We summarize the temporal evolution of the distribution of country-level profit rates in Figures 1, 2 and 3. In Figure 1, we plot the mean and median of the distribution of country-level profit rates in each year. This captures the central tendency in the distribution of country-level profit rates. In Figure 2, we plot the standard deviation and interquartile range (IQR) of the distribution of country-level profit rates in each year. This captures the dispersion of the distribution of country-level profit rates in each year. In Figure 3, we plot the number of countries for which data was available to compute the profit rate in each year.

[Figure 1 about here]

From Figure 1 we see that the mean of the distribution of country-level profit rates increased from the early 1950s to the early 1970s. It declined for the next two and a half decades, till the mid-1990s. Thereafter, the mean profit rate increased for about a decade. From the start of the Great Recession, the mean profit rate has witnessed a declining trend. The median of the profit rate distribution, also plotted in Figure 1, shows a similar trend, the only difference being a relatively flat trend in the two decades since the early 1950s, a period when the mean had increased.

[Figure 2 about here]

Turning to Figure 2, we see that the interquartile range of the distribution of country-level profit rates declined from the early 1950s to the early 1990s. The IQR increased for the next two decades before declining, once again, since the mid-2010s. The standard deviation of country-level profit rates, also plotted in Figure 2, displays a broadly similar trend over time, other than the two decades from the early 1950s. Unlike the IQR, the standard deviation increased for two decades from the early 1950s. It declined thereafter till the mid-1990s, increased for the next decade and then declined once again from the early 2010s.

[Figure 3 about here]

The EPWT 7.0 is not a balanced panel. The number of countries with data on the variables needed to compute the profit rate increases over time. The pattern of data availability over time is represented in Figure 3. In the early 1950s only about 50 countries have the relevant data; in the early 1960s, that number increases to over 75; by the 1980s, we have data on more than 100 countries, which increases to about 150 by the early 2000s; the mid-2000s have the maximum number of countries with relevant data, ranging at about 170.

4.2 Trends in World Profitability

We faced two data-related issues in aggregating country-level profit rates into a world profit rate. The first issue arose because of variability of country-year data availability in the EPWT 7.0, and the second issue came from the availability of exchange rate-both nominal and PPP exchange rates-data.

The variable number of countries with data to compute country-level profit rates forced us to think about at least two different aggregation strategies to compute the world rate of profit. In the first strategy, we use all countries for which data are available at any point in time to compute the world profit rate. This strategy has the advantage that it uses all the available data at every point in time. It also has the disadvantage that the countries used to compute the world profit rate varies over time, raising some issues of across-year comparability. To address this issue of comparability, we adopt a second strategy for aggregation.

In the second strategy, we use a balanced panel of countries to aggregate country-level profit rates into the world profit rate. The balanced panel consists of all countries for which data are available for all years from 1960 to 2019. This strategy has the advantage that the same group of countries is used at each point for computing the world profit rate. Hence, the world profit rate is easily compared across years. It also has the disadvantage that it does not use all the available data at any point in time.

To aggregate country-level profit incomes, values added and capital stocks into corresponding world variables, we need to express all country-level variables (which are denominated in local currency units) in terms of a common unit. We do so in two ways. First, we use the PPP exchange rate to convert national currency units into current US-equivalent dollars; second, we use the nominal exchange rate to convert local currency units into US dollars. Data on both PPP and nominal exchange rates are available only from 1960. This restricts our world profit rate series to the period 1960 to 2019. We can only start in 1960 because exchange rate data are not available before that year; we have to stop in 2019 because

the EPWT 7.0 stops in that year.

4.2.1 World Profitability Using All Observations

We summarize the temporal evolution of the world profit rate computed with all observations available in any year in Figure 4 and Figure 5. In Figure 4, aggregation used PPP exchange rates; in Figure 5, we use nominal exchange rates for aggregation.

[Figure 4 about here]

Both world profit rate series, i.e. the one computed with PPP exchange rates and the one computed with nominal exchange rates, display similar trends over time. The world profit rate hovered at around 14-15 percent in the early 1960s. For the next two decades, the world profit rate declined continuously and had reached its lowest value of around 12 percent in the early 1980s. From its lows in the early 1980s, the world profit rate recovered some ground over the next few years. But the recovery was quickly reversed and overall, the world profit rate has displayed a weak negative trend in the period since the early 1980s.

[Figure 5 about here]

The use of exchange rates, either PPP or nominal, restricts our sample drastically. This is because data on exchange rates are available for a very small subset of the countries that are covered in the EPWT7. Figures 6 and 7 highlight this fact. Figure 6 plots the number of countries with nonmissing observations when we use PPP exchange rates for aggregation; Figure 7 plots the number of countries with nonmissing observations when nominal exchange rates are used for aggregation. If we compare these figures with Figure 3, we see how many countries have dropped out of the sample due to nonavailability of data on exchange rates. For instance, in the 1960s, EPWT7 has data on more than 75 countries, but data on exchange rates are available only for 25 countries. Similar magnitudes of contraction of the sample is seen in later years too.

[Figure 6 about here]

[Figure 7 about here]

We can turn to Table 1 (aggregating with PPP exchange rates) and Table 2 (aggregating with nominal exchange rates) to understand which of the two factors, income distribution or technology, has been the primary driver behind the movement of the world profit rate. From the first three rows in Table 1, we see that the rate of profit declined at an average annual rate of -0.24 percent during the whole sample period, 1960-2019, at -0.70 percent during the sub-period 1960-1980, and at an annual rate of -0.09 percent during the sub-period 1981-2019. During the whole period and during both sub-periods, the profit share increased, at 0.38 percent, at 0.20 percent and at 0.32 percent per annum, respectively. Hence, during both periods, the decline in the world profit rate was completely driven by adverse movement in technology-captured by the negative growth in the output-capital ratio, whereas regressive income distribution (rise in profit share) prevented a further decline in the profit rate.

During the whole sample period, the world output-capital ratio declined at -0.63 percent per annum; in the first sub-period, 1960-1980, the world output-capital ratio declined at an average annual rate of -0.90 percent; during the second sub-period, 1981-2019, the corresponding decline was at an average annual rate of -0.41 percent. We get a very similar picture if we use the first three rows of Table 2 for the decomposition analysis, even though the actual numbers are a little different. Hence, we refrain from commenting in detail on the results in Table 2.

4.2.2 World Profitability Using A Balanced Panel Data Set

We summarize the temporal evolution of the world profit rate computed with a balanced panel of countries for which data are available in each year from 1960 to 2019 in Figure 8

Table 1: *Medium Run Decomposition of World Profit Rate (Aggregation uses PPP exchange Rate)*[a]

	Period		Variable		
	Start	End	Π/K	Π/Y	Y/K
A. Country Data:					
All Observations	1960	2019	-0.25	0.38	-0.63
All Observations	1960	1980	-0.70	0.20	-0.90
All Observations	1981	2019	-0.09	0.32	-0.41
Balanced Panel	1960	2019	-0.52	0.27	-0.79
Balanced Panel	1960	1980	-1.24	0.06	-1.30
Balanced Panel	1981	2019	-0.32	0.25	-0.57
B. Industry Data:					
All Observations	2000	2014	-0.45	0.19	-0.64

[a] In the last three columns, we report the average annual growth rates of the rate of profit, Π/K, the profit share, Π/Y and the output-capital ratio, Y/K, respectively. The average annual growth rate of a variable is computed with a regression of the logarithm of the variable on a constant and a linear time trend. The coefficient on the linear time trend, multiplied by 100, is the average annual growth rate of the variable (expressed in percentages) and is reported in this table.

Table 2: *Medium Run Decomposition of World Profit Rate (Aggregation uses nominal exchange rates)*[a]

	Period		Variable		
	Start	End	Π/K	Π/Y	Y/K
A. Country Data:					
All Observations	1960	2019	-0.32	0.34	-0.65
All Observations	1960	1980	-0.95	0.06	-1.01
All Observations	1981	2019	-0.08	0.32	-0.40
Balanced Panel	1960	2019	-0.50	0.26	-0.76
Balanced Panel	1960	1980	-1.23	-0.01	-1.21
Balanced Panel	1981	2019	-0.30	0.25	-0.55
B. Industry Data:					
All Observations	2000	2014	-0.44	0.37	-0.80

[a] In the last three columns, we report the average annual growth rates of the rate of profit, Π/K, the profit share, Π/Y and the output-capital ratio, Y/K, respectively. The average annual growth rate of a variable is computed with a regression of the logarithm of the variable on a constant and a linear time trend. The coefficient on the linear time trend, multiplied by 100, is the average annual growth rate of the variable (expressed in percentages) and is reported in this table.

and Figure 9.[9] The picture of the evolution and drivers of the world profit rate that comes from the use of a balanced panel data set is not very different from the one we get when using all available observations at each point in time.

[Figure 8 about here]

The world profit rate declined sharply during the 1960s and 1970s, mildly recovered in the 1980s and 1990s and then declined once again into the current period. If we use PPP exchange rates for aggregation, then the recovery of the profit rates in the 1980s holds for a few years into the 1990s, before declining into the 2010s. On the other hand, if we use nominal exchange rates for aggregation, then the recovery of the profit rate in the 1980s is sharp but brief, which is followed by a long period of declining world profit rate.

[Figure 9 about here]

Decomposition analysis, presented in the 4th, 5th and 6th rows of Table 1 and Table 2, is not very different. Whether we use PPP exchange rates for aggregation (Table 1) or nominal exchange rates for aggregation (Table 2), we see a pronounced decline in the rate of profit during the first period, 1960–1980, and a milder decline over the second period, 1981–2019. Both declines, moreover, are driven completely by declines in the output-capital ratio.

[9]The balanced panel has the following 25 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

5 Industry-Level Profit Rates: Distribution and Aggregation

5.1 Trends in the Distribution of Industry-Level Profit Rates

We plot the mean and median of the distribution of industry-level profit rates at the global level between 2000 and 2014 in Figure 10 (aggregation using PPP exchange rates) and Figure 11 (aggregation using nominal exchange rates). The mean and median display similar trends over time, rising from 2000 to 2007 and then declining till 2014. The same pattern is observed for both PPP exchange rate and nominal exchange rate aggregation.

[Figure 10 about here]

[Figure 11 about here]

The dispersion of the profit rate distribution can be seen from Figure 12 (PPP exchange rate aggregation) and Figure 13 (nominal exchange rate aggregations). When we use PPP exchange rates to aggregate across countries, the distribution of industry-level profit rates do not show any appreciable trend in terms of the standard deviation or the interquartile range. When, on the other hand, we use nominal exchange rates for aggregation, we see that the standard deviation increases for more than a decade starting in 2000 and then falls significantly during the last years of the sample.

[Figure 12 about here]

[Figure 13 about here]

5.2 Trends in World Profitability

In Figure 14 (PPP exchange rate aggregation) and Figure 15 (nominal exchange rate aggregation), we present the time series plot of the world profit rate computed by aggregating

global industry-level profit rates. The world profit rate increased from 2000 to 2007 and then crashed with the onset of the Great Recession. The world profit rate recovered a little as the Great Recession ended, but then declined thereafter. We see the same pattern irrespective of whether we use PPP or nominal exchange rates for aggregation.

[Figure 14 about here]

[Figure 15 about here]

The last rows in Table 1 and Table 2 present results of the medium run decomposition. Over the whole period, 2000-2014, the world rate of profit declined at -0.45 percent per annum if PPP aggregation is used and declined at -0.44 percent per annum if nominal exchange rate aggregation is used. In both cases, the decline in the rate of profit is driven by the fall in the output-capital ratio; the profit share, in fact, increased over the sample period. Thus, we get a very similar picture about the movement in the world profit rate whether we use country-level data from the EPWT7 or country-industry level data from the SEA-WIOD.

6 The World Profitability Dashboard

To disseminate our findings about world profitability and to provide access to the underlying data set to all researchers, we have created a World Profitability Dashboard. The dashboard is a convenient and publicly available tool to display and share data with other researchers, policy makers and activists on global profitability at multiple levels of aggregation. Programmed with the "Shiny" R package, the dashboard provides users with a variety of options to filter and display the data. The dashboard contains two main options to present profitability data: industry-level and country-level. The former aggregates global data for a specific industry, while the latter aggregates global data for entire national economies.

Since the EPWT does not break down its variables by industry, only the WIOD is used for industry-level calculations. For country-level data, the user may select between the EPWT and WIOD.

Once a user has selected between industry-level and country-level data, the user must further choose between the following three levels of aggregation, presented as tabs on the dashboard: "global", "by income group", and "by country". The "global" tab computes profit shares, output-capital ratios, and profit rates for the entire global economy using all countries available in the given data set. The "by income group" tab computes the same variables from all countries which are members of a specific income group, chosen by the user. The income groups and its members are those classified by the World Bank: low income, lower-middle income, upper-middle income, and high-income. The latter is further split into high-income countries within and excluded from the OECD. Given the fewer number of countries included in the WIOD, aggregation by income group is only made available for the EPWT. The "by country" tab displays data for a specific individual country, chosen by the user. The dashboard as a whole therefore includes five distinct aggregation levels: for country-level aggregates, these are (1) global, (2) by income group, and (3) by country tabs, and for industry-level aggregations these are (4) global and (5) by country tabs.

For every section of the dashboard, the user has the option to select a date range to filter the data. When observations are available over the entirety of the selected date range, all of those observations are presented. When observations are not available for the entirety of the selected date range due to a paucity of available data, all available observations within that date range are presented. Note that the WIOD only contains observations over the period 2000-2014, while the EPWT contains observations for some (but not all) countries over the period 1950-2019.

Missing observations within the EPWT pose a problem when aggregating variables on the global and income group level over certain date ranges, as we have indicated above.

When one country is missing an observation in some years of the chosen date range but contains observations in other years within the chosen date range, the inclusion of that country in a global or income-group profit rate would result in aggregated variables which include a different number of countries for different years within that date range. Therefore, the user may select between two methods of calculation: one which includes every available observation–and, as a result, may include different numbers of countries over the chosen date range–and one which only includes those countries which contain observations in every year of the chosen date range, thus resulting in a consistent number of countries included in the aggregated variables over the entire duration of that date range. Although some countries do not contain observations in the WIOD for certain industries, the WIOD nevertheless contains at least some observations for every country in each year throughout the period 2000-2014; therefore, when the WIOD is selected, all available countries are used in aggregated calculations over any selected date range.

The variables taken from the EPWT and WIOD are in current prices of local currencies. To compute global aggregates, local currencies must be converted into common units. The user may select between the use of nominal exchange rates and purchasing power parities (PPPs) for conversion into US dollars.[10]

For each of the five distinct panels in the dashboard–for the five distinct aggregation levels listed above–the dashboard displays two plots. The first plot displays a time-series of the rate of profit over the selected date range for the selected level of aggregation. The second plot displays the medium run decomposition of the rate of profit into two components: the profit share and the output-capital ratio. The user has the option to display these variables as a time-series or as a bar plot which shows the average rate of growth of the two variables, as well as the rate of profit, over the selected date range. So long as there are more than

[10]Note that due to limited availability of PPP and exchange rate data, the use of these conversion factors diminishes the number of countries available for global aggregation. The title of each plot indicates the number of countries included in the world profit rate.

two years selected in the date range, the average rate of growth is calculated as the ordinary least squares regression coefficient of the logarithm of the given variable on a constant and a linear time trend. If there are only two years selected, the rate of growth is computed directly.

The user has the option to display the following types of trend lines over time-series plots: linear, loess, quadratic, and cubic. The user may download any plot displayed, with a choice of file types in the side panel. The user may also download the data used to generate the plots in .csv format, which includes all available observations for the rate of profit, profit share, and output-capital ratio over the selected date range for the chosen level of aggregation.

7 Conclusion

In this paper we have reported estimates of world profit rates for the period 1960-2019. The world profit rate series has been constructed by aggregating country-level and industry-level profit rates for a large group of capitalist countries. Aggregation uses both PPP and nominal exchange rates. We find that the world profit rate series displays an overall negative linear trend from 1960 to 2019. Our results generally demonstrate similar broad trends in the world rate of profit as calculated by Maito (2014) and Roberts (2015).

Using a medium run decomposition analysis, we find that the decline in the world profit rate has been completely driven by a fall in the output-capital ratio. The same pattern is visible in two sub-periods, 1960-1980 and 1981-2019, with the decline being much sharper in the first than in the second period. In both sub-periods, the decline in the world profit rate has been driven by a fall in the output-capital ratio.

The evidence presented in this paper shows that technological problems have been the main cause of the declining profitability at the level of the world economy. It is technological problems that have led to a declining trend in the world output-capital ratio. Regressive

distribution of income, i.e. an increase in the profit share, has propped up the profit rate. In the absence of the regressive income redistribution, the world profit rate would have declined by a greater magnitude. That technological problems, the key strength of capitalism, have been the primary contributor to the declining profit rate in the world capitalist economy is exactly in line with Marx's insights into the contradictory dynamics of capitalism.

Future research on world profitability should explore several outstanding issues. What has been the primary cause of the decline in the output-capital ratio at the global level? While it is clear that the information technology revolutions managed to reverse the decline in the world output-capital ratio for a decade or two in the early 1990s, that effect quickly wore off. What is the reason for this? Why did capitalism not manage to keep the output-capital ratio rising for a longer duration? What are the implications of the declining trend in the world profit rate for global capital accumulation? These are some of the issues that might be taken up in future research.

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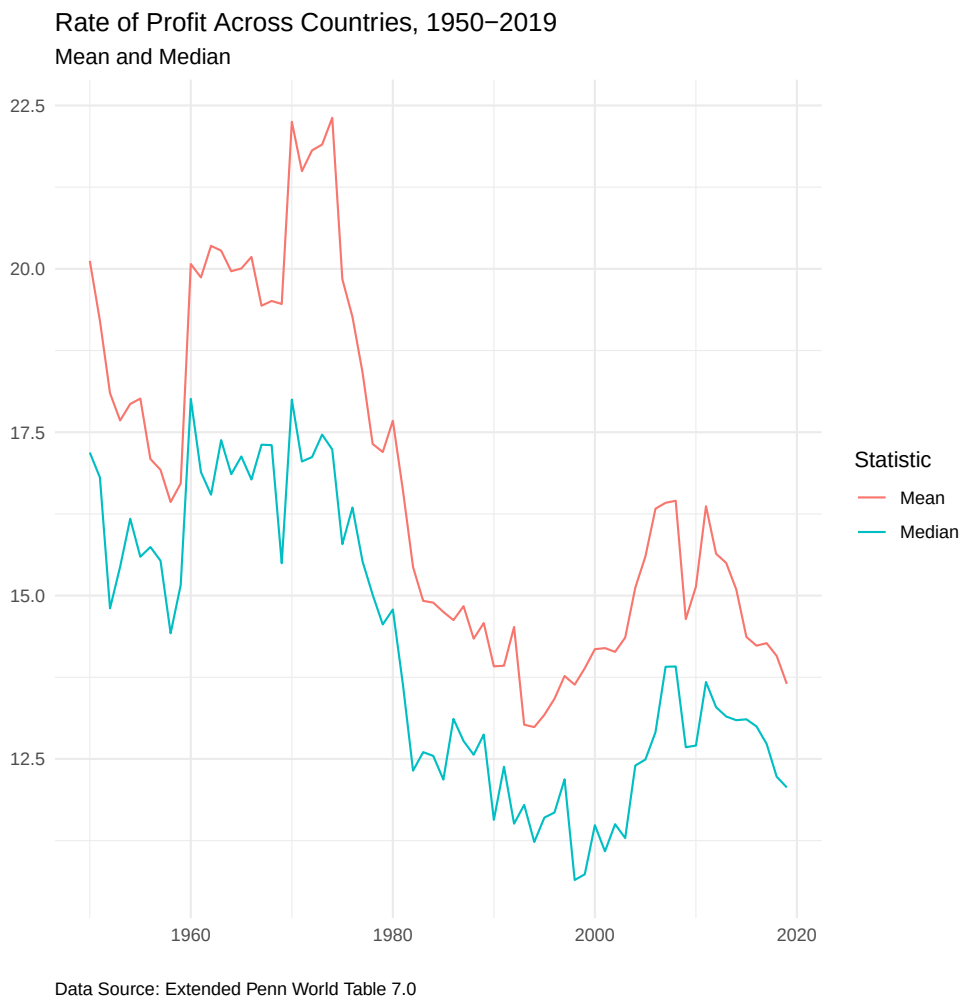

Figure 1: *Mean and median of country-level profit rates in each year between 1950 and 2019.*

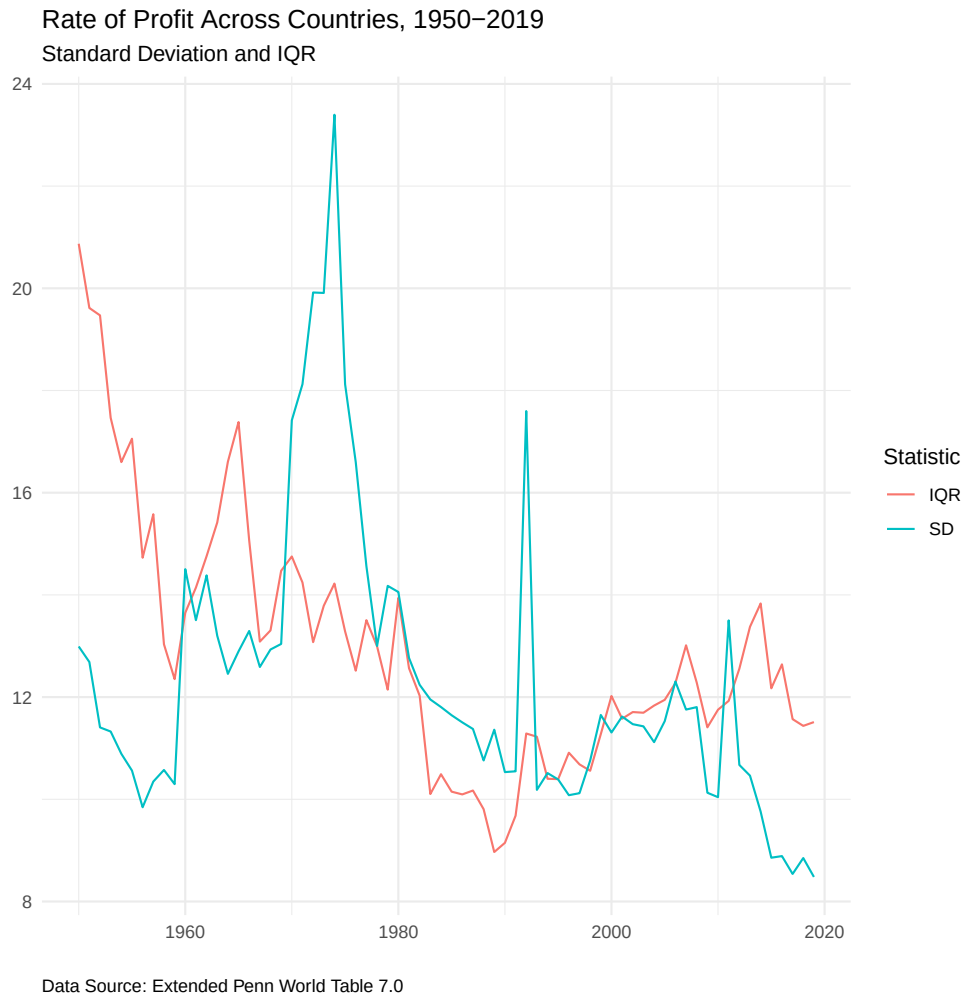

Figure 2: *Standard deviation and interquartile of country-level profit rates range in each year between 1950 and 2019.*

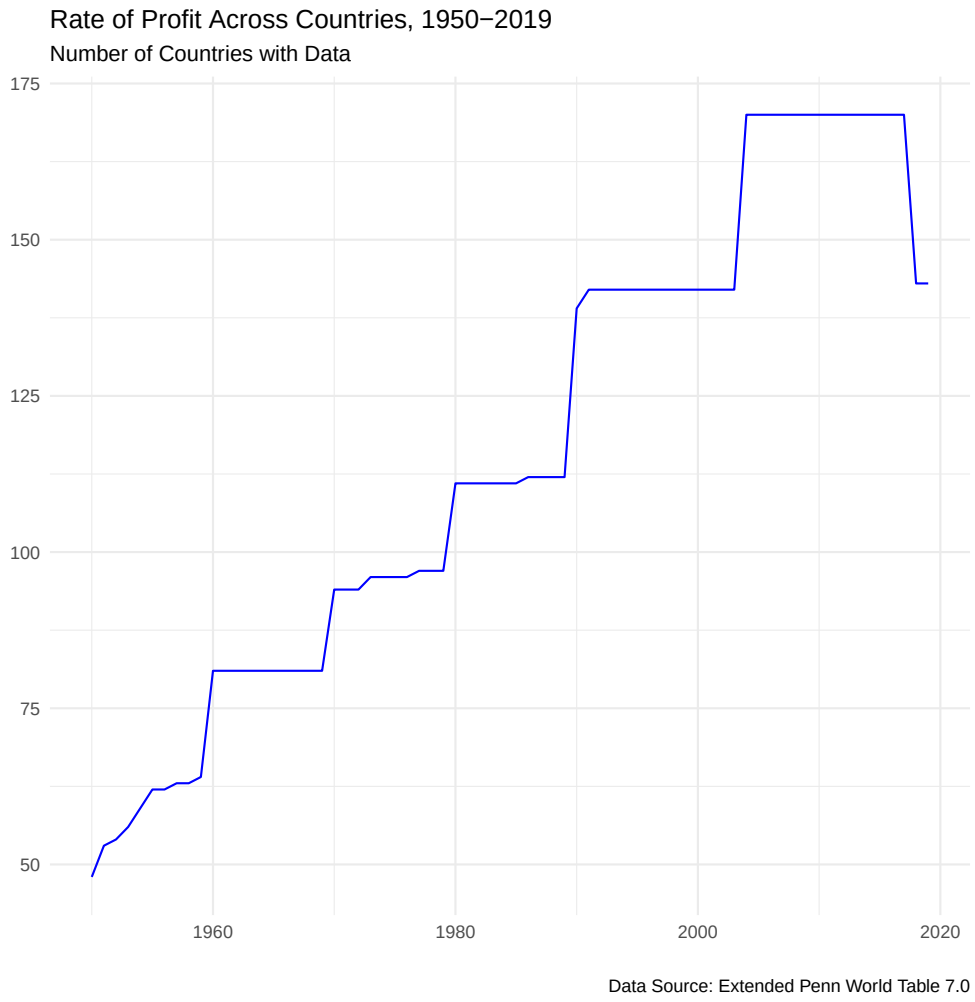

Figure 3: *Number of countries with observation on the rate of profit, profit share and the output-capital ratio in each year between 1950 and 2019.*

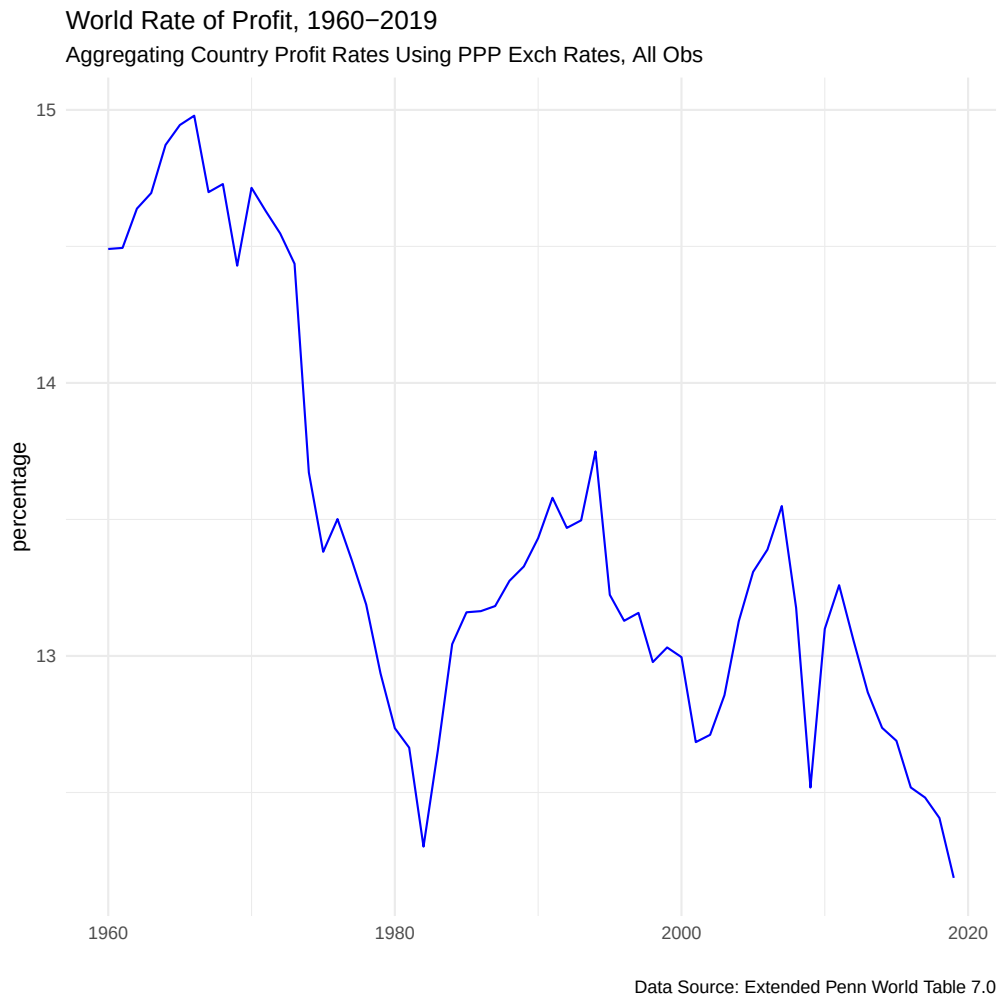

Figure 4: *World profit rate as the aggregate of country-level profit rates between 1960 and 2019. The aggregation uses PPP exchange rates to convert country-level variables into US dollars. All country-year observations are used for aggregation.*

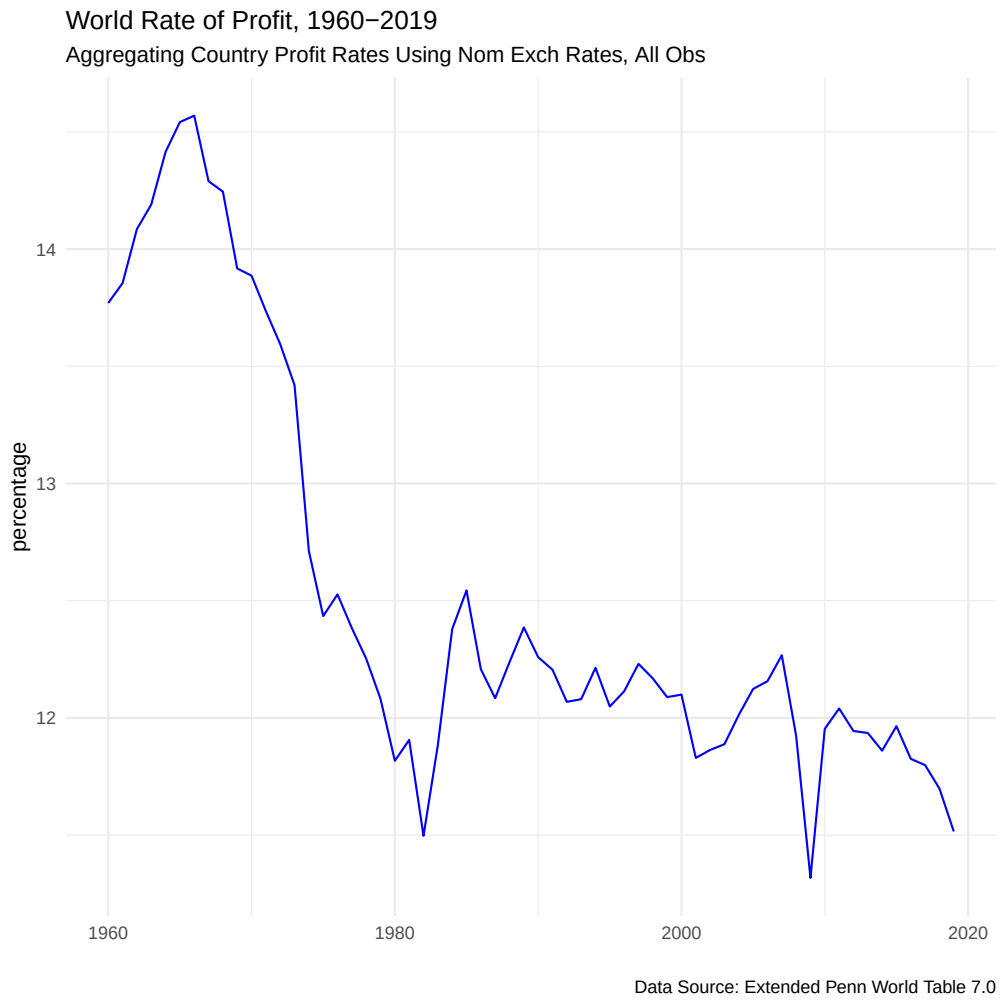

Figure 5: *World profit rate as the aggregate of country-level profit rates between 1960 and 2019. The aggregation uses nominal exchange rates to convert country-level variables into US dollars. All country-year observations are used for aggregation.*

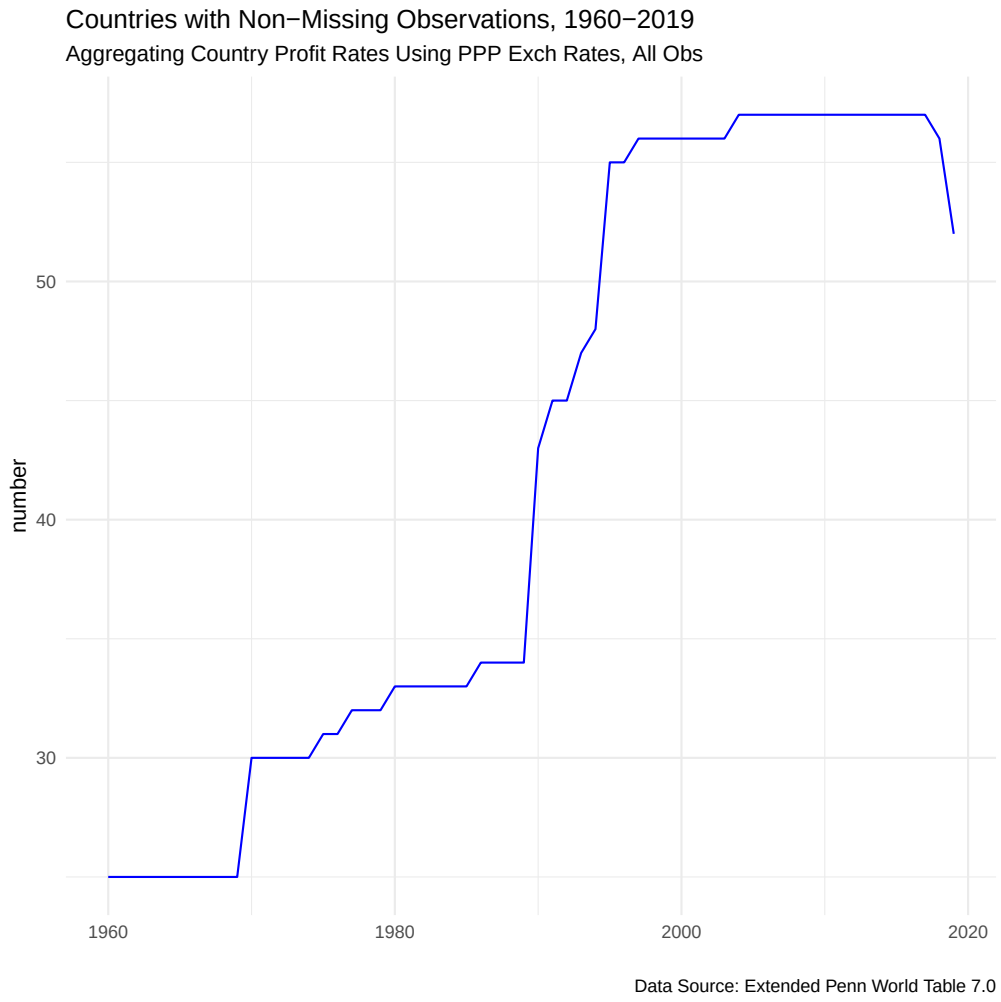

Figure 6: *Number of countries with non-missing observations that were used to compute world profit using PPP exchange rates between 1960 and 2019.*

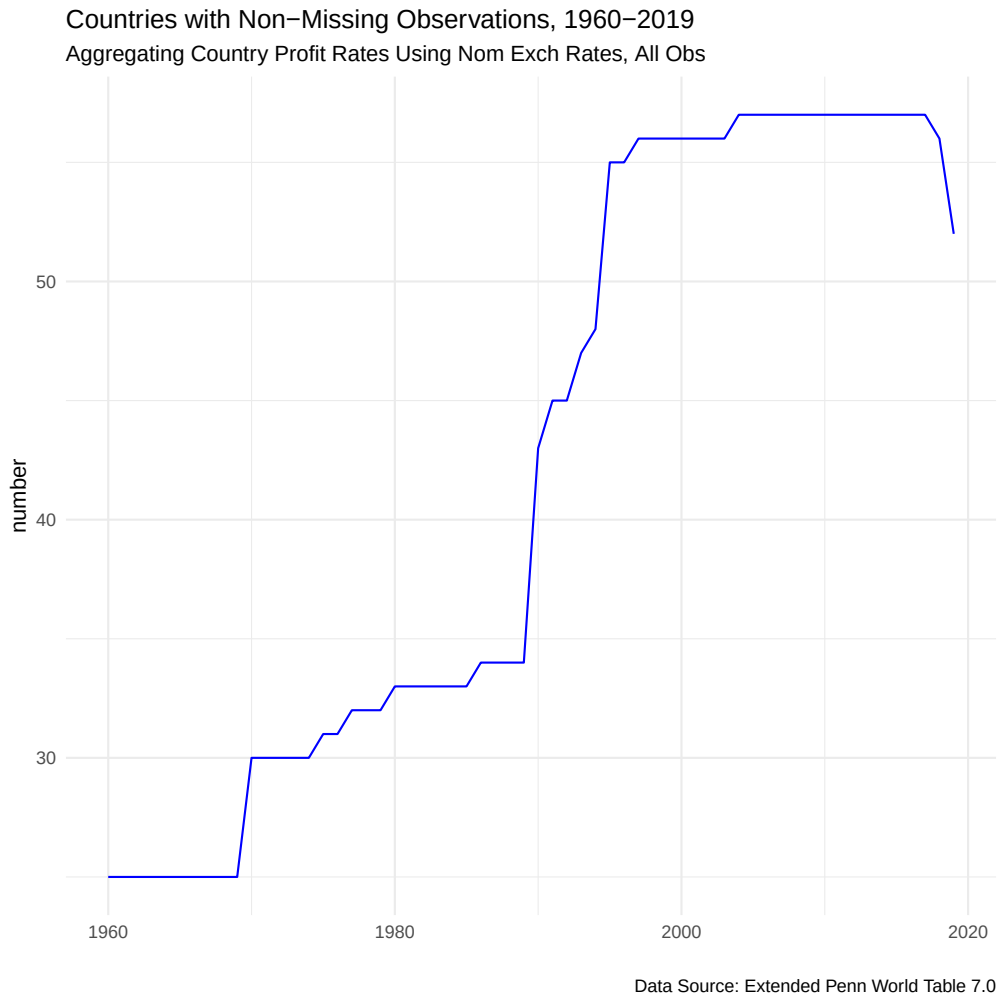

Figure 7: *Number of countries with non-missing observations that were used to compute world profit using nominal exchange rates between 1960 and 2019.*

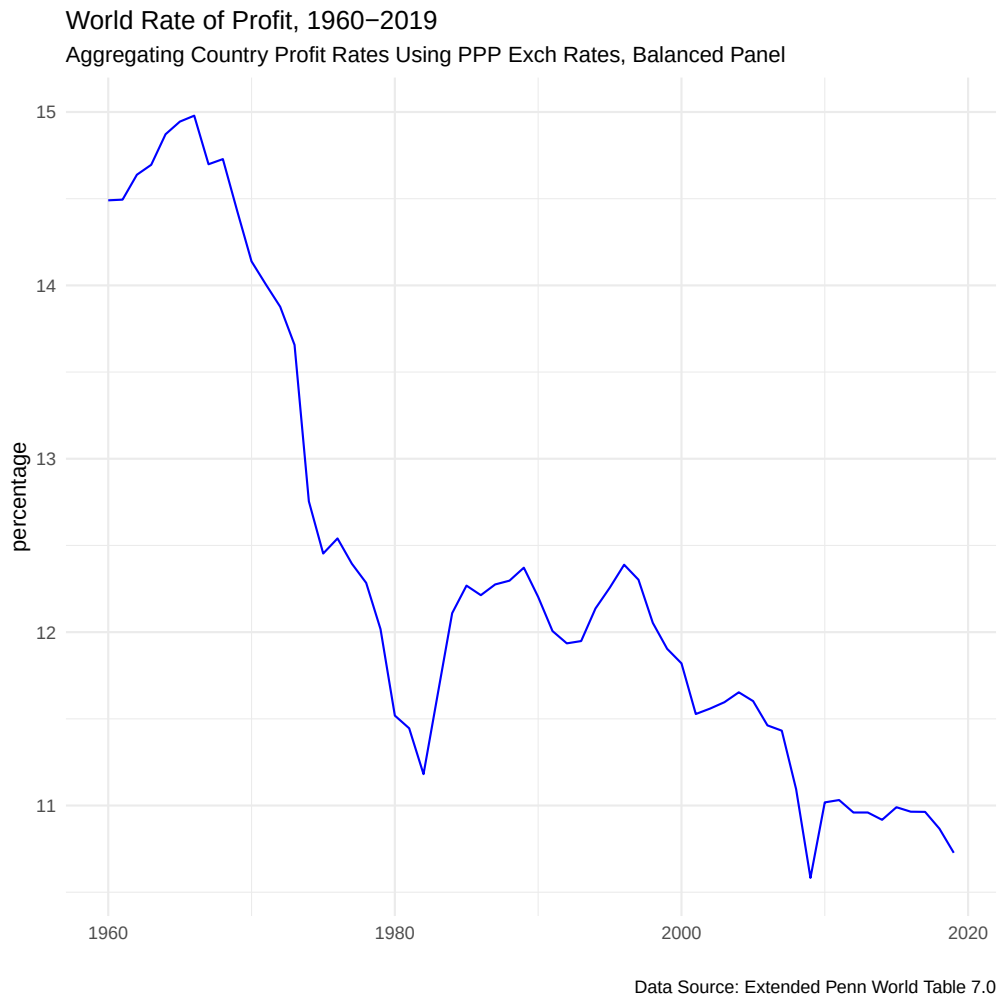

Figure 8: *World profit rate as the aggregate of country-level profit rates between 1960 and 2019. The aggregation uses PPP exchange rates to convert country-level variables into US dollars. A balanced panel of country-year observations are used for aggregation.*

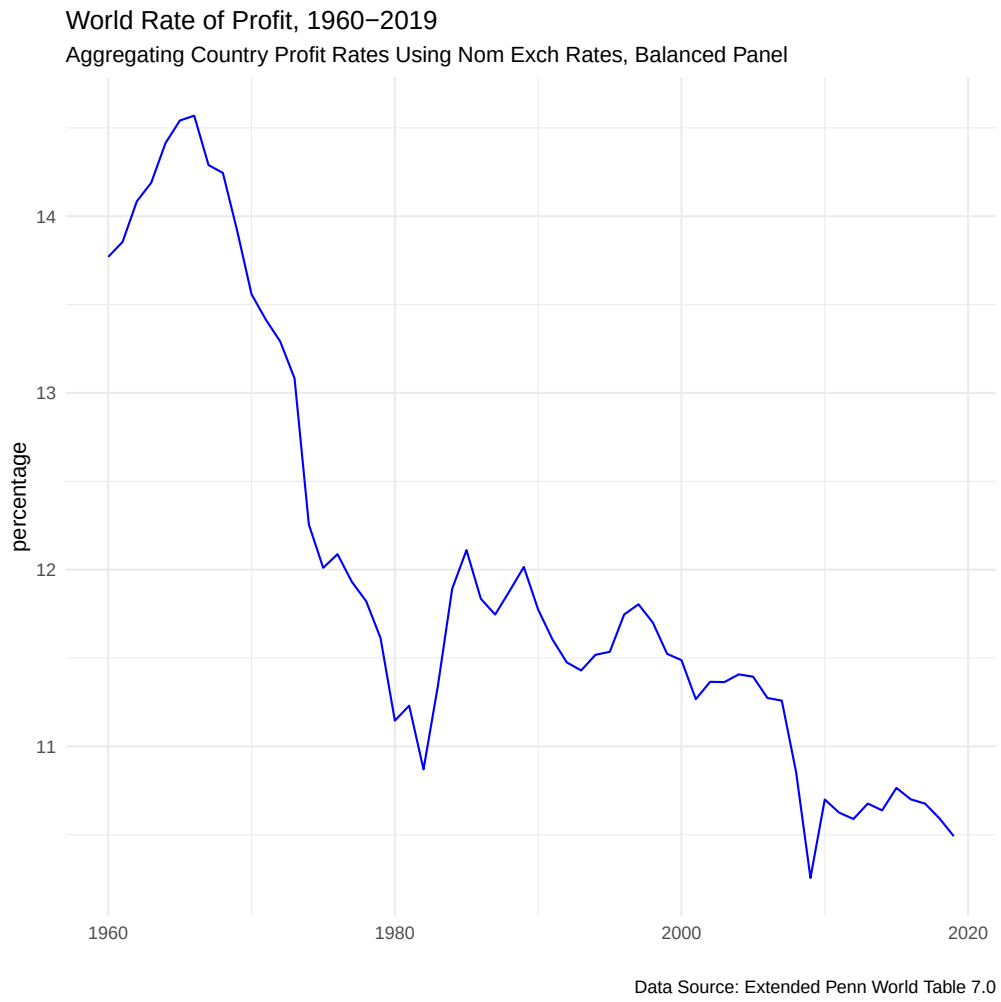

Figure 9: *World profit rate as the aggregate of country-level profit rates between 1960 and 2019. The aggregation uses nominal exchange rates to convert country-level variables into US dollars. A balanced panel of country-year observations are used for aggregation.*

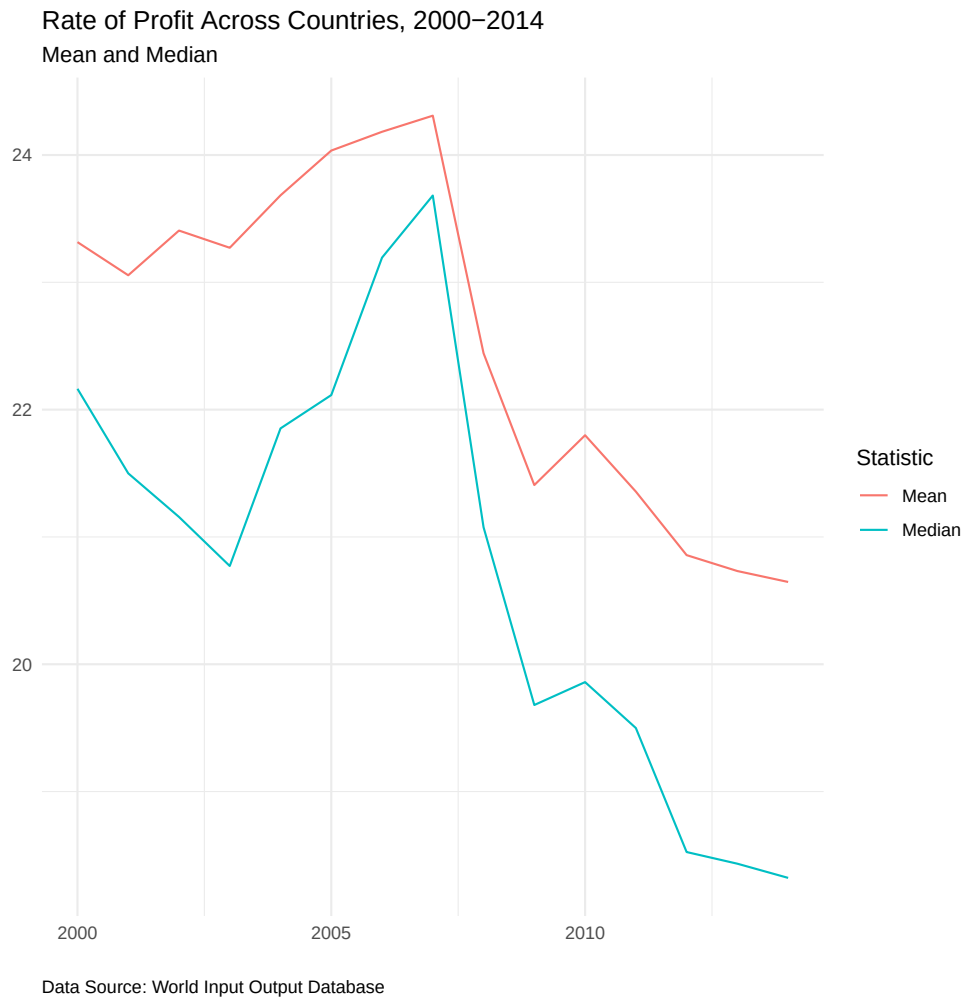

Figure 10: *Mean and median of industry-level profit rates in each year between 2000 and 2014. Industry-level magnitudes at the world level are constructed by aggregating country-level industry data using PPP exchange rates.*

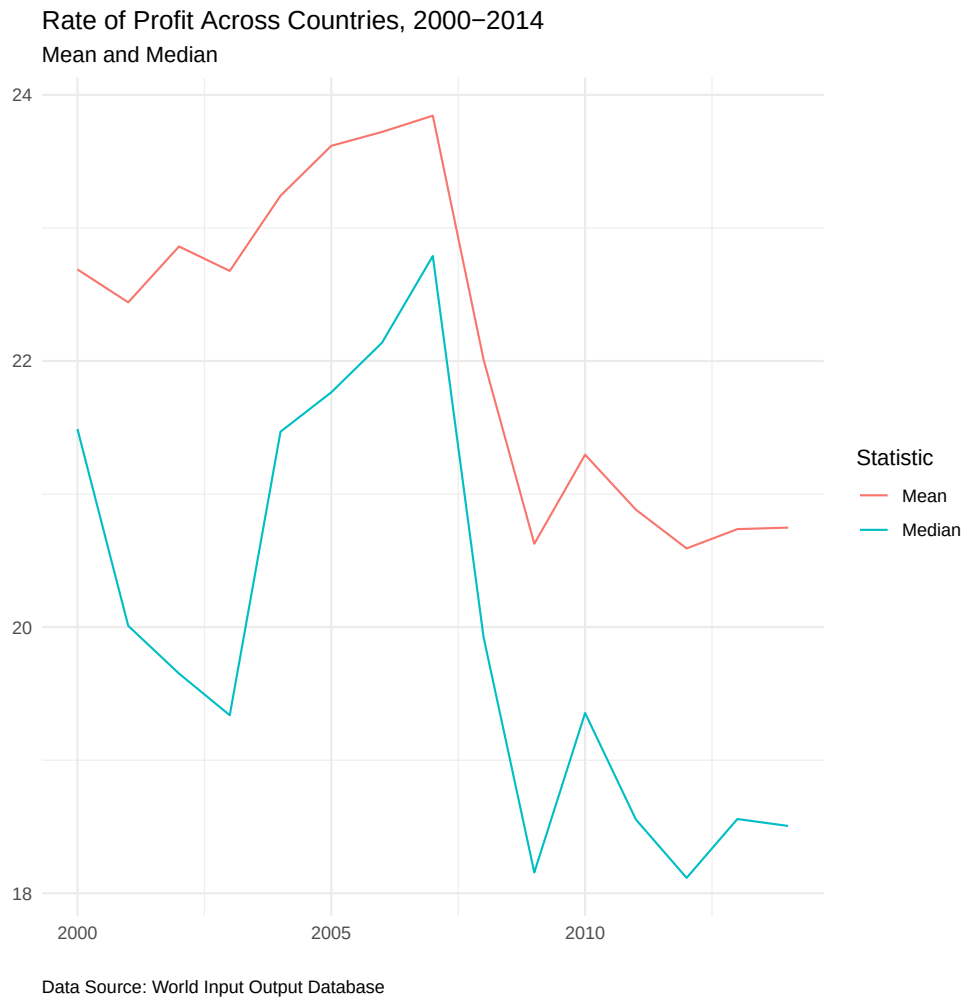

Figure 11: *Mean and median of industry-level profit rates in each year between 2000 and 2014. Industry-level magnitudes at the world level are constructed by aggregating country-level industry data using nominal exchange rates.*

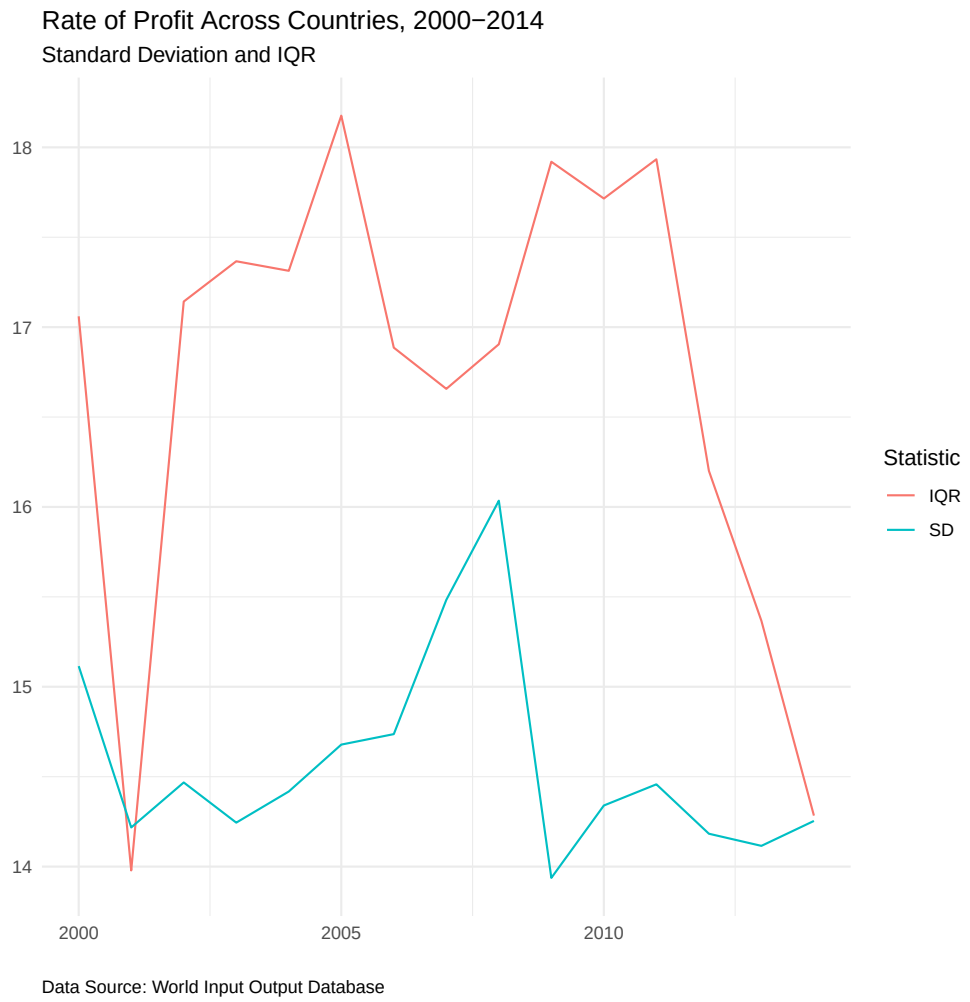

Figure 12: *Standard deviation and interquartile of industry-level profit rates range in each year between 2000 and 2014. Industry-level magnitudes at the world level are constructed by aggregating country-level industry data using PPP exchange rates.*

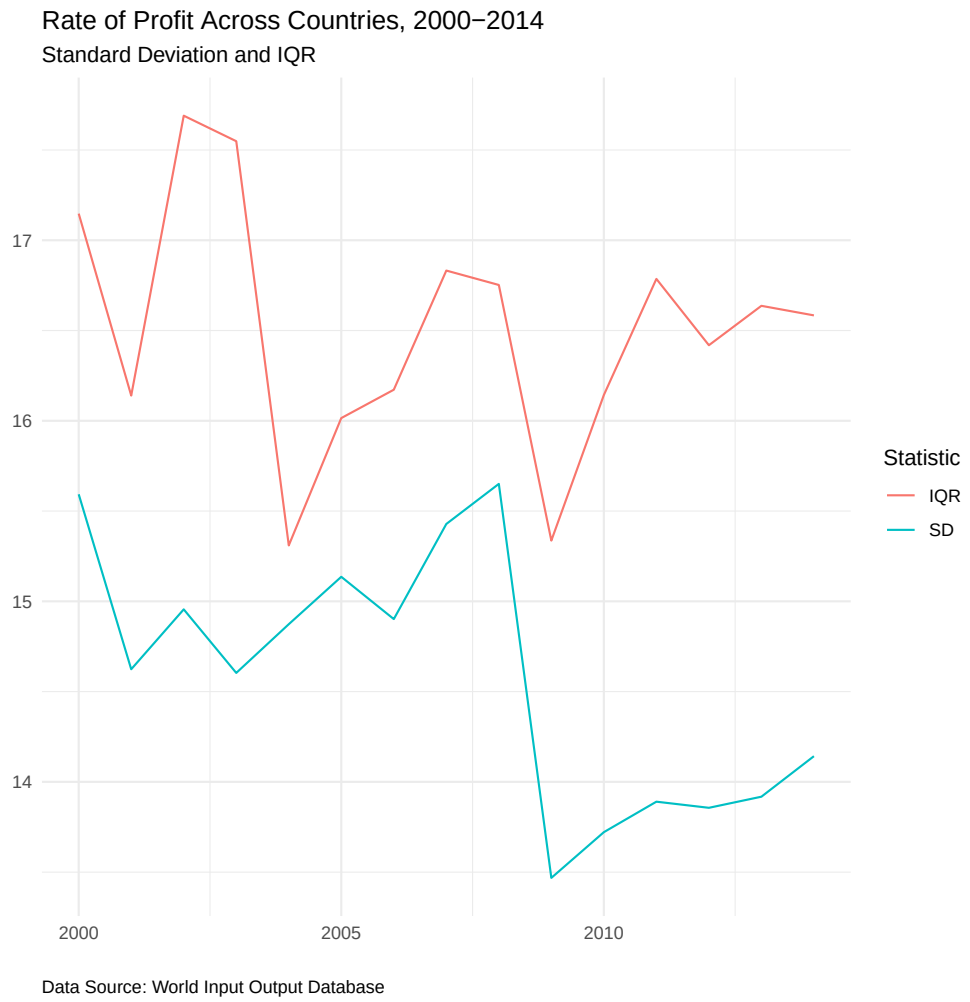

Figure 13: *Standard deviation and interquartile of industry-level profit rates range in each year between 2000 and 2014. Industry-level magnitudes at the world level are constructed by aggregating country-level industry data using nominal exchange rates.*

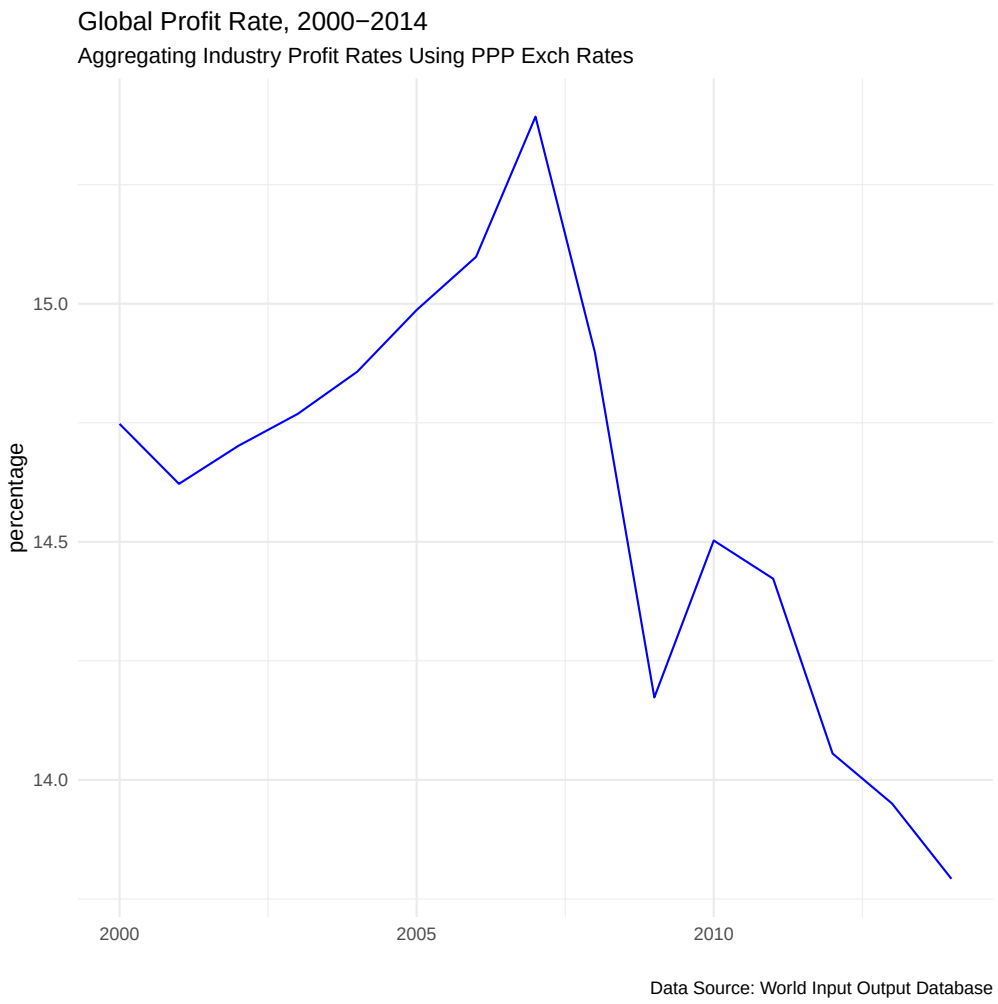

Figure 14: *World profit rate as the aggregate of industry-level profit rates between 2000 and 2014. The aggregation uses PPP exchange rates to convert country-level variables into US dollars magnitudes at the world industry-level, and then aggregates across industries to arrive at the world profit rate.*

Figure 15: *World profit rate as the aggregate of industry-level profit rates between 2000 and 2014. The aggregation uses nominal exchange rates to convert country-level variables into US dollars magnitudes at the world industry-level, and then aggregates across industries to arrive at the world profit rate.*