

A note on Esteban Maito's calculation of the secular profit rate in Germany

Gérard DUMÉNIL Dominique LÉVY

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Contact: gerard.dumenil@u-paris10.fr
Website: <http://www.jourdan.ens.fr/levy/>

1 Introduction

This paper is a note on Esteban Maito's calculations of the profit rate in Germany since the mid-19th century. We began to work on Maito's paper as it was discussed during a session during a Conference in King's College¹ (2014). We received a revised version when we sent the first draft of this note to Maito (2015, The "final draft").

This calculation is part of a gigantic and, in this respect quite impressive, research program, whose outcome was the determination of a "global profit rate" over a period of about one and a half century. The result is spectacular, since a steady decline of the global profit rate is revealed, thus, fully vindicating Marx's analysis and nurturing Maito's conviction of the key importance of the tendency for the profit rate to fall in Marx's thesis regarding the "transience" of capitalism.

Fourteen countries is much less than the entire globe, but still a lot, and the mid-19th century is a very early point of departure. Although, years ago, we put forward a similar calculation for the U.S. economy since 1869, we believe such ambitious calculations must be considered cautiously.

Long-term estimates are difficult. Data sets have been produced by historians of the economy, but the sources are scant and strong assumptions must be made. Thomas Piketty and Gabriel Zucman collected the results of these historical investigations for a number of countries and placed the series on the web, solving, at least, the problem of the access to data sets.² In the appendix to his paper, Maito refers to Piketty's and Zucman's tables. We decided to check the calculation for the first country in the list, namely Germany for which very high profitability levels are revealed during the second half of the 19th century in Maito's papers.

The basis of Piketty's and Zucman's estimates and, therefore, the source of Maito calculations for the early decades in Germany is the book by Walther Hoffmann, also the earlier co-authored book with Heinz Müller (Hoffmann and Müller, 1959; Hoffmann, 1965). Much more research and competence would be required to assess Hoffmann's sources and their pos-

1. Workshop on Crises and Transformation of Capitalism: Marx's investigations and contemporary analysis 27-8 May 2015 in King's College London, organized by Alex Callinicos Eduardo da Motta e Albuquerque.

2. <http://piketty.pse.ens.fr/en/capitalisback>.

sible use for a calculation of profit rates. This is not, anyhow, the object of the present note limited to Maito's use of Hoffmann data, while the relevance of these data is hypothesized. We limit the investigation to the 19th century and the beginning of the 20th century to World War I.

Maito sent us an excel file where his estimates in the second paper are more carefully described. This is the basis of what follows. In Maito's first paper, the profit rate for Germany in his Figure 2 fluctuated between 30 percent and 50 percent during the 1870s and 1880s, that is, significantly higher than in his second paper and as shown in the series read in the worksheet we received, where the profit rate fluctuates between 25 percent and 40 percent during the two decades.

Our assessment is straightforward:

1. Maito's estimates in one or the other of his calculations are not reliable due the incoherent treatment of the various components of profits and capital.
2. The correction made from one paper to the next is not appropriate.
3. The required corrections has large consequences. The average profit rate during the 1870s and 1880s in Maito's worksheet and second paper is 28 percent. The average profit rate during the same decades is, in our calculation, 6.3 percent.

Taking Maito's measures for the 21st century at face value, a horizontal or upward historical trend of the profit rate would be revealed. In any instance, beginning with such low profit rates during the second half of the 19th century, no calculation of profit rates for the early 21th century could support the thesis of a downward trend.

This note does not investigate Maito's calculations for other countries. In the Figure 5 of Maito's second paper, profit rates of about 50 percent are shown after 1850 in the Netherlands and Sweden. It is hard to imagine the coexistence of such rates with the corrected estimates of 6.3 percent for Germany during the same years.

More work is obviously necessary and seems actually underway. The research program in Li, Xiao, and Zhu 2007 is less ambitious. The United States and the United Kingdom are considered since the 19th century, Japan since 1905, and countries of the Euro zone from 1963 onward. With

respect to Germany, one can cite the work by Thomas Weiß 2015. We will not discuss here the methods used in such studies.

2 Data

The section successively considers the data on income and capital from Hoffmann, as in Piketty’s and Zucmann’s file.

2.1 Income

The data on income are from the worksheet DataDE1c of Piketty and Zucmann.³ The notation and the definitions of the variables are respectively shown in the first and second columns of Table 1. (The notation is ours.) The last column provides the column letters of the series in Piketty’s and Zucman’s worksheet.

Table 1 – Incomes in Hoffman’s data (Worsheet DataDE1c)

Symbol	Variable	Column
Y_K	Total capital income	X
Y_B	Business capital income	Y
Y_H	Housing capital income	Z
Y_A	Agricultural capital income	AA
Y_F	Net foreign capital income	AB
Y_L	Total labor income	AD
α	Share of self-employed in Total labor income (1882-1907)	BR

One can check that $Y_K = Y_B + Y_H + Y_A + Y_F$. (In Hoffmann’s data, there is no Government income.⁴)

A well-known difficulty in the assessment of various categories of income is the existence of self-employed workers (SEWs). In worksheet DataDE1c, data concerning the share, α , of the number of SEWs in the

3. Germany.xls. <http://piketty.pse.ens.fr/en/capitalisback>.

4. A very small Capital income of the Government can be found in Worksheet DataDE1c, Column AR, derived from another source.

total employed population (self-employed and salaried workers) is only provided for the period 1882-1907. In Maito's worksheet (column X), additional data are given for the period 1868-1881 and after 1907. (The series varies linearly with time and can reasonably be retropolated for the earlier years, 1851-1867.) The number of SEWs is, therefore:

$$\text{Number of self-employed workers} = \alpha \text{ Total number of workers}$$

Under the assumption made by Maito that the average income of a SEW is equal to the average income of a worker (from any category), the total income of SEWs is:

$$Y_S = \alpha Y_L$$

The key issue is to determine whether this income must be considered as labor income, capital income (profits), or a mix of labor and capital incomes. Maito treats the total of self-employed income as profits.

Finally, Maito's definition of profits is:

$$\begin{aligned} \text{Profits} &= \text{Total capital income} + \text{Self-employed income} \\ \Pi &= Y_K + Y_S \end{aligned}$$

2.2 Capital

The same worksheet provides data on private and government fixed assets. Tables 2 and 3 are built along the same lines as Table 1.

Table 2 – Private fixed assets in Hoffman's data (DataDE1c)

Symbol	Variable	Column
A_N	Nonfinancial assets	BT
A_L	Land	BU
A_A	Agricultural fixed assets (excluding land)	BW
A_B	Business assets	BX
A_H	Houses	BY

One can check that $A_N = A_L + A_A + A_B + A_H$.

Table 3 – Government fixed assets in Hoffman’s data (DataDE1c)

Symbol	Variable	Column
A_G	Government fixed assets	CH
A_E	Public buildings	CI
A_R	Public railways at market value	CJ
A_K	Public constructions	CN

One can check that $A_G = A_E + A_R + A_K$.

The definition given by Maito of Government fixed assets, A_P , excludes Public buildings, and conserves Public railways and Public constructions:

$$A_P = A_G - A_E = A_R + A_K$$

Finally, Maito’s definition of Capital (government and private) is:

Capital = Business assets + Government fixed assets

$$K = A_B + A_P$$

This definition is narrow, as it excludes Agricultural fixed assets.

3 A critical assessment

Two criticisms are put forward regarding the lack of coherence in the definitions of profit rates and the questionable treatment of the income of self-employed workers.

3.1 The lack of coherence

Maito’s profit rate calculated according to his definition of profits and capital is:

$$r_M = \frac{\Pi}{K} = \frac{Y_K + Y_S}{A_B + A_P} \quad \text{with} \quad Y_K = Y_B + Y_H + Y_A + Y_F \quad (1)$$

The definitions of profits in the numerator of the profit rate and capital in the denominator in Equation 1 are not compatible:

1. Since Agricultural capital income is part of profits, Agricultural fixed assets (an important component of capital in those years) must be added to capital besides A_B and A_P . Excluding the price of land from capital is a reasonable option given the complexity of the issue (Section 4.5).
2. A second incoherent treatment is that housing capital income is included as a component of profits while Houses are not part of capital. Housing capital income is the sum of rents actually paid to owner and primarily fictitious rents that the owners of self-occupied homes would pay to themselves. Such incomes cannot be treated as components of capital income in the determination of a profit rate à la Marx. Thus, the best option to ensure the consistency of the ratio is to exclude both housing income and capital.
3. In a similar manner, Net foreign capital income is included as a component of profits while the corresponding capital (a stock of securities) is not part of capital. The best option is also to exclude both profits and capital.
4. It is not possible to include (a selected fraction of) the Government fixed assets within capital, since no profit is considered in the data for this capital despite the inclusion of Railways. (The fact that government investment in infrastructures contributes to the profitability of firms is of another nature and would require a specific investigation.)

3.2 The treatment of self-employed income as profits

It is not possible to consider the total of self-employed income as profits. SEWs—small farmers, craftsmen, and the like—are also workers.

Within contemporary national accounting frameworks two distinct series, respectively the income of SEWs and wages (total labor compensation), are considered. On this basis, a “wage equivalent” can be determined for SEWs under the assumption that their labor would be paid at the same rate as salaried workers. This average wage is then multiplied by the number of SEWs, yielding a “wage equivalent” for SEWs, and the excess of self-employed income over this wage equivalent can be treated as a “profit equivalent”. The two “equivalents” are, respectively, added to wages or profits.

In Hoffmann’s data, the only available series is Total labor income, Y_L , including the income of SEWs, and the share, α , of SEWs in total employment. Maito assumes that SEWs are paid at the same rate as other workers. Under this assumption, there should logically exist no “profit equivalent” and thus nothing to add to Total capital income. But, as mentioned earlier, Maito treats the entire share of SEWs in labor income as profits.

4 Six profit rates

This section establishes the link between Maito’s estimates of the profit rate and what could be, in our opinion, a relevant definition. This definition is nothing else than the straightforward average profit rate of Agriculture and Business. Section 4.4 is here the key section devoted to the quantitative assessment of Maito’s miscalculations (as in Figure 2). We finally further discuss the results obtained for Agriculture and Business, separately and jointly considered.

4.1 A cumulative chain of corrections

As suggested in the previous sections, Maito’s profit rate, r_M , in Equation 1, must be corrected in various respects. The subscript in the notation used for r indicates the number of corrections, as corrections are cumulative:

1. *Correcting for the omission of agricultural capital.* r_1 is defined as r_M but including Agricultural fixed assets in capital in the denominator:

$$r_1 = \Pi / (K + A_A)$$

2. *Further correcting for Housing capital income and Net foreign capital income.* Housing capital income and Net foreign capital income are subtracted from profits in the numerator since the corresponding assets are not included in the denominator:

$$r_3 = (\Pi - Y_H - Y_F) / (K + A_A)$$

3. *Further correcting for the inclusion of Public fixed capital in capital.* Public Fixed Capital is subtracted from capital in the denominator:

$$r_4 = (\Pi - Y_H - Y_F)/(K + A_A - A_P)$$

4. *Further correcting for the treatment of the income of SEWs as profits.* Self-employed income is subtracted from profits:

$$r_5 = (\Pi - Y_H - Y_F - Y_S)/(K + A_A - A_P)$$

4.2 Straightforward estimates

The chain of the five above corrections leads to the determination of the average profit rate for two sectors of the economy, namely Agriculture and Business, which could have actually been the straightforward point of departure of the derivation of profit rates from Hoffmann's data:

$$r_5 = r_{AB} = (Y_A + Y_B)/(A_A + A_B)$$

This finding suggests the separate calculation of the profit rates of the two sectors which can also be directly determined from the data:

$$r_A = Y_A/A_A \quad \text{and} \quad r_B = Y_B/A_B$$

4.3 Profit rates in Maito's papers and worksheet

Three alternative series are actually involved in Maito's profit rates:

1. Maito's profit rate as calculated above is slightly different from the profit rate read in his file and shown in his second paper. To distinguish between the two rates, we use the notation r_{M_1} for Maito's profit rate as in Equation 1, and r_{M_2} as read in Maito's table.

2. A major difference is observed between the profit rate in Maito's worksheet and second paper, and the series shown in Figure 1 of his first paper. In the series used in the first paper, only Business fixed assets were considered, instead of the joint consideration of Business fixed assets and two components of Government fixed assets in the second paper (while the definition of profits is the same):

$$r_{M_3} = \frac{Y_C + Y_S}{A_B} = \frac{Y_B + Y_H + Y_A + Y_F + Y_S}{A_B}$$

As can be expected, when the narrower definition of capital was used, the ensuing profit rate was even larger. As contended in Section 3.1, Maito’s new definition is not an improvement in any sense.

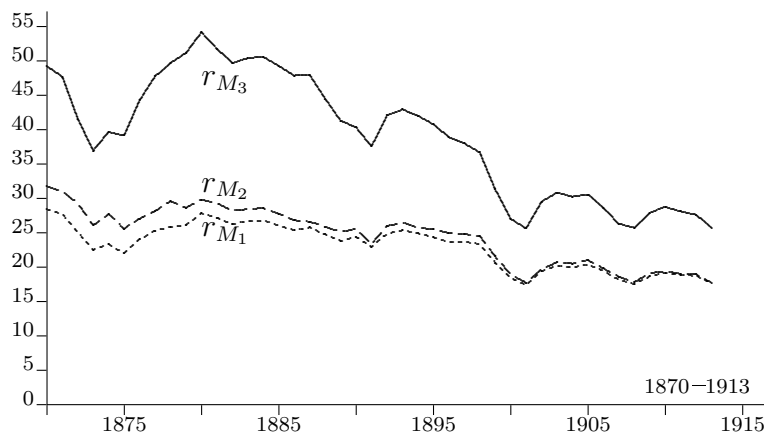


Figure 1 – *Three definitions of profit rates from Maito*

r_{M_1} is the result of our calculation of the profit rate using Maito’s definition. r_{M_2} is the profit rate “read” from Maito’s worksheet and shown in his second paper. (The negligible difference between the two series is due to discrepancies in the data.) They both strikingly differ from r_{M_3} , the reconstruction of Maito’s series in Figure 1 of his first paper.

The three estimates for r_{M_1} , r_{M_2} , and r_{M_3} are shown in Figure 1. The minor difference between r_{M_1} and r_{M_2} is due to the discrepancy between two measures of National income, namely “National income, expenditure approach”, and “National income, income approach”. The major difference is between r_{M_3} and the two other rates. Our reconstruction in r_{M_3} is straightforwardly evocative of Maito’s curve for Germany in Figure 1 of his first paper, except for the latter years where r_{M_3} declines less than in Maito’s figure.

The discussion in the following section abstracts from Maito’s measure in his first paper and focuses on his worksheet and second paper.

4.4 Assessing consequences (Maito’s second paper)

Figure 2 shows the values of four profit rates, r_{M_1} , r_1 , r_2 and r_3 . (In Maito’s worksheet, reservations are made concerning the unreliable character, as mentioned by Piketty, of the data prior to 1870. The results

of the calculation for earlier years, given Hoffmann's data, are presented in our figure only for information purposes.)

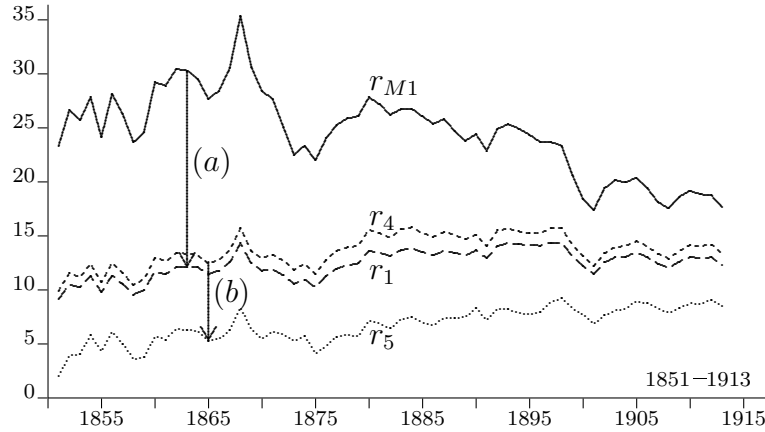


Figure 2 – *Alternative uses of Hoffmann's data: The gradual correction of Maito's profit rates in Germany during the second half of the 19th century*
 The definitions of profit rates are given in Section 4.1, beginning with Maito's profit rate r_{M_1} as read in his worksheet. r_5 is the outcome of five cumulative corrections, 5.5 percent in the 1870s compared to 28.4 percent for r_{M_1} . As suggested by Arrow (a), the main correction is the introduction of consideration of Agricultural fixed assets into Maito's calculation.

At the bottom of the set of curves, one can observe the profile of r_5 , cumulating the five corrections, also the average profit rate of Business and Agriculture considered jointly, which we consider as the most realistic measurement given Hoffmann's data. The values and trend observed for r_5 reveal an upward trend from 5 to 9 percent, to be compared to Maito's estimates, r_{M_1} , on top of the figure, with profit rates four or five times larger and a declining trend from 30 percent to less than 20 percent during the period.

A closer examination of Figure 2 shows that the major miscalculation in Maito's estimates is the exclusion of the fixed capital of Agriculture (whose effect is symbolically represented by Arrow (a)) to which about 20 percentage points (within almost 30) can be imputed during the first half of the period. A second difference of about 5 or 6 percentage points is the effect of the treatment of the total income of SEWs as profits (Arrow (b)). About two percentage points can be pinned on the treatment of Houses and Public capital. (Net foreign capital income is negligible.)

4.5 Profit rates in Agriculture and Business

Figure 3 shows the ratio of Agricultural fixed assets and Business fixed assets. In the middle of the 19th century, fixed assets in Agriculture were 2.5 larger than in Business. The ratio diminished to the end of the century and, in 1898, the two stocks of assets were equal. The figure also shows the ratio of profits in the two sectors. During the first decades the profits in Agriculture were equal to those of Business, and declined to half of the profits of Business after 1900.

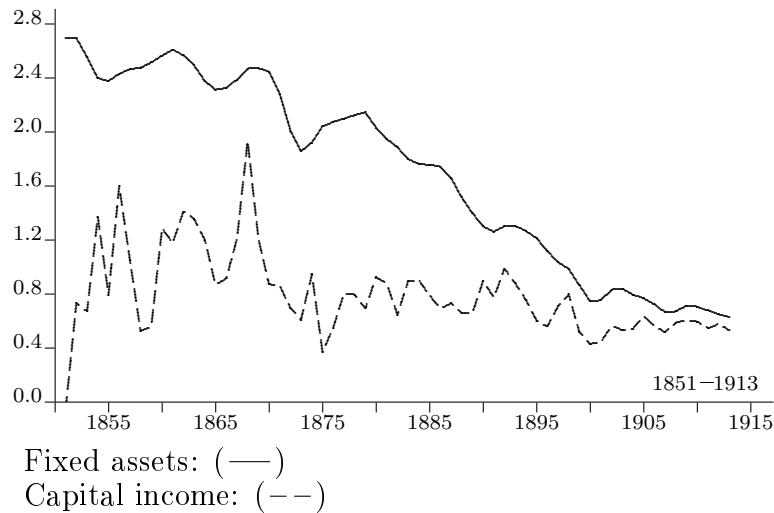


Figure 3 – Hoffmann’s data: The ratios of (1) Agricultural fixed assets and Business fixed assets, and (2) Agricultural capital income and Business capital income

The two ratios illustrate the comparative size of the two sectors Agriculture and Business. The first ratio emphasizes the importance of Agricultural fixed assets, that Maito neglects in his computation of profit rates.

The exclusion of land by Maito from the nonfinancial assets of Agriculture was certainly the best choice. (A first difficulty is that not only agricultural land is considered in the data.) It must be emphasized, however, that this issue is controversial. For example, Piketty contends (2014, 197) that in the late 19th century investments and improvements already accounted in Britain and France for “three-quarters of the value of land and probably more”. If such ratios were considered for Germany during the second half of the 19th century, the profit rate for the aggregate

economy would be further dramatically reduced. We do not know how Hoffmann solved these problems. This is, however, an example of what we meant in the introduction to this paper, referring to the necessary critical assessment of Hoffmann's sources and methods.

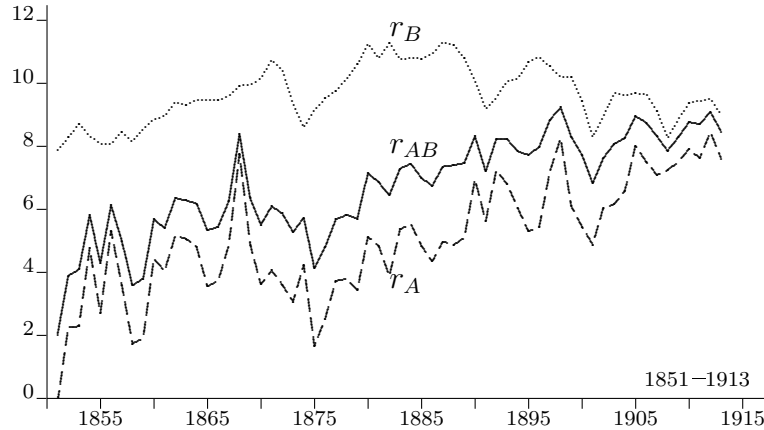


Figure 4 – Hoffmann's data: The profit rate of Agriculture and Business r_A and r_B are respectively the profit rates of Agriculture and Business, straightforwardly derived from Hoffmann's data, that is, the simplest and best measures of profitability in Germany during these data. r_{AB} is the average profit rate for the two sectors. The rise of the profit rate of Agriculture from 1875 onward reveals a catching-up of the profitability of the sector with business rates, and is at the origin of the upward trend of the average profit rate of the two sectors.

Figure 4 shows the profit rates in Agriculture and Business, and in the average of the two sectors as in $r_5 = r_{AB}$. Agriculture was not only large but also profitable. The main result is that, though the profit rate of Business was larger than the profit rate of Agriculture during the first half of the period, the strict limitation to Business would not have yielded a decline of the profit rate prior to World War I.

5 Conclusion: A secular upward trend of the profit rate?

To sum up, in our opinion, a number of miscalculations in Maito's attempt to determine secular profit rates in Germany led to unrealistic estimates, and the dramatic historical downward trend of the profit rate

from the 19th century to World War I vanishes when the necessary corrections are made. Beginning with the low values of profit rates revealed in Hoffmann's data for the 1870s and 1880s, it is hard to imagine a historical declining trend up to the early 21st in these measures.

This does not mean, obviously, that the framework of trajectories à la Marx and the thesis of the historical character of capitalism are disproved. First, the relevance of Hoffmann's data in a calculation of profit rates cannot be taken for granted; second, the dynamics of capitalism are more complex (Duménil and Lévy, 2016).

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