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AN OVERLOOKED SCENARIO OF “RESWITCHING” IN THE AUSTRIAN STRUCTURE OF PRODUCTION

ER’EL GRANOT*

JEL CLASSIFICATION: B53, E43, L11, L16, D24, B25, L23

ABSTRACT: Since Samuelson’s (1966) reswitching example in the 1960s, it became clear that the Average Production Period (APP) is not necessarily a decreasing function of the interest rate. Recently, Fillieule (2007) and Hülsmann (2010) have shown that Samuelson’s example is not a mere curiosity. They showed that in a reasonable production structure model, the length of production increases with the interest rate instead of decreasing. However, their model did not present “reswitching” behavior. In this paper a generic model of the structure of production, in which both Fillieule’s and Hülsmann’s models are specific cases, is presented. It shows that the APP has a *nonmonotonic* dependence on the interest rate, which resembles a “reswitching” behavior: it increases for low-interest rates up to a maximum value, and then decreases back to almost the initial value. The decrease occurs within a relatively narrow range of interest rates, which may explain why it was missed in the literature.

INTRODUCTION

Recently, there has been a revival in the interest in the reswitching debate. The debate is part of the Cambridge capital debate, which took place during the 1960s and 1970s (Harcourt 1972, 1976;

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Cohen and Harcourt 2003). While the capital debate did not end with a clear conclusion, Samuelson (1966) used a nice pedagogical example to illustrate the problem, in what was considered to be one of the main pillars of economics. One of the conclusions of Böhm-Bawerk's intratemporal studies was that the players' time preference determines the pure rate of interest (PRI), and therefore when the PRI decreases the entrepreneur seeks more productive roundabout production processes (Böhm-Bawerk 1959). Consequently, it seems that the natural conclusion is that when the PRI decreases, the structure of production lengthens.

This conclusion affected not only the neo-classical school but significantly influenced the Austrian school of thought. Hayek (1933, 1935) developed Jevons's structure of production and Böhm-Bawerk's analysis in his business cycle studies. Rothbard (2008) developed Hayek's treatment by integrating the interest rate in the structure of production. The general structure appears in more modern writings.¹

The reswitching debate did not have a considerable impact on the Austrian school, probably because it was not regarded initially as more than a mere curiosity. Moreover, it is true (see Murphy [2003]) that the validity of reswitching does not fundamentally contradict Böhm-Bawerk's claim that the entrepreneurs' time-preferences is directly related to their willingness to lengthen or to shorten the production process. In fact, the reswitching effect does not contradict any fundamental praxeological law. However, does it affect the structure of production?

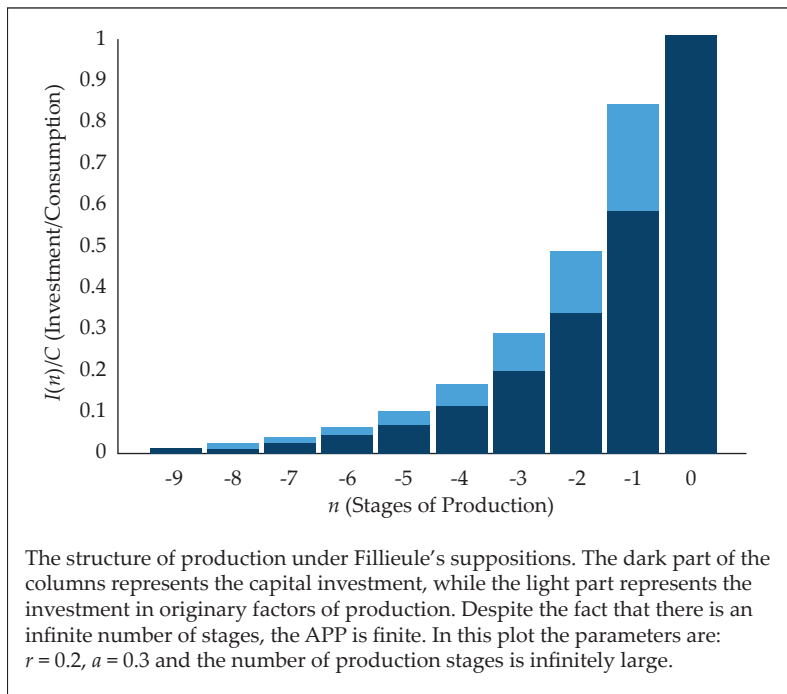
Fillieule (2007) constructed a simple model for the structure of production. In his model the structure of production consists of infinite stages of production, i.e., the structure of production begins at the dawn of humanity. Moreover, it was taken that in every stage the ratio between the amount of money invested in original factors of production (labor and land) and the amount of money invested in capital goods is a given constant ratio.

Under these fundamental propositions, the structure of production has an exponential shape. That is, the structure of production decays exponentially the higher one goes in the production's stages, since the

¹ See, e.g., Skousen (1990), de Soto (2006).

ratio between the amounts of investment in adjacent stages is fixed. An example of such a production structure is illustrated in Fig. 1.

Figure 1.



Due to the fixed ratio between adjacent stages of production, the calculation is relatively simple and straightforward. In this case, the Average Production Period (APP) was found to be (Fillieule 2007)

$$(1) \lambda = \frac{I}{C}(1+r)$$

where λ is the APP, I stands for total investment, C is the amount of consumption and r is the interest rate per stage of production.

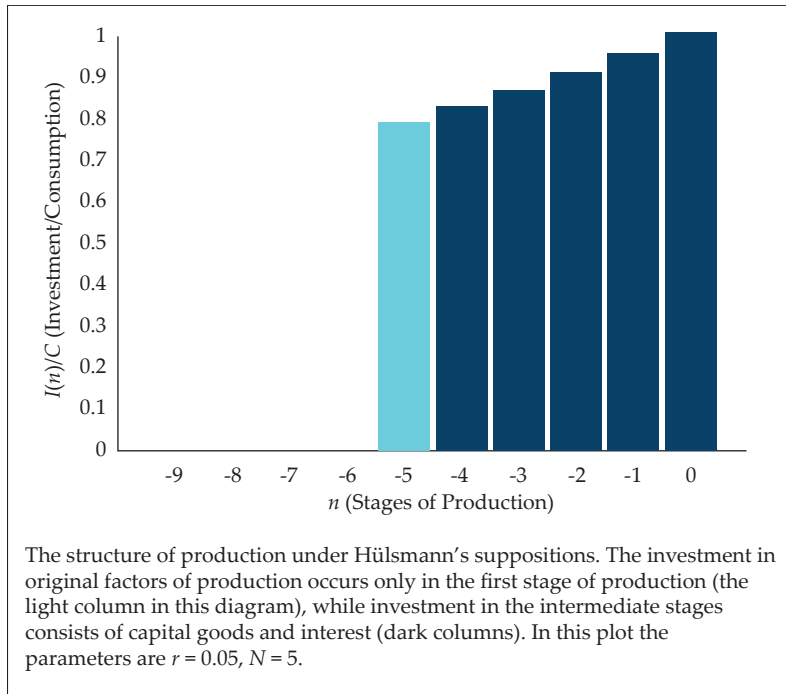
It should be noted that in the literature the stages are usually numbered by positive numbers, however, to be consistent with the fact that stage 0 is the final stage, I chose to present them as negative numbers. This notation is also consistent with the terminology:

“1st stage of production”, “2nd stage of production” etc. 1st cannot correspond to 9, but it may correspond to -9.

Hülsmann (2011) took a similar approach, but with several differences, which have to be stressed. In Hülsmann’s production structure model, there is a finite number of production stages. Furthermore, it is assumed that capitalists pay for original factors of productions (land and labor) only at the beginning of the production process. In the intermediate production stages, capitalists pay only for capital goods plus interest. Furthermore, his research focuses on a low interest rate, in which case the structure of production has a trapezoidal shape (as in Hayek’s model). An example of such a production structure is presented in Fig. 2 (again, one can see that I use negative numbers to represent the stages of production because production takes place in the present).

To simplify the discussion, Hülsmann (2011) did not present a formula, and instead, numerical results were presented. However, straightforward derivation reveals that in the low interest regime (the most relevant one, and the one which creates the trapezoidal shape), the dependence of the number of production stages (N) on the interest rate (r) is (see Eq. 6 in Appendix A)

$$(2) N \cong \frac{I}{C} \left[1 + \left(\frac{I}{C} + 1 \right) \frac{r}{2} \right].$$

Figure 2.

A more accurate derivation, which is valid for $0 < r < C/I$, shows that (these expressions *do not* appear in the original paper, but are derived in Appendix A as Eqs. A5 and A6).

$$(3) N = \frac{\ln\left(1 - r \frac{I}{C}\right)}{-\ln(1+r)},$$

Both the numerator and denominator of Eq. 3 increase with the interest rate, however, since in the numerator r is multiplied by a larger number $I/C > 1$ then the number of stages is an increasing function of the interest rate. Moreover, as r increases and tends toward C/I from below, then the number of stages diverges, i.e., $N \rightarrow \infty$.

Therefore, we recognize that in both models the length of production (LOP) *increases* with the interest rate, which, as was emphasized by Hülsmann, is in clear contrast to the Austrian understanding of the structure of production.

Machaj (2015, 2017) tried to solve the inconsistency between these results and the Austrian literature by emphasizing the importance of the Intertemporal Labor Intensity (ILI) in the production's structure. According to this terminology, ILI indicates the amount of money being spent on original factors of production in the earlier stages of production relative to the later stages.

High ILI corresponds to the case where most wage payments, i.e. labor investment, are concentrated in the early stages of the production process. Low ILI corresponds to the opposite case, where most wages are paid in the last stages of production. Machaj does not quantify the relation between the ILI and the correlation between the LOP and the interest rate; however, it seems that he relates low ILI with negative correlation and high ILI with a positive one. This tool helps him to explain the positive correlation between the LOP and the interest rate in Hülsmann's and Fillieule's model, since, *according to him*, in both models the ILI is high (see Machaj [2017, 78]).

Clearly, the ILI has an important impact on the structure of production. However, how can it explain the inconsistency between the Austrian literature and the results of Hülsmann and Fillieule? After all, contrary to Machaj's claim, the ILI is completely different in the two models.

In Hülsmann's case, the ILI is clearly high (since labor is invested only in the first stage of production). However, in Fillieule's model, most of the labor investment is concentrated in the last stages of production (after all, there are infinitely many stages, but the labor investment increases exponentially), and therefore the ILI is definitely low, *regardless of the interest rate*.

Nevertheless, both models present a positive correlation between the LOP and the interest rate (provided the ratio between investment and consumption is fixed).

Therefore, knowing the ILI is insufficient to determine whether the LOP increases or decreases as a function of the interest rate.

Moreover, the ILI is not a well-defined quantity. If ILI is a measure of the average period of labor investment, then it is almost identical to the Böhm-Bawerkian definition of the APP. Then it is clear that the APP is low whenever the ILI is low and vice versa. Therefore, the ILI does not add information to the question about whether the APP will

increase or not; the ILI is the *solution* to this question. But, as we will see below, the situation is even more complicated than that.

Hülsmann emphasized that it is not surprising that in both models the same positive tendency appears, i.e., LOP increases with interest rate, because, according to him, they basically followed the same methodology. However, a close inspection reveals major differences.

Nevertheless, despite the differences between the two models, they are, basically, two specific cases in a more generic one.

CONSTRUCTING THE GENERIC MODEL

The generic model, is the case where there is a finite number of production stages N (like Hülsmann's, Hayek's and Rothbard's models), but in every production stage the investment consists of capital investment, whose fraction is $(1-a)$, investment in original factors (OF), whose fraction is a (as in Fillieule's model) and interest fraction r (it should be noted that only when the time period of a single stage is one year does r stand for the annual interest rate). Mathematically, it means that the amount of money capitalists spend in the $-n$ th stage is I_{-n} and the consumption at the final stage (stage zero) is equal to c , i.e.,

$$(4) \text{ expenditure} = \begin{cases} I_{-n} & n \geq 1 \quad (\text{investment}) \\ C & n = 0 \quad (\text{consumption}) \end{cases}$$

In the first production stage of high-level goods, the investment is equal to

$$(5) I_{-1} = C / (1 + r)$$

In general, the expenditure on OF of production at the n th stage of production is

$$(6) I_{OF(-n)} = \begin{cases} aI_{-n} & n < N \\ I_{-n} & n = N \end{cases}$$

that is, in the intermediate states only a fraction a out of the entire investment is dedicated to OF, while in the first production stage all investment is directed to it.

Therefore, the investment in capital products at the $-n$ th stage of production is

$$(7) \quad I_{KG(-n)} = \begin{cases} (1-a)I_{-n} & n < N \\ 0 & n = N \end{cases}$$

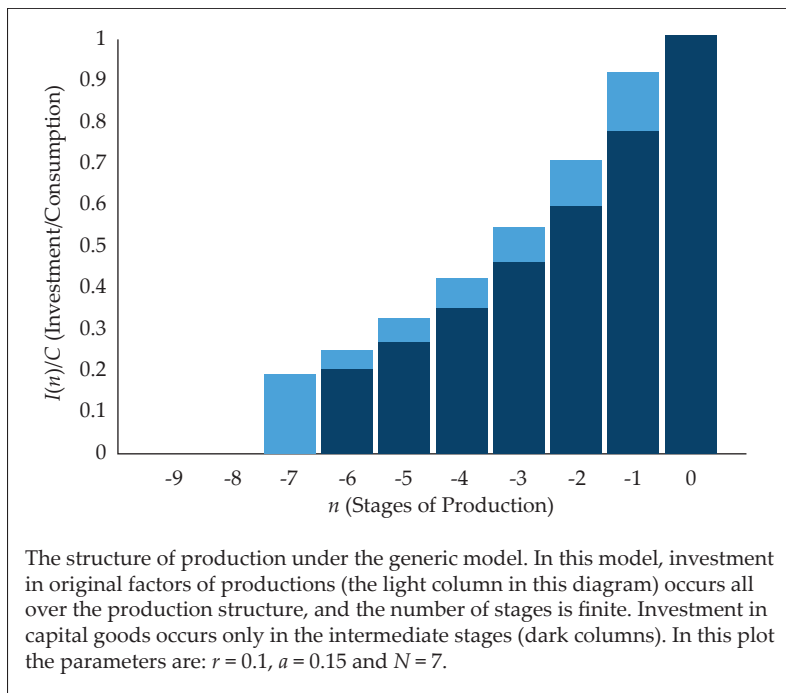
(note that we adopted Fillieule's notations except for the stages' numeration).

Consequently, the relation between the investments in adjacent stages is (for $2 \leq n \leq N$)

$$(8) \quad (1-a)I_{-n+1} = I_{-n}(1+r).$$

The structure of production of this generic model is presented in Fig. 3.

Figure 3.



This is a generic model: Hülsmann's model is a specific case, which can be derived by taking the limit of zero expenditure on original factors, i.e. $a \rightarrow 0$, while keeping the number of production stages finite, i.e., $N < \infty$. Fillieule's model can be reconstructed by keeping a constant percentage of the expenses on original factors, i.e., $a > 0$, but taking an infinite number of stages, i.e. $N \rightarrow \infty$. In both models, the interest rate is taken to be non-zero, i.e., $r > 0$. It should be noted in passing, that the generic model encompasses a third kind of structure, which is reminiscent of Hayek's (1935) model of the structure of production in that it does not take the interest payments into account, i.e., $r = 0$. However, it is not the same kind of structure because Hayek's structure is linear, while the generic model is exponential.

Now, since the LOP in both models (Eqs. 1 and 2) is independent of a we find a problem. Nevertheless, before we explain the problem, we must emphasize again the point that r in our model (as in Fillieule's and Hülsmann's) is not the *annual* interest rate, but rather the interest rate paid in a single production stage. Therefore, if one chooses very short production stages (in the possible range), r can be *arbitrarily small regardless of the interest rate* (note that the ratio I/C is independent of the length of the stages). In this limit, Fillieule's result $\lambda = \frac{I}{C}(1+r)$ reveals only a negligible dependence on the interest rate.

In fact, if one follows Fillieule's derivation with a single difference: omitting the interest rate at the last stage of production, the prefactor $(1+r)$ vanishes, i.e., $\lambda = I/C$. Therefore, the dependence on the interest rate $(1+r)$ is a result of the last stage and has nothing to do with the entire (infinitely long) structure of production.

If the number of production stages is finite, then it is clear that in the limit of low interest rate $rN \ll 1$ Hülsmann's model is retrieved, because then Hülsmann's trapezoid shape appears. However, in the limit of high-interest rate $rN \gg 1$, Fillieule's model is retrieved, since in these cases the amount of investment in the early stages ($n > 1/r$) is minuscule, and therefore for any practical purposes N can go to infinity without affecting the distribution of investment.

Consequently, the parameter which determines in which domains we are is the product Nr . If $Nr \gg 1$ then the model enters Fillieule regime (the production structure is approximately exponential), while

when $Nr \ll 1$ the model enters Hülsmann's domain (the production structure is approximately trapezoidal). Clearly, however, our model is richer than the two independent regimes.

Now, we can turn to and explain the problem:

When the interest rate is low, then the APP can be approximated by Eq. 2, i.e. $\lambda \approx \frac{I}{C} \left[1 + \left(\frac{I}{C} + 1 \right) \frac{r}{2} \right]$, however, since $I/C > 1$ then $\lambda \approx \frac{I}{C} \left[1 + \left(\frac{I}{C} + 1 \right) \frac{r}{2} \right] > \frac{I}{C} (1+r)$. However, $\lambda = \frac{I}{C} (1+r)$, as was explained above, should be valid for higher interest rates, when the number of stages diverges. Therefore, for any given interest rate, Hülsmann's model APP is higher than Fillieule's, which means that eventually, the APP must decrease. Below we will present this behavior in detail.

The inevitable conclusion is that the two formulae do not present the same reality, and not even the same tendency. In fact, these results show that for low interest rates, the LOP increases with the interest rate, while for high interest rates the LOP *must decrease*. The mathematical proof for this will be presented below.

There is no monotonic dependence on the interest rate. Therefore, not only do these models contradict the Austrian and neo-classical literature, but a reswitching *must* eventually occur. Reswitching is, then, not an anomaly or a mere curiosity, but it is the norm (provided the ratio between consumption and investment is fixed).

It should be stressed, however, that this "reswitching" is not equivalent to Samuelson's original one. This is because the reswitching does not occur between two different production methods, but rather a reswitching occurs in the sense that for low interest rates the production structure is short; when the interest rate increases the structure of production lengthens. However, it shrinks again when the interest rate keeps increasing.

One of the reasons that this unexpected conduct was overlooked is that there are inconsistencies in the definitions of the LOP.

In what follows, we will solve this model analytically, and present the reswitching result. However, before we do that, we have to clear up the confusion regarding the definition of the LOP.

Jevons, Hayek, Rothbard, and Hülsmann identified the LOP with the number of production stages. When the number of stages is low, i.e., when $N(\alpha+r) \ll 1$, the number of stages is indeed a very good estimation to the LOP. However, when the number of stages increases, the amount of money invested in the early stages of production, i.e., where higher-level goods are produced, is small in comparison to the aggregate investment. Therefore, the contribution of these stages to the LOP is negligible. Clearly, when the number of stages is infinite, i.e., when the production process begins at the dawn of humanity (as in Fillieule's model), it is clear that the number of stages is an inadequate evaluation of the LOP.

It should be stressed that taking the production stages to infinity is not merely an academic exercise. In fact, as was stressed by Machaj (2017), any modern production process begins with capital goods. It is almost impossible to reconstruct a production process that does not require capital goods in its initial production stage. Therefore, an infinite number of stages does not seem to be the exception, but rather seems to be the norm, and should not be disregarded.

Ironically, it seems that Böhm-Bawerk has realized this problem, and used the average period of production, which is defined as the "*average* time interval occurring between each expenditure of originary productive forces and the final completion of the ultimate consumption good." Therefore, instead of using the ambiguous term LOP, we would use the more clearly defined term "average period of production" (APP). This term can easily be implemented in all three models by

$$(9) \quad \lambda = \sum_{n=1}^N n(L_n/L)$$

where L_n is the amount of money invested in labor during the n th stage of production, while

$$(10) \quad L = \sum_{n=1}^N L_n$$

is the aggregate investment in original factors (labor and land).

Hereinafter we will adopt Fillieule's assumption that in the intermediate stages all the investment on OF consists of labor's

salaries. This is a reasonable assumption because it is very rare that the industries utilize unprocessed OF, i.e. non-capital goods, during intermediate stages of production. Moreover, it is not a restrictive assumption, and the model can easily be generalized.

CALCULATION OF THE APP

From Eqs. 5 and 8, the investment in the n th stage can easily be calculated:

$$(11) \quad I_{-n} = \frac{c}{1+r} q^{n-1} = \frac{c}{1-a} q^n$$

for $n \geq 1$, where, for simplicity, the following notation was used

$$(12) \quad q = (1-a)/(1+r).$$

Then, aggregate saving is (see Appendix A)

$$(14) \quad I = \sum_{n=1}^N I_{-n} = \frac{C}{1-a} \sum_{n=1}^N q^n = \frac{C}{1-a} \frac{q(1-q^N)}{1-q}$$

Similarly, the aggregate income of owners of OF is

$$(15) \quad \begin{aligned} Y_{OF} &= Y_{OF(-1)} + Y_{OF(-2)} + \dots + Y_{OF(-N)} = \\ &= aI_{(-1)} + aI_{(-2)} + \dots + aI_{(-N+1)} + I_{(-N)} = \\ &= \frac{aC}{1-a} \sum_{n=1}^{N-1} q^n + \frac{C}{1-a} q^N = \frac{aC}{1-a} \frac{q(1-q^{N-1})}{1-q} + \frac{C}{1-a} q^N \end{aligned}$$

where

$$(16) \quad Y_{OF(-n)} = \begin{cases} aI_{-n} & n < N \\ I_{-n} & n = N \end{cases},$$

are the incomes of owners of OF in the $-n$ th stage, which is a manifestation of the fact that in the N th production stage all money is invested in OF, while in the intermediate stages only part (a) of the money is invested in them.

Similarly, the aggregate income of owners of capital goods is equal to

$$(17) Y_{KG} = (1-a)I_{(-1)} + (1-a)I_{(-2)} + \dots + (1-a)I_{(-N+1)} = C \frac{q(1-q^{N-1})}{1-q}.$$

Using Eq. 9 the APP is (see Appendix A)

$$(18) \lambda = \frac{1}{Y_{OF}} \sum_{n=1}^N n Y_{OF(-n)} = \frac{1}{Y_{OF}} \left\{ \frac{aC}{1-a} \sum_{n=1}^{N-1} n q^n + N \frac{C}{1-a} q^N \right\}$$

which can be solved as

$$(19) \lambda = \frac{a \sum_{n=1}^{N-1} n q^n + N q^N}{a \sum_{n=1}^{N-1} q^n + q^N} = \frac{a[(N-1)q^{N+1} - Nq^N + q + Nq^N(q-1)^2]}{a(q^N - q)(q-1) + q^N(q-1)^2}.$$

The dependence of the APP on the interest rate is via the auxiliary parameter q .

According to Eq. 19 when the parameters a and N are fixed then λ (the APP) decreases when the interest rate r increases. However, when the interest rate varies, so does the aggregate investment I (according to Eq. 14).

In order to keep the aggregate investment fixed, the number of stages of production N must increase accordingly. Therefore, in order to keep the ratio between consumption and investment fixed, one can substitute the number of stages N from Eq. 14 into Eq. 19, i.e., to substitute

$$(20) N = \frac{\ln \left(\frac{I}{C} \frac{q-1}{q} (1-a) + 1 \right)}{\ln q}$$

in the expression for λ , (note that Eq. 3 is a specific case when $a=0$). But before we do it, it is useful to adopt the following definition of the critical interest rate

$$(21) r_c \equiv C/I - a.$$

Using this terminology, the number of production stages, i.e., Eq. 20, can be written

$$(22) \quad N = \ln \left(\frac{r_c - r}{r_c + a} \right) / \ln \left(\frac{1-a}{1+r} \right),$$

which clearly diverges when $r \rightarrow r_c$.

By substituting Eqs. 12, 21, and 22 in Eq. 19 the APP can finally be written as (see Appendix B for elaboration)

$$(23) \quad \lambda = \frac{(r_c - r) \frac{r}{a} \ln \left(\frac{r_c - r}{r_c + a} \right) / \ln \left(\frac{1-a}{1+r} \right) + (1+r)}{(r_c - r) r / a + (r_c + a)}$$

When $a \rightarrow 0$ then $\lambda \rightarrow N$, i.e., the APP converges to the number of stages. In fact, as long as $r \ll r_c$ and $a \ll r$ then $\lambda \approx N$ (see Eq. B2 in Appendix B), i.e., in this case, the number of production stages is indeed a good approximation of the APP. This is the interest rate regime, which was investigated by Hülsmann.

However, as the interest rate approaches the critical interest rate, i.e., $r \approx r_c$, then the number of stages N diverges, while the APP, i.e. λ , does not (see Fig. 4). In fact, the APP finally decreases and converges to (note that all the terms $(r_c - r)$ in Eq. 23 vanish)

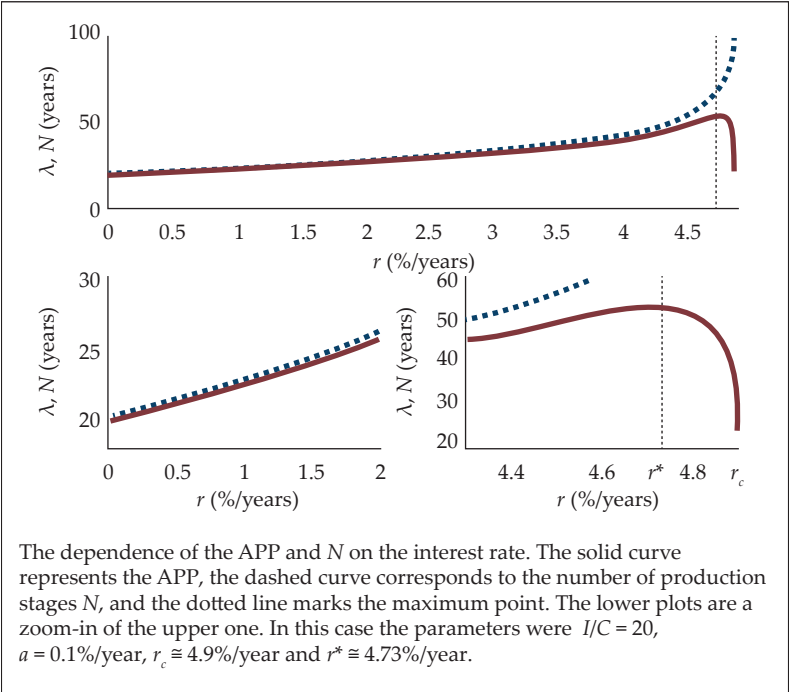
$$(24) \quad \lambda = \frac{1+r_c}{a+r_c} = \frac{I}{C} (1+r_c)$$

which is exactly Fillieule's (2007) result for $r \approx r_c$.

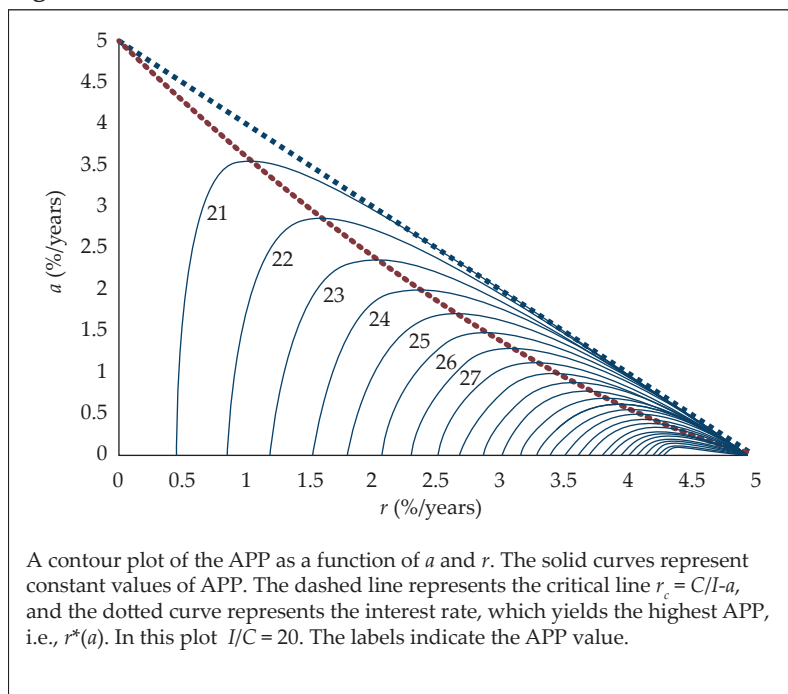
In context of the generic model, which is presented in this paper, we see that Hülsmann and Fillieule investigated different regimes of the interest rate. Hülsmann's model agrees with the generic model at the low interest rate regime, while Fillieule's model agrees with the generic model only around $r \approx r_c$ where the number of stages diverges.

As can be seen from Fig. 4, there is an interest rate level r^* , below which the APP increases, and above which the APP decreases. This is the point where APP receives its maximum value $\lambda_{\max} = \lambda(r^*)$ (see Fig. 4).

Figure 4.



In Fig. 5, the APP as a function of a and r is presented in a contour plot. As can be seen, for any given $0 < a < C/I$ there is an interest rate, which is lower than the critical one, in which the APP receives its maximum value, and above which it decreases to almost the initial value.

Figure 5.

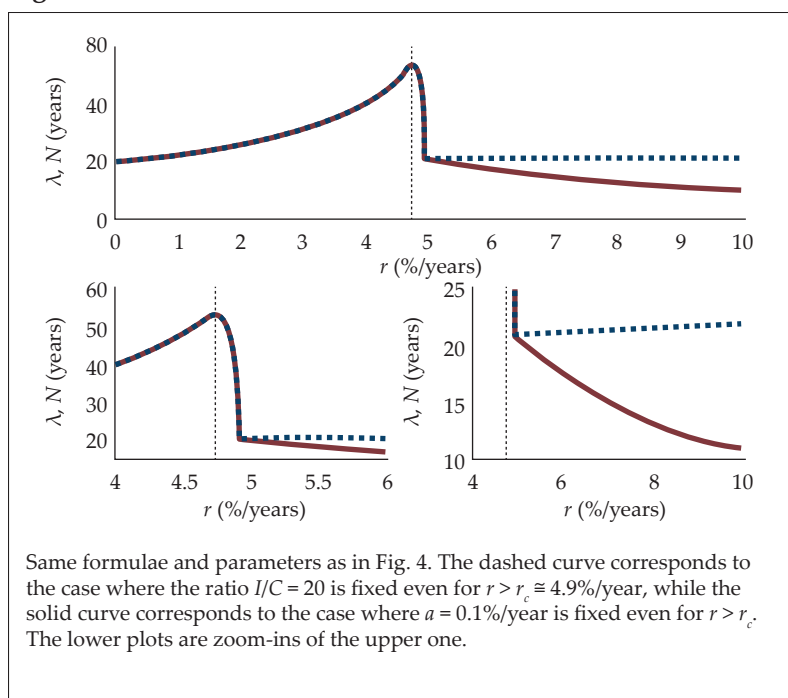
This maximum effect is especially noticeable when the fraction of OF's investment is very low, i.e., $a \ll 1$ (For details, see Appendix C).

This “reswitching” phenomenon occurs due to the following reasons. In the low interest rate regime, any increase in the interest rate forces the APP to expand in order to compensate for the reduction in the high-level stages of investment. However, this process cannot last for long, since when the interest rate increases beyond a certain level (r^*), the reduction in the low stages' investment reduces the APP beyond the increase caused by the additional stages. Thus, in this regime, the APP decreases. Beyond the critical interest rate (r_c) the reduction in the low stages' investment cannot be compensated by the negligible investment in the high stages of production.

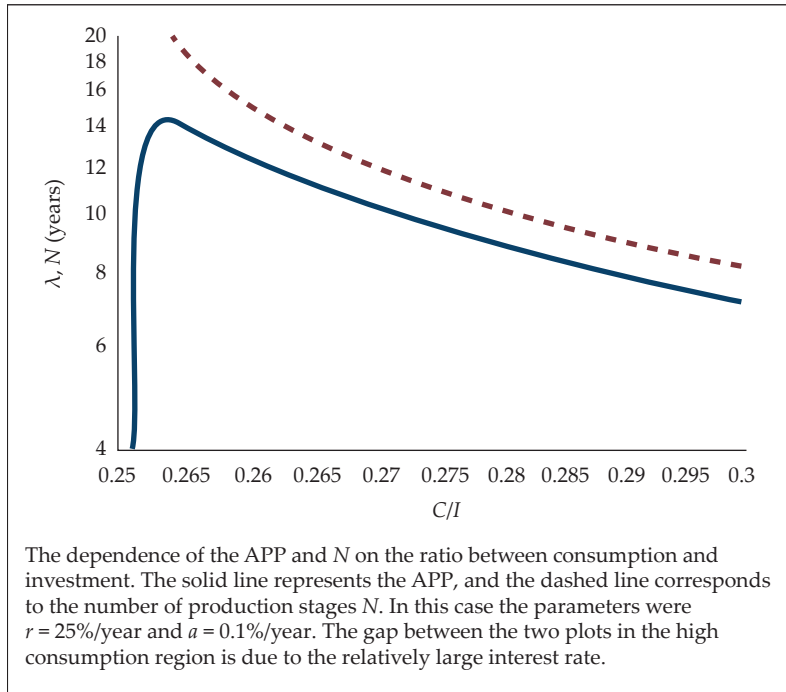
It should be emphasized that when $r < r_c$ the interest rate can increase while both I/C and a are fixed, because the number of stages can increase. However, beyond r_c since the number of stages

is already infinite, it is impossible to raise the interest rate without affecting either a or I/C . In this regime, if the ratio I/C is fixed, then $\lambda = (I/C)(1+r)$ (Eq. 1), in which case the APP mildly *increases* with the interest rate (see the dashed curve in Fig. 6). However, if a is fixed, then APP obeys the equation $\lambda = (1+r)/(r+a)$ (see Fillieule [2007]), in which case the APP *decreases* with the interest rate (see the solid curve in Fig. 6).

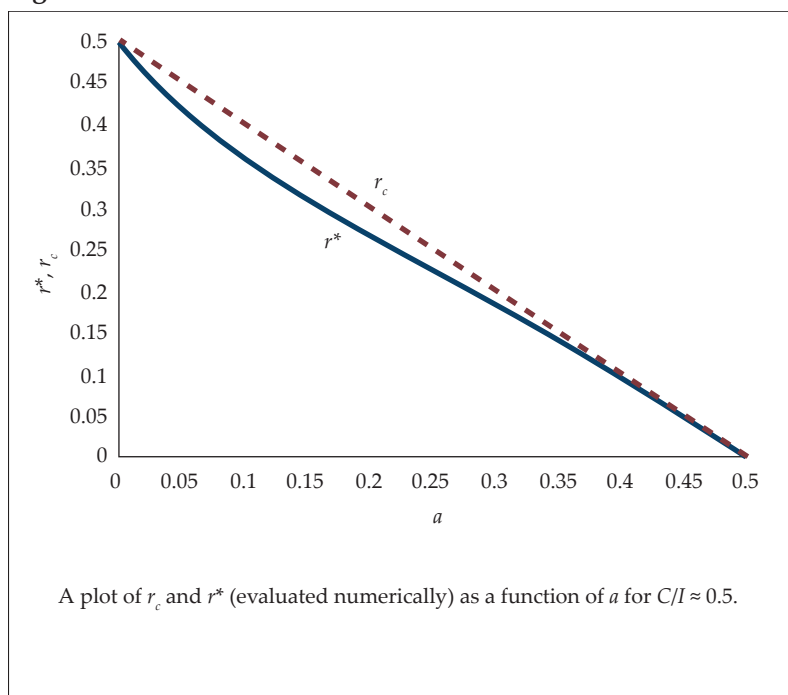
Figure 6.



A further important and original result is, that the APP does not have a simple monotonic decreasing dependence on the ratio between consumption and investment (as wrongly predicted in the literature, see, for example, Chapter 8 in Murphy [2006]). If the fraction a and the interest rate r are fixed, the APP initially *increases* with the ratio (C/I) , and only after receiving its maximum value, it begins to decrease (as N does); see Fig. 7.

Figure 7.

In countries like the United States where $C/I \approx 0.5$ (see Skousen [1991, 45]) the difference between $r_c \equiv C/I - a$, and r^* (the interest rate with the longest APP) is very small (see Fig. 8 where r^* was calculated numerically).

Figure 8.

This fact can explain why this “reswitching” was missed in the literature, and how it became common knowledge that the APP must decrease when the interest rate increases.

SUMMARY AND CONCLUSION

A generic model of the structure of production was presented and studied. Hülsmann’s and Fillieule’s models are two *limiting* cases of the generic model. The low interest regime of the generic model can be approximated by Hülsmann’s model, while the high interest regime of the generic model can be approximated by Fillieule’s model.

Thus, the generic model leads to a result that is different both from the *older* Austrian literature and from the *recent* one.

Therefore, this model predicts that when the interest rate increases, the APP does not decrease as the neo-classical models

(and the old Austrian literature) predict. Moreover, the APP does not increase as the new Austrian models predict.

In fact, the main prediction is that when the ratio between consumption and investment is fixed, the APP increases for low interest rates, but beyond a certain value, it decreases.

This conduct resembles a “reswitching” behavior when the APP is low for both low and high interest rates, but it grows for intermediate interest rate levels.

However, this conduct can occur only if the ratio between consumption and investment (C/I) and a are both fixed, which is possible to maintain only within a narrow range of interest rate values. Whenever the interest rate exceeds this range, at least one of these parameters, either (C/I) or a , must vary as well. If the former (C/I) is fixed, then the recent Austrian prediction holds, but when the latter (a) is fixed, then the older Austrian prediction is valid.

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APPENDIX A: USEFUL FORMULAS AND THE DERIVATION OF EQS. 2 AND 3

The summation of a geometric series is

$$(A1) \sum_{n=1}^N q^n = q \frac{1-q^N}{1-q}$$

After taking the derivative of the above,

$$\sum_{n=1}^N nq^{n-1} = \frac{Nq^{N+1} - (N+1)q^N + 1}{(1-q)^2}$$

therefore

$$(A2) \sum_{n=0}^N nq^n = \sum_{n=1}^N nq^n = \frac{q[Nq^{N+1} - (N+1)q^N + 1]}{(1-q)^2}$$

Eq. A1 can be implemented to calculate the aggregate investment in Hülsmann's model:

$$(A3) \frac{C}{(1+r)} + \frac{C}{(1+r)^2} + \dots + \frac{C}{(1+r)^N} = C \sum_{n=1}^N \frac{1}{1+r} = I$$

i.e.,

$$(A4) C \frac{1 - (1+r)^{-N}}{r} = I$$

Solving for N yields Eq. 3:

$$(A5) N = -\frac{\ln\left(1 - r \frac{I}{C}\right)}{\ln(1+r)}$$

In a regime of low interest rates, this expression can be expanded in a Taylor series:

$$(A6) N = \frac{I}{C} + \frac{1}{2} \frac{I}{C} \left(\frac{I}{C} + 1 \right) r + \frac{1}{12} \frac{I}{C} \left[4 \left(\frac{I}{C} \right)^2 + 3 \frac{I}{C} - 1 \right] r^2 + \dots$$

The first two terms correspond to Eq. 2.

APPENDIX B: DERIVATION OF EQ. 23

Eq. 19 can be rearranged to read

$$(B1) \quad \lambda = \frac{Nq^N \left[\frac{a-1}{q} + 1 \right] + a \left(\frac{1-q^N}{q-1} \right)}{q^N \left[\frac{a-1}{q} + 1 \right] - a}.$$

Since $q^N = \frac{r_c - r}{r_c + a}$, $\frac{1-q^N}{q-1} = -\frac{(1+r)}{(r_c + a)}$ and $\frac{a-1}{q} + 1 = -r$ then, these expressions can be substituted into B1 to yield

$$(B2) \quad \lambda = \frac{N(r_c - r)r + a(1+r)}{(r_c - r)r + a(r_c + a)}$$

After substituting N (Eq. 22) into B2 and dividing by a , Eq. 23 is retrieved:

$$(B3) \quad \lambda = \frac{(r_c - r) \frac{r}{a} \ln \left(\frac{r_c - r}{r_c + a} \right) / \ln \left(\frac{1-a}{1+r} \right) + (1+r)}{(r_c - r)r/a + (r_c + a)}$$

APPENDIX C: LOW a REGIME ($a \ll 1$)

In the $a \ll 1$ regime, Eq. 22 can be approximated to

$$(C1) \quad \lambda(r) \cong \frac{-\ln(1-r/r_c)}{r+a(1-r/r_c)^{-1}}$$

which receives its maximum value for

$$(C2) \quad r^* = r_c - aW(r_c/a)$$

where W is the Lambert W function (Hoorfar and Mehdi 2007; Corless et al. 1996), which can be approximated by

$$(C3) \quad r^* \cong r_c - a \ln(r_c/a)$$

for which case the maximum APP is approximately

$$(C4) \quad r^* \cong \frac{1}{r_c} \ln \left(\frac{r_c/a}{\ln(r_c/a)} \right)$$

This APP value can be much larger than the APP's value in both $r \cong 0$ and $r \cong r_c$ regimes

$$(C5) \quad \lambda(r \cong 0) \cong \lambda(r \cong r_c) \cong \frac{1}{r_c} \ll \frac{1}{r_c} \ln \left(\frac{r_c/a}{\ln(r_c/a)} \right) \cong \lambda_{\max}.$$

THE MACROECONOMIC MODELS OF THE AUSTRIAN SCHOOL: A HISTORY AND COMPARATIVE ANALYSIS

RENAUD FILLIEULE*

JEL CLASSIFICATION: B13, B25, B53, E14

ABSTRACT: This paper offers a synthetic and comparative assessment of the most basic Austrian macroeconomic models, i.e. the models that analyze the static forces determining the equilibrium interest rate and structure of production (monetary disequilibria and business cycles are not part of this investigation). The three models presented here are those of Böhm-Bawerk ([1889] 1959), Hayek (1936, 1941), and Garrison (2001). This review shows that these models are largely inconsistent with each other, but also that at a more general level they share several important characteristics. Finally, a tentative explanation is offered as to why there is no cumulative tradition in the Austrian School in this kind of basic macroeconomic theorizing.

INTRODUCTION

The Austrian School is best known for its subjectivist approach and for its theories of the market process and the business cycle. This paper focuses upon a less familiar but nevertheless significant

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topic. Prominent economists of this school have developed, over the century and a half of its existence, a series of basic macroeconomic models. These models are “basic” in the sense that they investigate the most fundamental forces operating in an economic system, leaving aside the complications due to monetary disturbances and to uncertainty. No systematic comparison between them has been provided yet, and this paper seeks to fill this gap. This kind of basic and integrated model analyzes the convergence process of a very simplified economic system towards a macroeconomic equilibrium, and investigates the macro-effects of typical changes such as technical progress, a lower or higher time preference (leading respectively to a larger or smaller saving-investment), or an increase in the number of workers. Monetary disturbances and short-term fluctuations are therefore off topic here. Three models fit these criteria in the published Austrian literature. They were respectively elaborated by (i) Böhm-Bawerk ([1889] 1959), (ii) Hayek (1936, 1941), and (iii) Garrison (2001).¹ The first purpose of this paper is to provide a history of the way basic macroeconomic theorizing has been conceived in the Austrian School. The three models will be expounded in turn, with a review covering in each case the convergence process, the final equilibrium characteristics, and the response to typical exogenous changes (Section One). The second purpose is to analyze the relationships between these models and to expose their theoretical inconsistencies (Section Two). The third purpose is to show that, beyond their differences and contradictions, these models have in common a number of significant general features (Section Three). The fourth and last purpose is to seek to explain why—in contrast with the standard neoclassical paradigm since the classic contribution by Solow (1956) and Swan (1956)—no single basic reference model dominates within the Austrian School (Section Four).

1. THE AUSTRIAN MODELS: A CHRONOLOGICAL PRESENTATION

This presentation of the three basic macroeconomic models aims at elucidating, as briefly as possible, their framework and internal

¹ Hülsmann (2010) has developed a macroeconomic model that integrates Rothbard’s model of determination of the pure interest rate and the Hayekian structure of production, but it is still a working paper and can therefore not yet be considered as an “official” contender. Fillieule (2005) has expounded a graphical model illustrating the interrelations between various aspects of the economic system, but it lacks a very important element, namely a theory of interest.

logic. Many secondary features will be left out, so that the length of the paper remains within reasonable limits. In each case the graphical visualization of the model will be used instead of the mathematical formalization, but the latter also exists.²

1.1 Böhm-Bawerk's Model

Böhm-Bawerk ([1889] 1959) expounds his model in a chapter titled "The Rate of Interest." However, his theory is not just a theory of interest and turns out to be a genuine macroeconomic model, in which not only the equilibrium interest rate but also the equilibrium wage and period of production are determined. Böhm-Bawerk was a true pioneer in modern macroeconomic analysis, but his exposé was a bit simplistic in that it was based upon a single numerical example. Wicksell ([1893] 1970) quickly replaced this elementary formulation by a general mathematical presentation using differential equations, and also by a convenient graphical display. Much later, Dorfman (1959) improved upon the Wicksellian graphical version of the model.³ It must nonetheless be noted that this model has not evolved between its original exposition by Böhm-Bawerk and its subsequent representations. It is exactly the same model, and only its form has been refined over time.

The model rests upon two exogenous data, the quantity of capital K and the number of workers N , and upon an exogenous production function f that relates the total period of production T of the economic system to the quantity q_c of consumption goods produced *per worker* and per year. Figure 1 shows this production function $q_c = f(T)$ as a concave curve on the top diagram.^{4,5} The function f is increasing,

² Wicksell ([1893] 1970) developed both the mathematical and the graphical versions of Böhm-Bawerk's model, Molavi Vasséi (2015) developed the first mathematical formalization of Hayek's model, and Cachanosky and Padilla (2016) the first mathematical formalization of Garrison's model.

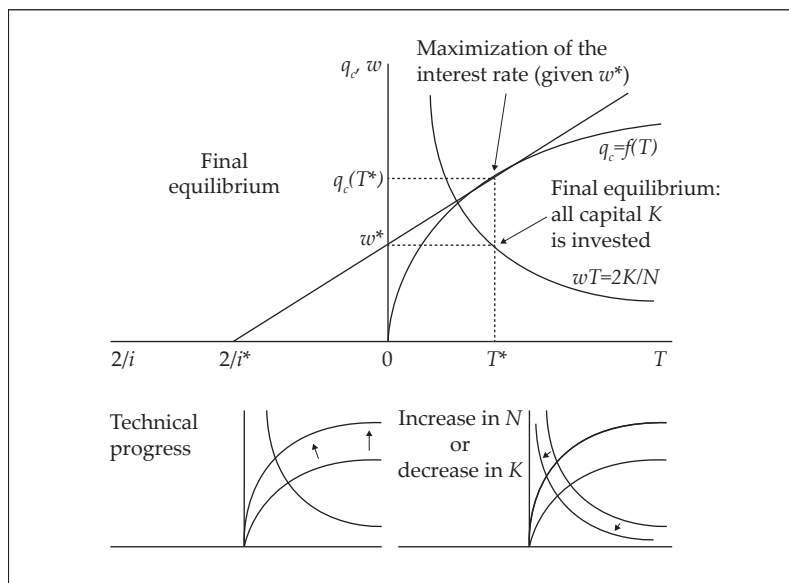
³ See Fillieule (2015) for a recent and comprehensive graphical account of the model.

⁴ Lower cases are used for individual variables, and upper cases for aggregate variables.

⁵ Two differences between the production functions respectively used in Böhm-Bawerk's model and in the well-known Solow-Swan model can be briefly highlighted. First, the Böhm-Bawerkian macroeconomic function of production determines the annual quantity Q_c of *consumption goods* produced, not the total quantity of consumption *and* capital goods. Second, the argument of this Böhm-Bawerkian function is the period of production T of the economic system, not the quantity of capital K (for a given quantity of labor N).

which expresses a central tenet of Böhm-Bawerk's theory of capital, namely that "roundaboutness" is productive: a "well-chosen" more roundabout method of production produces more consumption goods per period, everything else equal (Böhm-Bawerk [1889] 1959, 82–84). In other words, if T increases, then the annual product per worker q_c increases. This increase occurs with diminishing returns that Böhm-Bawerk justifies as an "observation... based on experience" (p. 83).⁶

Figure 1. Böhm-Bawerk's model (adapted from Wicksell 1893, p. 122, and Fillieule 2015, p. 309)



In final equilibrium, two conditions must be fulfilled. The first one is that the whole capital K is invested, no part remaining idle. The second condition is that the capitalists maximize the interest rate (by choosing the appropriate length T for the production process). This optimization condition—maximum interest rate—is visualized on the diagram as the *tangency* between the production function f

⁶ These diminishing returns should rather be explained by the fact that there is a fixed factor, namely labor.

and the straight line going through the point $(0, w^*)$. If the line going through $(0, w^*)$ rotates clockwise, then the ratio $2/i$ increases (which implies that the interest rate i falls); if it rotates counterclockwise, then no intersection point appears with the production function f and no corresponding economic system exists. The tangency point therefore represents the highest possible level for the interest rate (equivalently, the lowest possible level for $2/i$). The graphical relationship illustrated in Figure 1 between the endogenous variables (i, w, T) is the visual translation of the fundamental equation of the model:

$$q_c = w + ik = w + i\left(\frac{wT}{2}\right)$$

This equation expresses the distribution of the quantity q_c of the annual final product (per worker) between the worker (wage w) and the capitalists (interest ik). The quantity of capital $k = (wT/2)$ invested per worker is viewed by Böhm-Bawerk as the subsistence fund required to carry out the process. If all the production processes started at the same date and simultaneously ended T periods later, then the capital—i.e. subsistence fund—required would be $k = (wT)$ (each worker would “subsist” on wage w during T periods). But production is not organized this way. Rather, it is “synchronized” in the sense that, if the length of the production process is T , then there are T processes occurring simultaneously and at different levels of completion.⁷ The calculation shows that, with a synchronized production, the subsistence fund required falls from $k = (wT)$ to approximately $k = (wT/2)$. The fund is lower because thanks to the synchronization, a part of the subsistence required to sustain a worker is produced by the processes that reach completion while the process in which this worker participates is still under way. The fundamental equation can be written so that the intercept theorem (Thales’ theorem) applies: this theorem is then used to show that the values $(2/i)$, w , T , and $q_c(T)$ are necessarily related in the way illustrated in the diagram in Figure 1 (Wicksell 1893).

⁷ If a process lasts for three periods, for instance, then a “synchronized” system comprises three simultaneous processes: at the beginning of each period, one process just begins (and will be completed three periods later), another process is half-way (and will be completed two periods later), and the third process nears completion (and will be over at the end of the current period). Thanks to this synchronization, the final product is delivered in each period, instead of waiting for the many periods required to complete a single process.

The convergence process towards equilibrium is carried out through the actions of the capitalists. The latter aim at maximizing the interest rate while competing to invest their funds. Their actions lead the economic system towards an equilibrium characterized by the values (i^*, w^*, T^*) of the three endogenous variables, namely the interest rate, the real annual wage, and the period of production. The convergence process takes place as follows. Initially, an arbitrary wage prevails. Given this initial wage w_0 ($w_0 < w^*$), the capitalists maximize the interest rate i (in the symmetrical version, the interest rate is given and workers maximize their wage). The maximization of the interest rate is carried out by choosing between the different possible lengths for the structure of production. If the optimal period of production is T_0 , then the quantity of invested capital is $k_0 = wT_0/2$ (per worker) and $K_0 = NwT_0/2$ (total). Now, suppose that K_0 happens to be below the total available quantity of capital K (exogenous data). The capitalists have some capital left to invest, and they want to invest it to increase their income. So they compete to hire more workers, the demand for labor increases, and the wage therefore rises from w_0 to w_1 . At this higher wage w_1 , the capitalists once again maximize the interest rate, capital invested once more falls short of the total quantity available, the wage increases again, and so on and so forth. This process keeps on until the wage reaches the equilibrium level w^* : at this wage, the maximization of the interest rate determines a period of production T^* such that $Nw^*T^*/2$ is just equal to the total quantity of capital K (and this configuration is bound to happen because T necessarily goes up when w does, so $NwT/2$ increases until it is equal to K). At this point, the whole available capital is invested, and the final equilibrium has been reached.

The two lower diagrams of Figure 1 show how the typical changes are visualized. Technical progress is represented as a counterclockwise rotation of the production function. An increase in the supply of labor N is represented as a downward and leftward shift of the (wT) hyperbola. An increase in the quantity of capital K is represented as a shift of this hyperbola in the other direction. It is then possible to analyze the effects of these typical changes on the equilibrium position and, from there, on the distribution of the final product between capitalists and workers.⁸ This investigation

⁸ Böhm-Bawerk (1959 [1889]) thoroughly analyzes the effects of the typical changes on the level of the interest rate, but only cursorily notes the effects on the level of wages (for instance on p. 378).

concludes that technical progress is advantageous both to capitalists and to workers, an increase in the quantity of capital favors workers but not necessarily capitalists, and a rise in the number of workers benefits capitalists but harms workers.⁹ In order for the results to be appropriately interpreted, it should be noted that an individual can be both a worker and a capitalist, even though Böhm-Bawerk seems to implicitly suppose that workers and capitalists are two separate groups of people. Böhm-Bawerk's model is summarized in Table 1.

Table 1. A summary of Böhm-Bawerk's model

Exogenous data	f production function K quantity of capital N number of workers
Endogenous variables	i interest rate w real wage T period of production
Causal relationship	$(f, K, N) \Rightarrow (i, w, T)$
Increase in K (lower time preference)	Endogenous effects: $i^* \searrow, w^* \nearrow, T^* \nearrow$ Distributional effects: - real individual wage $w^* \nearrow$ - real aggregate interest $\Pi^* = i^*K \nearrow$ or \searrow
Technical progress	Endogenous effects: $i^* \nearrow, w^* \nearrow, T^* \searrow$ Distributional effects: - real individual wage $w^* \nearrow$ - real aggregate interest $\Pi^* = i^*K \nearrow$
Increase in N	Endogenous effects: $i^* \nearrow, w^* \searrow, T^* \searrow$ Distributional effects: - real individual wage $w^* \searrow$ (if the division of labor intensifies, it may be that $w^* \nearrow$) - real aggregate interest $\Pi^* = i^*K \nearrow$

⁹ Böhm-Bawerk does not take into account here the increasing returns due to the intensification of the division of labor that follows a multiplication of workers. He never mentions these increasing returns in the chapter. He only refers, in the penultimate footnote (1959 [1889], 461, footnote 52), to the diminishing returns on labor brought about by an increasing population.

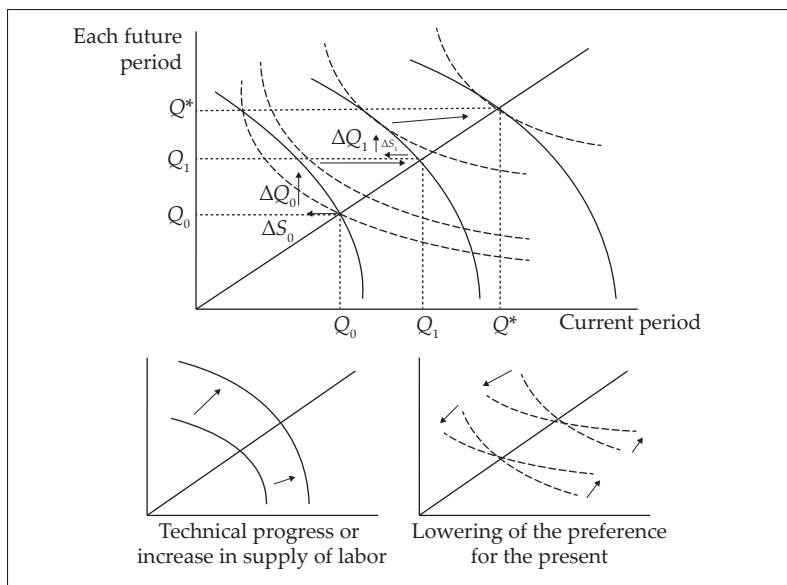
1.2 Hayek's Model

In the early 1930's, Hayek developed the most famous macroeconomic construct of the Austrian School, namely the representation of the structure of production as a triangle displaying the annual nominal consumption and the smaller and smaller annual investment expended into the higher and higher stages (Hayek [1931] 1935). This illustration was inspired by Jevons (1871), but the latter applied it to a single economic process while Hayek used it as a macroeconomic tool to represent the whole economic system. This Hayekian triangle was quite influential and quickly found its way even among authors not members of the Austrian School, such as Abrams (1934, 25–28) and Durbin (1935, 34) who was then a leading economic expert for the British Labour Party.¹⁰ It may come as a surprise that this subsection will not at all be devoted to this macroeconomic construct. The first reason is that Hayek did not associate his triangle with a model explaining the determination of the interest rate. This combination was achieved much later by Garrison (1978, 2001) and will be presented in the next subsection. The second reason is that Hayek's theory of the interest rate (which will be our subject matter here) is incompatible with his triangle, because this theory requires that capital accumulation takes place laterally, while with the triangle capital accumulation takes place longitudinally (see Subsection 2.1).

For these reasons, Hayek's triangle is left aside for now, and the focus is on his model of the interest rate (Hayek 1936, 1941). Hayek's model is inspired, not by the theoretical insights elaborated by the Austrian economists since Böhm-Bawerk's contribution, but rather by the theory of interest developed by the American neoclassical economist Irving Fisher (1930). The main purpose of Hayek with his model is to investigate the question of the determining principle of interest: time preference or productivity? He concludes that productivity is the key factor, but we are not primarily concerned here about this issue. Our focus is on the macroeconomic core of the model, i.e. the convergence towards a macroeconomic equilibrium, the characteristics of this equilibrium, and the study of the effects of typical changes upon the distribution between workers and capitalists.

¹⁰ The author wishes to thank an anonymous referee for these references.

Figure 2. Hayek's model (adapted from Hayek 1941, 233). The concave curves are the productivity curves and the dotted curves are the intertemporal indifference curves.



Hayek (1941) presents his model in a figure inspired by Fisher's classic intertemporal graph (see Figure 2). The difference with Fisher's graph is that the vertical axis here measures the final output, not just in the next period, but in each and every future period: at the starting point Q_0 , for instance, the economic system produces the quantity Q_0 of consumption goods in the current period (as shown on the horizontal axis: current output) and also Q_0 in each future period (as shown on the vertical axis). The concave curve going through Q_0 is the *productivity curve*, showing the additional output that can be obtained in each future period against the corresponding additional amount of present saving. The convex dotted lines are the intertemporal indifference curves. When the economic system is at the starting point Q_0 , the actors maximize their intertemporal satisfaction—reach the highest possible indifference curve—by saving ΔS_0 and getting ΔQ_0 additional final product in each future period. In the next period, the system is at the point Q_1 , and once again the actors maximize their intertemporal satisfaction, this time

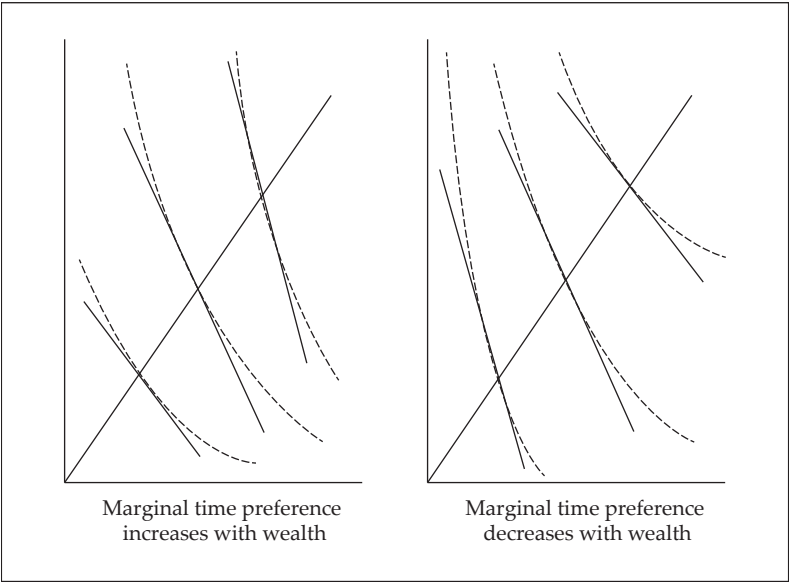
through saving ΔS_1 and getting ΔQ_1 additional final product in each future period. Figure 2 only shows the first step of the convergence process (from Q_0 to Q_1), but this process goes on period after period, until the system finally reaches the equilibrium point Q^* . At the point Q^* , the productivity curve and indifference curve are *tangent to each other on the 45-degree line*, so that the actors cannot improve their intertemporal satisfaction (i.e. cannot get to a higher indifference curve), either through saving or through dissaving. The economic system has therefore reached a state of final equilibrium: marginal productivity and marginal time preference are equal, and their identical value is the equilibrium interest rate. In other words, the equilibrium interest rate is equal to the common slope of the productivity curve and the indifference curve on the 45-degree line.

Hayek first analyzes the case of a *linear* productivity curve (1941, 222), and then the more general case of a *concave* productivity curve (1941, 233). Only the latter, exhibiting the diminishing returns on capital accumulation, is represented here.¹¹ The bottom diagrams of Figure 2 display the typical changes. The bottom-left diagram illustrates both a technical progress and an increase in the supply of workers, through an upward shift and a rotation clockwise of the productivity curve. The bottom-right one illustrates a lowering of the preference for the present, through a rotation counter-clockwise of the pattern of indifference curves. The effects of these changes upon the distribution of the final output between capitalists and workers, depend on the hypothesis made about the pattern of intertemporal indifference curves. There are two main possibilities: as the economic system becomes more productive and wealthier (climbing the 45-degree line), people can become *more* present-oriented, or they can become *less* present-oriented. Correspondingly, the marginal rate of time preference can respectively increase or decrease as wealth grows. Graphically, these two cases are illustrated by the indifference curves becoming respectively steeper or flatter on the 45-degree line (see Figure 3). Under the

¹¹ At this point, we skip the quite important but a bit technical discussion by Hayek of the shape of this productivity curve. When the productivity curve is linear, the equilibrium interest rate is necessarily equal to the (constant) marginal productivity, and therefore does not depend on time preferences. Hayek argues that the productivity curve is linear or almost linear, and concludes that the level of the equilibrium interest rate is determined by productivity, not by time preferences.

assumption of a concave productivity curve, the two configurations are compatible with the existence of an equilibrium.¹² However, the pattern with an increasing time preference is quite unlikely, since it implies that as people become wealthier, they are more and more eager to consume their marginal net income rather than saving and investing it. It is more plausible that, when people become wealthier, they also become more, not less, prone to save an extra unit of present good in order to get additional units in the future (see the discussion in Block, Barnett and Salerno 2006). This pattern—a decrease of time preference with wealth—is illustrated in the right diagram of Figure 3, and the consequences of the typical changes in the case when this pattern prevails are summarized in Table 2.

Figure 3. Two patterns of time preference in Hayek’s model



¹² In Hayek’s first model, i.e. with a linear productivity curve, then the existence of an equilibrium necessitates an *increase of time preference with wealth* (Molavi Vasséi 2015).

Table 2. A summary of Hayek’s model (the effects of the typical changes are those that occur under the assumptions of a concave productivity curve and of a marginal time preference that decreases with wealth)

Exogenous data	<i>PC</i> productivity curve <i>IC</i> intertemporal indifference curves <i>N</i> number of workers
Endogenous variables	<i>i</i> interest rate <i>K</i> quantity of capital (implicit) <i>W</i> aggregate real wage (implicit)
Causal relationship	$(PC, IC, N) \Rightarrow (i, K, W)$
Lowering of time preference	All three typical changes have the same effects: $i^* \searrow, K^* \nearrow$ Distributional effects: - real aggregate interest: $\Pi^* \nearrow$ (generally) - real aggregate wage: $W^* \nearrow$ or \searrow
Technical progress	
Increase in <i>N</i>	

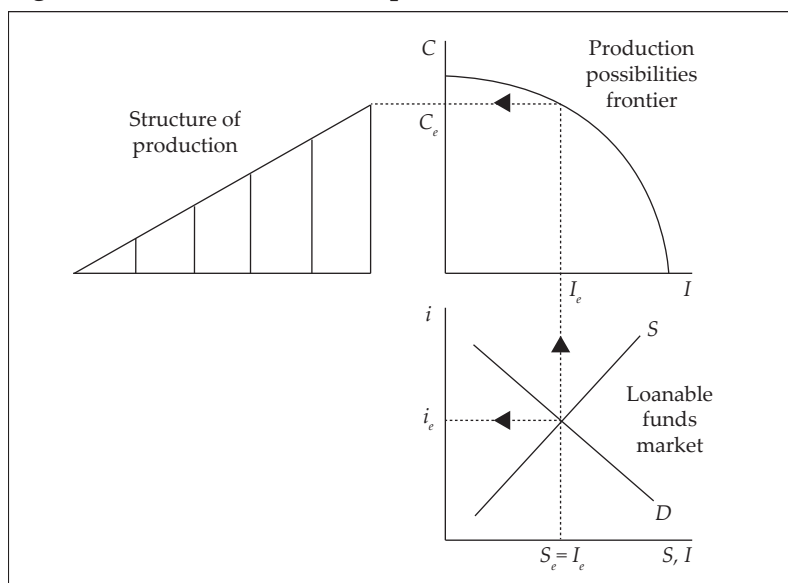
1.3 Garrison’s Model

The models of Böhm-Bawerk and of Hayek rest upon an optimization process (graphically: a tangency between curves). Garrison’s model, on the other hand, rests upon the equalization between a supply and a demand (graphically: a point of intersection between two curves). Here, equilibrium is determined on a generalized loanable funds market.¹³ The intersection of the supply of and demand for loanable funds displays the equilibrium values of the interest rate and of the gross investment spending. These values are then used to determine the shape of a Hayekian structure of production, through the use of the production possibilities frontier (PPF) of the economic system (see Figure 4). This frontier indicates the “fundamental trade-off between consumer goods and capital goods” (Garrison 2001, 41): a greater investment during the current period requires

¹³ This market is generalized in the sense that it includes, not only business lending and borrowing in the strict sense, but also “retained earnings and saving in the form of the purchasing of equity shares” (Garrison 2001, 36).

a lower consumption, and a lower investment allows for a greater current consumption. For an equilibrium amount of investment I_e as determined on the loanable funds market (bottom-right quadrant), the PPF indicates the corresponding equilibrium amount of final consumption C_e , and from there on the Hayekian structure of production is itself determined (top-left quadrant).

Figure 4. Garrison's model (adapted from Garrison 2001, 50)



The typical changes analyzed by Garrison are (i) a technical progress and (ii) a lowering of time preference (there is no mention in his presentation of a change in the aggregate supply of labor). Let us begin with technical progress. If this progress "affects all stages of production directly and proportionally," then "Investment, output, income, consumption, and saving would all rise together without putting pressure one way or the other on the rate of interest" (2001, 58). If, on the other hand, the technical improvement "is usable only in one or a few stages," then the interest rate is impacted: first, the demand for loanable funds increases and the interest rate rises, as entrepreneurs "seek to take advantage of [the] new technology"; then, as incomes increase due to the enlarged investment, the supply

of loanable funds also increases, and the interest rate falls; equilibrium aggregate investment I_e necessarily rises, but the resulting effect on the equilibrium interest rate i_e is indeterminate since the effects of a higher demand for and a higher supply of loanable funds balance one another. Simultaneously, the PPF shifts outward since the economic system has become more productive, so that the amount of final consumption and the period of production also rise. In the case of a lowering of time preference: the supply of loanable funds shifts to the right, since people are willing to lend and invest more, but the demand does not move. As a consequence, the equilibrium interest rate diminishes, equilibrium investment increases, consumption falls, and the structure of production becomes more roundabout.¹⁴ Garrison's model is summarized in Table 3.

Table 3. A summary of Garrison's model

Exogenous data	<i>S&D</i> supply of and demand for loanable funds <i>PPF</i> production possibilities frontier
Endogenous variables	i interest rate I aggregate investment C aggregate consumption T length of the structure of production
Causal relationship	$(S\&D, PPF) \Rightarrow (i, I, C, T)$
Lowering of time preference	Endogenous effects: $i_e \searrow, I_e \nearrow, C_e \searrow, T_e \nearrow$ Distributional effects: - real aggregate interest $\Pi_e \nearrow$ or \searrow - real aggregate wage $W_e \nearrow$ or \searrow
Technical progress	Endogenous effects: $i_e \nearrow$ or $\searrow, I_e \nearrow, C_e \nearrow, T_e \nearrow$ Distributional effects: - real aggregate interest $\Pi_e \nearrow$ or \searrow - real aggregate wage $W_e \nearrow$ or \searrow
Increase in N	-

¹⁴ The lengthening of the structure increases the productivity of labor and will eventually cause an outward movement of the PPF, but Garrison does not illustrate this effect.

2. VIENNA, WE HAVE A PROBLEM

After this review of the Austrian models, the first and most obvious remark is that they are *inconsistent with each other*. In the case of the implementation of technical progress, for instance, Böhm-Bawerk's model concludes that the interest rate will rise, while according to Hayek's model it will rise first and then fall more than it has risen (under the assumption that time preference diminishes with wealth), and in Garrison's model it can either rise or fall. In the case of a lowering of the preference for the present, all the models conclude that the interest rate falls and that investment necessarily increases. However, even when the conclusions converge they are deduced from incompatible premises, and this is the deeper problem that will be investigated hereafter. In order to carry out the comparison between these models, we are going to distinguish between the "productivity" models of Böhm-Bawerk and of Hayek on the one hand, and the "demand and supply" model of Garrison on the other. The comparative analysis will be carried out first between the "productivity" models, and then across the two kinds of models.

2.1 The "Productivity" Models

In both Böhm-Bawerk's and Hayek's models, productivity plays a key role and the convergence towards equilibrium takes place through a step-by-step optimization process, but there are significant differences between them. The first and main one pertains to *intertemporal choice*. In the two models, the economic agents make intertemporal decisions, but not at all of the same kind. In fact, while Hayek's model is built upon a genuine intertemporal choice, Böhm-Bawerk's rests upon what can be called a "pseudo" intertemporal choice. The actors in Hayek's model face a trade-off between present and future consumption. If they want to consume more now, they must decumulate capital, and the less capitalistic structure will provide a smaller output and consumption in the future. Conversely, if they sacrifice a part of their present consumption and invest this net saving, then capital is accumulated, and the more capitalistic structure will provide a larger output and consumption in the future. There is of course nothing surprising or unusual in this kind of very basic intertemporal arbitrage. However, when we turn to what Böhm-Bawerk

calls the “exchange” of present against future goods by capitalists, we realize that the phenomenon he is talking about is completely different.¹⁵ Here, the capitalists “exchange” present goods (present wages) against the goods that will be produced in the future with the help of the hired labor. In these exchanges, the capitalists invest the *same* amount at the beginning of a period (the wage), and they can get, over the period, different levels of interest rate according to the length T of the structure of production. It so happens, in the framework of the model, that there is a period of production that brings the highest interest rate (and also interest), and they choose this period. The crucial point is that the capitalists choose the highest interest that they can get at the end of each period, while their investment at the beginning of this period is fixed. This means that they do not choose between present and future goods, but rather *between future goods* available at the *same* moment (at the end of the period): at this moment, the capitalists can get more or can get less, and choose more over less. This choice cannot appropriately be considered as an intertemporal choice because it is made between options available at the same moment in time. Whether the period of production is longer or shorter does not require a greater or smaller sacrifice from the capitalist. There is no trade-off between present and future consumption. While the exchange in Hayek’s model is truly intertemporal, in Böhm-Bawerk’s it only appears, but is not, intertemporal.

The second significant difference between the two models has to do with the *roundaboutness* of the production process. The period of production is a pillar of the Austrian theory of capital, according to which capital accumulation takes place through a lengthening of the structure of production. Böhm-Bawerk’s model explicitly takes this length T into account as an endogenous variable. The period of production thus plays a key role in his formalization. Hayek (1941, 60) accepts the “roundaboutness” theory but maintains that it is not applicable in the framework of his model. The reason is that in his model “there is only one possible period of investment” (1941, 221), and as a consequence there cannot be any change in the duration of

¹⁵ Böhm-Bawerk uses the word “exchange” many times in his chapter on “The Rate of Interest,” for instance in the very first sentence that reads: “The exchange of present goods for future goods, which constitutes the source of the phenomenon of interest, is merely one special case under the rubric of the exchange of goods in general” ([1889] 1959, 347).

the period of production: capital accumulation takes place laterally, through the addition of similar processes of identical length, not longitudinally. His model indeed requires that, when an extra saving is invested, the increase in the production of consumption goods occurs in the very next period. Now, when the period of production lengthens, the reorganization of the structure extends over several periods, which means that a number of periods elapses before the eventual increase in the production of consumption goods. But such a waiting cannot happen in the framework of the model, which requires that the production of consumption goods increases in the period immediately following the period when the net saving is invested. Hayek's model therefore does not integrate the phenomenon of roundaboutness that is the fundamental law of the Austrian theory of capital.¹⁶ To sum up, when compared to Böhm-Bawerk's model, Hayek's one offers a much more appropriate formalization of intertemporal choice, but uses a theory of capital accumulation that is not the core theory of the Austrian School.

2.2 Across "Productivity" and "Demand and Supply"

The "productivity" models are well suited for the study of changes that affect the real output, such as technical progress and an increase in the supply of labor: suffices to move the productivity curve and investigate the ensuing convergence process. The "supply and demand" model of Garrison, on the other hand, is especially appropriate for the study of lending and borrowing. Two questions now deserve to be answered. First, how does this "supply and demand" model address the issue of productivity? And second, are the "productivity" models able to integrate the phenomenon of lending and borrowing?

Can productivity be taken into account in the "demand and supply" model? Productivity has to do with quantities of goods, i.e.

¹⁶ This impossibility to integrate the phenomenon of roundaboutness is (in our opinion) the reason why Hayek did not try to combine his theory of the interest rate of *The Pure Theory of Capital* (1941) with his famous "triangle" of *Prices and Production* ([1931] 1935). When the economic system is depicted as a triangle, capital accumulation takes place through a lengthening of the overall period of production: the triangle becomes thinner and longer. This "longitudinal" or "vertical" accumulation of capital is incompatible with Hayek's theory of the interest rate.

with real values. In Garrison's model, there is an element that shows the real final output, namely the production possibilities frontier (PPF). Technical progress simultaneously affects the PPF and the loanable funds market. The PPF moves upwards, since for any level of investment I , the real final output C_t is now larger. In parallel, the supply and demand curves increase, simultaneously if technical progress is implemented all along the structure of production, and sequentially if it is implemented at one stage only (see Subsection 1.3 above). This "supply and demand" model can therefore analyze the productivity effects, even though its theory is in this case more convoluted than those offered by the "productivity" models.

This is the place to say a few words about the comparison between the Garrisonian PPF and the Hayekian productivity curve. These two curves bear a superficial resemblance, as they are both concave curves that relate consumption to investment. However, the two constructs are very different from each other. The Hayekian productivity curve is an *intertemporal* construct that shows how future consumption will change following a current net saving or dis-saving. This productivity curve therefore shows how a current netsaving (for instance) turns into an increase in future consumption. Garrison's PPF, on the other hand, is an *instantaneous* construct that shows how a current net saving implies a decrease in current consumption. Another difference is that the Hayekian productivity curve is a barrier that the economic system cannot cross, while the Garrisonian PPF is a boundary that *can* be crossed: the economic system can move beyond it. Garrison (2001, 70) defines the PPF as "*sustainable combinations of consumption and investment*," so the economic system can indeed produce an amount that goes beyond the frontier if part of the capital is consumed.

The "supply and demand" model can take productivity into account, but can the "productivity" models integrate the phenomenon of lending and borrowing? The answer, in our opinion, is no. Hayek's and Böhm-Bawerk's models are exclusively based upon productivity. They have no place for a loanable funds market in which the economic agents supply or demand various amounts of present goods according to the level of the interest rate. Hayek (1941) never mentions loans in the two chapters of the book in which he develops his model. Böhm-Bawerk ([1889] 1959, 369) takes consumer loans into account, but not in his basic model,

since the latter only features the wage and productivity of capital. He analyzes the demand for consumer loans separately, as an additional and specific force that impacts the interest rate and the structure of production: the economic agents who ask for consumer loans compete with workers to get a part of the subsistence fund; the more intense the demand for consumer credit, the higher the interest rate, and the shorter the structure.¹⁷

Leaving aside consumer loans and focusing on the more relevant phenomenon of productive loans, a follow-up question arises: is it a serious defect for these “productivity” models that they do not integrate loans to producers? The answer depends in turn on the answer to another question: how significant is the role of loans to producers in a basic macroeconomic model? In the context of such a study, investors do not face any uncertainty, and have thus no reason to prefer less risky loans to more risky equity. Furthermore, there is no money creation by banks building additional credit (loanable funds) upon fractional reserves. It appears, therefore, that productive loans would play a secondary role in the study of the determination of investment and the interest rate. The fact that the “productivity” models cannot explicitly take these loans into account is therefore not at all a critical flaw. Furthermore, a developed economic system can be conceived without any loans, but not without any productivity of capital, so that the latter is more important from a theoretical viewpoint.¹⁸

¹⁷ In the graphical representation of Böhm-Bawerk’s model (see Figure 1), the effects of the emergence of a demand for consumer loans can be visualized as a downward movement of the hyperbola $wT = 2K/N$, since this demand reduces the amount of capital K available for productive purposes.

¹⁸ In the context of his discussion of the tendency towards an equilibrium, Hayek (1941, 266) writes:

We might conceive a society where the lending of money (at least at interest) was prohibited and where nevertheless, so long as the possibility of spreading investments by means of partnerships, joint-stock participation, etc., existed, the rate of return on investment would be uniform throughout the system. The rate of return on investment as determined by the price relationships between capital goods and consumers’ goods is thus *prior to*, and in principle independent of, the interest on money loans, although, of course, where money loans are possible, the rate of interest on these money loans will tend to correspond to the rate of return on other investments (our emphasis).

In conclusion, there are bridges between a “demand and supply” model such as Garrison’s and the phenomenon of productivity. The relationship between the “productivity” models and the phenomenon of productive lending and borrowing is more problematic, and has not been investigated either by Böhm-Bawerk or by Hayek in the framework of their “productivity” models.

3. SOME COMMON FEATURES OF THE AUSTRIAN MODELS

Even though the three models widely diverge in their specifics, at a more general level they share a number of significant characteristics.

First, they all implicitly or explicitly accept the validity and relevance of a “macro” approach in the realm of economic analysis. The idea of an “Austrian macroeconomics” may at first sight seem problematic and even paradoxical, on account of the importance that the economists of the Austrian School have attached to subjectivism and individual action since the seminal contribution by Menger ([1871] 1976). Now, as much as the proof of the pudding is in the eating, the proof of an Austrian macroeconomics is in the models presented above. Horwitz (2000, 1) writes that “In the eyes of many economists, Austrians are seen as rejecting the whole concept of macroeconomics in favor of a focus on microeconomic phenomena such as price coordination and entrepreneurship.” He adds that “there *is* an Austrian macroeconomics that is alive and well” (2000, 2), pointing to the study of topics such as money, banking, and the business cycle. This paper shows that Austrian macroeconomics is not limited to the theories of monetary disequilibrium and of cyclical fluctuations. It also covers much more elementary topics such as the determination of the static equilibrium interest rate and distribution between capitalists and workers. Like Horwitz, Hülsmann (2012) recognizes the existence of an Austrian macroeconomics. He notes that before Garrison’s first contribution (Garrison 1978), “the very

Hayek does not clarify what he means by the rate of return on investment being “prior to” the interest on money loans, but he is likely talking of a historical and a theoretical priority. Decades before, Fetter ([1914] 1977, 234) argued that “capitalization” (interest on investment) is both historically and logically antecedent to “contract interest” (interest on loans).

expression Austrian macroeconomics was considered an oxymoron" (2012, 46) because the word macroeconomics was associated "with positivistic and mercantilist ideas," ideas to which the Austrians were—and still are—strongly opposed. However, it can be argued that the Austrian tradition in macroeconomics was not born in the 1970s, but goes way back to the end of the nineteenth century.

The second common feature of these Austrian models is that they all have, in one way or another, a subjectivist foundation in human action. In Böhm-Bawerk's model, the convergence process is driven by the capitalists aiming at maximizing the interest rate, and also competing with each other to invest their whole capital. Hayek's model is formalized around the intertemporal choice of a Robinson Crusoe or a collectivist dictator. Garrison's model is based upon a generalized loanable funds market in which the individual actors interact. Since the appearance in the 1930s of a macroeconomics severed from any micro-foundations (Frisch 1933), the Austrian scholars have ceaselessly criticized this kind of approach. Hayek was one of the earliest opponents of this search for relationships between aggregate statistical constructs,¹⁹ but his attack should not be understood as a criticism against any and all kind of macroeconomic investigation. The Austrian models do not suffer from the defects of the purely holistic macroeconomics that he strongly condemns. In the distinction elaborated by Lachmann (1973) between "formalism" and "subjectivism," these models clearly belong to the latter category. Lachmann defines "formalism"—an approach with which he disagrees—as "a style of thought according to which abstract entities are treated as though they were real." He then defines "subjectivism" as "the postulate that all economic and social phenomena have to be made intelligible by explaining them in terms of human choices and decisions" (1973, 9–10). The Austrian macroeconomic models indeed rest upon the subjectivist approach, in line with the Mengerian tradition of methodological individualism.

¹⁹ "In fact, neither aggregates nor averages do act upon another, and it will never be possible to establish necessary connections of cause and effect between them as we can between individual phenomena, individual prices, etc." (Hayek [1931] 1935, 4–5). He expressed the very same thought in his last book, defining what he calls "macro-economics" as the search for "causal connections between hypothetically measurable entities or statistical aggregates," and stating that it is a "delusion that macro-economics [in this sense] is both viable and useful" (Hayek 1988, 98).

Third, all the models use very similar simplifications in order to make the analysis of the economic system manageable. These simplifications are too numerous to be listed exhaustively, but here are some of the most significant. The economic system produces a homogenous consumption good or basket. The capital goods, on the other hand, can be different from the consumption good, and to this extent these models are not as simple as the standard neoclassical model of Solow and Swan, in which there is only one good used both as a capital and as a consumption good. There are two kinds of factors of production, namely labor and capital goods (in the Böhm-Bawerkian sense of produced factors of production). In the more general case, there are three kinds of factors, labor, capital goods and land. If land is taken into account, then the corresponding (unproduced) natural resources are not exhaustible: if there were an exhaustible resource, then a static equilibrium could not occur because the quantity of one of the productive inputs would diminish over time. When the effect of technical progress is analyzed, the discovery of more efficient techniques of production is free, and these more advanced methods increase final production as soon as they are discovered and implemented.²⁰ The functioning of the price system that reallocates the factors of production where they are the most useful is taken for granted, and quickly adjusts the structure of production after an exogenous shock. Finally, these models eliminate uncertainty, and with it the entrepreneurial function. The absence of uncertainty gives them a “mechanistic” appearance that is discordant with the work in the Austrian paradigm that is more focused on the way the market process allows the agents to cope with radical ignorance.²¹ This mechanistic aspect, however, seems to be the price to pay for the high degree of simplification required in order to cope with an economic system as a whole.

²⁰ It would be more realistic to suppose that there is a delay between the implementation of new techniques and the eventual increase in the production of consumer goods. If the progress takes place at a stage far away from final consumption (for instance an improvement in the methods of extraction of deposits), then it could take several years before the increase in the final output occurs.

²¹ As Lachmann ([1991] 1994, 278) puts it, “In its essence Austrian economics may be said to provide a voluntaristic theory of action, not a mechanistic one. Austrians cannot but reject a conceptual scheme, such as the neoclassical, for which man is not a bearer of active thought but a mere bundle of ‘dispositions’ in the form of a ‘comprehensive preference field.’”

On the theoretical side also, these models bear an undeniable resemblance. As far as production is concerned, it can only grow if the quantities of factors increase or if better techniques are implemented. The increase in the quantities of factors can be either exogenous in the case of the original factors labor and land, or endogenous (through saving) in the case of capital goods. In all these models, the crucial theoretical problem that has to be solved is the problem of the determination of the interest rate. In fact, for two of the three models (Böhm-Bawerk's and Hayek's), the essential reason they were developed was to get a theory of the forces that lead to the determination of the level of the interest rate. In the case of Hayek, the problem was to weigh the relative influence of productivity and of time preference on the height of the interest rate. Another major theoretical similarity is the kind of shocks whose effects upon equilibrium and distribution can be analyzed, namely a change of time preference (capital accumulation or dissipation), technical progress, and a change in the supply of labor. A last theoretical common point between the models is the use of the Austrian structure of production and of the related Böhm-Bawerkian theory of roundaboutness. The only model that does not resort to either of these two elements is Hayek's model, for reasons indicated above (see Subsection 2.1). It is surprising that Hayek's model is the one that does not make use of the most famous construct in Austrian macroeconomics, namely the Hayekian triangle developed by Hayek himself ([1931] 1935).

Finally, from an epistemological viewpoint, the three Austrian models all exemplify the same kind of endeavor. They are not intended to be tested against empirical observations. They are not meant to be calibrated to match historical macroeconomic data in order to determine the value of their parameters.²² Rather, they are conceived as intelligibility models that aim at clarifying some of the most basic economic questions in a very simplified setting. This clarification rests upon the logic of action, and has nothing to do with the empirical corroboration of hypothetical laws. These

²² We are not claiming that it would be impossible to relate in one way or another these models to macroeconomic data, but it certainly has never been attempted and was not the reason why they were developed in the first place.

models therefore follow an epistemology that is not the one used in the experimental sciences.²³

For all these reasons, in spite of their divergences, the three Austrian models are part of the same family. They can be considered as declinations or exemplars of a common approach to basic macroeconomics, illustrating the search for simple frameworks that illuminate the determination of the interest rate and the distribution of the net output. All these attempts agree on the purpose of a straightforward and relevant macroeconomic model in terms of equilibrium analysis and response to typical shocks.

4. WHY NO SINGLE MODEL DOMINATES

Up to this point, it has been established that the Austrian macroeconomic models are contradictory in their premises and conclusions, but bear a family resemblance. The question remains as to why none of them has managed, at least until now, to dominate the scene within the Austrian School, and by “dominate” we mean: being generally accepted within the School as a sound theoretical foundation.

Böhm-Bawerk’s model was published in 1889, and was mathematically formalized a few years later by Wickseil ([1893] 1970). There is, however, no trace of this model in Wieser’s treatise ([1914] 1927), nor in Strigl’s main book on capital ([1934] 2000). The model was revived by Dorfman (1959), and the last specific reference to it by a major Austrian economist is found, to the best of our knowledge, in Kirzner (1966).²⁴ In the meantime, the two main Austrian economists of the twentieth century, namely Mises and Hayek, had both aimed severe criticisms at Böhm-Bawerk’s approach of the theory of interest. Their criticisms are not consistent with each other, though, and furthermore do not rest upon a detailed examination of the model itself. Rather, they target some of the most general features of Böhm-Bawerk’s approach. Hayek (1941) criticizes the simplistic assumptions made by Böhm-Bawerk when he treats the quantity of capital and the

²³ Hayek (1952) and Mises (1962) offer classic statements, from an Austrian perspective, of the epistemological specificity of the social sciences vis-à-vis the natural sciences.

²⁴ Blaug ([1962] 1978) offers a detailed presentation of the model in the chapter devoted to the Austrian theory of capital and interest.

period of production as purely technical data.²⁵ Mises is extremely severe vis-à-vis the Böhm-Bawerkian concept of “average period of production,” which he labels an “empty concept.”²⁶ He also totally rejects the productivity theory of interest that forms the core of Böhm-Bawerk’s model. In this regard, the opinions of Mises and of Hayek diverge: Hayek considers Böhm-Bawerk’s criticism of earlier productivity theories as “mistaken,”²⁷ while Mises lauds how “brilliantly” Böhm-Bawerk refuted these first productivity theories.²⁸ So they both point out what they believe to be insurmountable flaws in Böhm-Bawerk’s theory. The latter’s model, therefore, could not be accepted by the followers either of Mises or of Hayek, which pretty much means that it could not be accepted by anyone in the Austrian School from the mid-twentieth century on.

In the 1970s, Faber (1979) developed a “neo-Austrian” approach to the theory of capital. After an in-depth analysis and criticism of Böhm-Bawerk’s model, Faber makes use of a mathematical model of the economic equilibrium elaborated by von Neumann (1945–46). This model rejects the concept of an average period of production, but it can be infused nonetheless with the Böhm-Bawerkian theory of roundaboutness. Faber is able, with his neo-Austrian version of von Neumann’s model, to investigate the cases of a two-period two-sector economy, and then of a multi-period (with a finite horizon) economy.²⁹

²⁵ “As will appear later in more detail, the quantity of capital as a value magnitude, no less than the different investment periods, are not data, but are among the unknowns which have to be determined.” (Hayek 1941, 192)

²⁶ “The length of time expended in the past for the production of capital goods available today does not count at all. These capital goods are valued only with regard to their usefulness for future want-satisfaction. The ‘average period of production’ is an empty concept.” (Mises [1949] 1998, 486)

²⁷ “[Böhm-Bawerk’s] effective, although I think mistaken, critique of the earlier productivity theories of interest had the effect of causing later development to centre [*sic*] increasingly round the ‘psychological’ or ‘time-preference’ element in his theory rather than the productivity element.” (Hayek 1941, 42)

²⁸ “... Böhm-Bawerk in the elaboration of his theory did not entirely avoid the productivity approach which he himself had so brilliantly refuted in his critical history of the doctrines of capital and interest.” (Mises [1949] 1998, 486)

²⁹ The author wishes to thank an anonymous referee for the reference to and remarks about Faber’s work.

Hayek's model has recently been brought to light by Molavi Vasséi (2015) and Fillieule (2017). White (2007) also devoted a few paragraphs to it in his "Introduction" to the new edition of Hayek (1941). There are a number of reasons why this model has not been used to build a cumulative tradition. The first one is that Hayek's book failed to have a significant following in the Austrian School, in the sense that nobody tried to develop capital theory along the lines first set out in this book. Furthermore, the model does not deal with the core topic of the 1941 book, namely capital theory. An off-topic model in an idiosyncratic book had little chance to make an impression.³⁰ A second reason is that the model was not conceived, and also not really recognized, as a macroeconomic model. In his ([1936] 2015) paper, Hayek insists upon the way his model formalizes time preference, and claims that the concept of "constant tastes" failed to be correctly understood by Böhm-Bawerk and by Schumpeter. Hayek ([1936] 2015, 36) then explains that "we... have to represent constant tastes by declaring the indifference map of the individual (or the indifference maps of all the individuals) to be the same at every moment." His model indeed solves the problem of formalizing "constant tastes" as a pattern of intertemporal indifference curves that remains the same at the successive periods. But as a result of this presentation, the much wider range of the model may have been neglected. There were also probably more technical reasons, such as the hypothesis of a constant marginal productivity (which deprives the model of much of its appeal, since it restricts the acceptable kind of time preference pattern to the implausible case of a marginal time preference that increases with wealth), and such as the fact that Hayek did not systematically try to investigate the effects of changes in time preference, technology, and supply of labor. A major reason for the neglect of this model is that in the United States, where the Austrian School experienced a renaissance in the second half of the twentieth century, the scholars adopted the Fetter-Mises subjectivist theory of interest instead of a productivity theory. The time preference theory of interest was endorsed by Rothbard ([1962] 2009), Garrison (1979), Kirzner (1993), and other authors (see Pellengahr 1996). Hayek (1941), on the other hand,

³⁰ In his recent presentation of *The Pure Theory of Capital*, Steele (2014) does not expound this model at all.

very explicitly chose the productivity explanation of interest, even though he thought that time preference could also play a (minor) role in the determination of interest.³¹ As a result, his model—interpreted by Hayek as a validation of the productivity theory of interest—was largely overlooked.

Garrison's model (2001) attracted a lot of attention within the Austrian School as soon as it was published. The reason is that this author had provided for more than two decades some of the most important macroeconomic work of the school (see for instance Garrison 1984). The book (not just the model) was received with great expectations by the Austrian scholars, but the reviews that were published in the two major Austrian journals were not entirely positive. In the *Review of Austrian Economics*, Oprea and Wagner (2003) criticized Garrison's book for being dated, reviving discussions from the 1960s, and for not taking into account the more recent mainstream macroeconomic paradigms. The *Quarterly Journal of Austrian Economics* devoted a whole issue to the analysis and commentary of the book (Thornton 2001). While more positive in tone than Oprea and Wagner's review, a number of criticisms were raised. The comments about the comparison drawn by Garrison between his "capital-based macroeconomics" and the macroeconomics of Keynes and Friedman do not concern us in this paper, and neither do the comments about the theory of the business cycle. The graphical construct is the focus here, and it was criticized by Hülsmann and by Salerno. Hülsmann (2001, 40) notes two inconsistencies in the diagrams displayed by Garrison (see Figure 4 above). First, there is a discrepancy between the nature of the variables in the top part of the diagram, namely between the *real* consumption on the vertical axis of the PPF and the *nominal* consumption on the vertical side of the Hayekian triangle. Second, there is a temporal discrepancy between the two horizontal axes, the bottom horizontal axis showing the *current* investment that will produce the future capital goods, and the top horizontal axis showing these *future* capital goods on the

³¹ "Of the two branches of the Böhm-Bawerkian school, that which stressed the productivity element almost to the exclusion of time preference, the branch whose chief representative is K. Wicksell, was essentially right, as against the branch represented by Professors F. A. Fetter and I. Fisher, who stressed time preference as the exclusive factor and an at least equally important factor respectively." (Hayek 1941, 420)

PPF. Salerno (2001) criticizes another aspect of the model, this time pertaining to the theory of growth. Garrison (2001, 54) claims that a “secular growth” can occur “without having been provoked by policy or by technological advance or by a change in intertemporal preferences.” This secular growth is simply the result of “the ongoing gross investment,” which “is sufficient for both capital maintenance and capital accumulation.” Salerno points out that the Austrian theory asserts, rather, that the growth brought by a net investment ends up in a stationary equilibrium and cannot lead to an indefinite growth.³² So, even though Garrison’s diagrammatic exposition of Austrian macroeconomics was generally praised as a pedagogical tool (and still is³³), some of the reviewers were skeptical about parts of the theoretical underpinnings of the model.

CONCLUSION

This paper has attempted to tell the little-known story of the basic Austrian macroeconomic models, models spanning from the end of the nineteenth century to the beginning of the twenty-first. After a presentation of each model, a detailed account of the differences between them has been provided. The main results of this investigation can be summarized as follows. (i) There exists an Austrian macroeconomics, even at a quite elementary level that does not take uncertainty and monetary disturbances into account. (ii) This macroeconomics is embodied in formal models that have been presented graphically as well as mathematically. (iii) These models are not consistent with each other. (iv) The inconsistencies between them are mainly due to disagreements on the theory of the interest rate. (v) Beyond these theoretical contradictions, these models all try

³² Writes Salerno (2001, 45): “However, in Austrian capital theory, each dose of net investment, *ceteris paribus*—and after a transition period during which the appropriate resource reallocations have been completed—brings about a stationary economy in which the new higher level of gross investment and the elongated structure of production is just sufficient to support a definite increase in the flow of consumer goods. As long as gross investment is maintained at its new higher level, the output of consumer goods per period will remain constant.” See also the recent qualified defense of Garrison’s theory of secular growth by Murphy (2017).

³³ “[P]erhaps the primary virtue of *Time and Money* is its exposition of capital-based macroeconomics in terminology and graphs that non-Austrian economists can understand.” (Murphy 2017, 353)

to solve the same kind of problems by using of the same (actionist) methodology. (vi) The continuing search for a basic macroeconomic model, from the birth of the Austrian school until today, shows the importance and relevance of this topic from a theoretical viewpoint. (vii) Nevertheless, very few discussions, if any, have taken place in the history of this school on the relative merits of the different models. From a history of thought perspective, this study shows that in macroeconomics just as in other areas (banking, for instance), the Austrian School is not monolithic but has been traversed by deep tensions, some of them still unresolved.

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ROTHBARD ON THE ECONOMICS OF SLAVERY

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JEL CLASSIFICATION: B53, N31, N91

ABSTRACT: Murray Rothbard wrote an unpublished note in the early 1960s on the economics of antebellum slavery. Essentially, it was a criticism of the methodology of the New Economic History, or cliometrics, of which Conrad and Meyer (1958a) was the breakthrough application, on the topic of the profitability of slavery. Rothbard points out that their procedure in no way supports their conclusion that slavery was profitable or their ideological conclusion that the Civil War was necessary to end American slavery.

A manuscript was found in the Rothbard Archives titled “A Note on the Economics of Slavery.” It appears to be an unpublished communication concerning an article and comment that appeared in the *Journal of Political Economy*. Given the dearth of analysis of the economics of slavery in Murray N. Rothbard’s writings and the revolution in the subject matter that was taking place at the time it was written, the manuscript is certainly worth publishing at this time.¹ The purpose of this article is to provide the necessary context in which the note was written.

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¹ By 1956, Rothbard had planned to write about the economic analysis of slavery as an appendix to a chapter on government intervention in his treatise *Man, Economy and State* (1962). According to Stromberg, the editor of the 2004 edition of *Man Economy and State*, in a private memo, Rothbard outlined the contents of that appendix and that sketch mimics the contents of Rothbard’s (1960) note.



In 1994, I published a paper on the economics of slavery, “Slavery, Profitability, and the Market Process,” in the *Review of Austrian Economics*, then edited by Rothbard. He had encouraged me to write on the economics of antebellum slavery based on comments I made during an impromptu debate I had with economic historian Robert Higgs at Mises University in the early 1990s.

Not only did Rothbard encourage me to write the article, he guided me with multiple single-spaced pages of references and suggestions. In the process I examined an enormous amount of literature on the economic issues of slavery in antebellum America. It could have easily turned into a second dissertation. However, there was nothing written by Rothbard himself among those recommended sources.

When I was writing, I was well aware of one of the articles that Rothbard commented on in the note. It was a landmark study in the “New Economic History” by Conrad and Meyer that was published in the *Journal of Political Economy* in 1958. However, I was unaware of the comments by Douglass Dowd (1958) and John E. Moes (1960), which were published in the same journal. The second comment is the direct subject of the Rothbard note. Conrad and Meyer published two revealing replies to both comments. This literature is reviewed here to provide the context of Rothbard’s note.

We assume that Rothbard’s note was submitted and rejected, if for no other reason, because it would have been submitted more than two years after the original article was published. Also, the “note” would have been the third comment on the article, and no other article in the *JPE* during this period had more than one published comment. For now, I will note that Rothbard did not bring my attention to either the Moes comment or his own note during the process of researching, writing, or publishing my 1994 article. Both would have been helpful, welcome additions to my research. Moes (1960) argues against the seminal article by Conrad and Meyer, a precursor to the classic and highly controversial work by Robert Fogel and Stanley Engerman, *Time on the Cross* (1974). Rothbard supplements Moes with a more theoretical commentary. It is worth noting here that the Conrad and Meyer (1958a) article was the epicenter of a methodological revolution in economic history.

The Conrad and Meyer article is an attempt to establish whether or not antebellum slavery was in fact profitable. At thirty-five pages, it is an empirical analysis of the available data, much like an historical accounting exercise with the assistance of economic modeling. This article marks the very beginning of cliometrics, a.k.a. the New Economic History, in which economic history would be studied primarily using models and statistics. It was a revolution that would eventually sweep the field of traditional economic history.

Conrad and Meyer's article is an effort to measure the ordinary profitability of slavery using an economic, as opposed to an accounting, formula of profit. In addition to the revolutionary method, the article confronted a critical ideological issue at the time: can the American Civil War be justified? Was slavery inefficient and unprofitable and would it have soon died off, making the American Civil War unnecessary? Or, was slavery efficient and profitable, thus necessitating, or at least justifying, the war? Rothbard represents a view that slavery is narrowly profitable (due to external forces) but inefficient and could plausibly and quickly wither away.

Conrad and Meyer begin with a production function for slave-based agriculture (i.e., cotton) and a production function for slave breeding as the joint product of slavery. They then bring together various data to examine the cost and the value of slave production in terms of cotton and slave breeding. They conclude that the joint product of slave labor in terms of crop production and slave breeding exceeded the returns on alternative investments and therefore that slavery was profitable.

That they find that slavery was profitable is not surprising, as any ongoing risky business should produce an ongoing positive return. This would be especially true in an *expanding* business such as cotton, which along with coal and iron was a primary raw material during the Industrial Revolution! The fact that prices were high and output was rising circa 1849–60 is a strong indication that the market for slaves was not in any kind of long-run equilibrium but instead was experiencing sustained increases due to increasing demand for cotton and other forces.

Their result of profitability is not surprising, because any good, factor of production, or institution that remains in use over a significant period of time must be profitable in some sense. The

laws of economics dictate this result. However, in the long-run equilibrium economy, or evenly rotating economy, economic profits should always be bid away.

This might not be true for things that provide psychic income, which offsets the lack of monetary profits, but it is only true until losses consume all the invested capital. Therefore this would not be an equilibrium situation. Or it could be that cross subsidies maintain an unprofitable operation in order to provide support for a profitable operation. For example, the owner of an apartment building might continue to operate an unprofitable laundry service on the premises because it increases the demand for the apartments or generates “good will” with tenants.

But what could the logic be with antebellum slavery? Did the slave owners get some kind of psychic income from slave ownership? Did they enjoy whipping their slaves? Or did they feel some kind of personal obligation to maintain slave ownership? Such arguments have been made about antebellum slavery, including by Moes (1960), but it seems doubtful that under ordinary conditions, such concerns could be maintained for centuries and over multiple generations.

In any case, those arguments fail, because the number of slaves continued to grow. Slave markets continued to grow and were increasingly vibrant and resilient during the late antebellum period. There was also an increasing long-term trend in inflation-adjusted slave prices. This evidence suggests that such psychic reasons could not be an important factor here, if they existed at all.

However, the fact that Conrad and Meyer (1958a) found slavery to be profitable satisfies their desire to justify the American Civil War:

In sum, it seems doubtful that the South was forced by bad statesmanship into an unnecessary war to protect a system which must soon have disappeared because it was economically unsound. This is a romantic hypothesis which will not stand against the facts. (Conrad and Meyer 1958a, 121)

Moreover, they also blame “inexorable economic forces” for the stability of slavery from the “strict economic standpoint.”

Furthermore, the American experience clearly suggest[s] that slavery is not, from the strict economic standpoint, a deterrent to industrial

development and that its elimination may take more than the workings of *inexorable economic forces*. (Conrad and Meyer, 1958a, 122, emphasis added)

They reiterate in the closing paragraph of the article that slavery is the fault of the market, that the market would continue to support slavery, and that ending slavery would necessarily require “the adoption of harsh political measures,” i.e., the American Civil War.

To the extent, moreover, that profitability is a necessary condition for the continuation of a *private business institution* in a *free-enterprise society*; slavery was not untenable in the ante bellum American South. Indeed, *economic forces* often may work towards the continuation of a slave system, so that the elimination of slavery may depend upon the adoption of harsh political measures. Certainly that was the American experience. (Conrad and Meyer 1958a, 122, emphasis added)

The first comment on the Conrad and Meyer article was by Douglas F. Dowd (1958). He challenges Conrad and Meyer for taking a simple and narrow approach to something that is very complex, particularly the question of the lack of economic development in the slave states. More generally, Dowd argues, correctly, that the institution of slavery prevented “the basic elements of a capitalist society” from taking root. He notes that the maintenance of slavery in the “land of the free” required the development of an “irrational ideology” which had a pervasive impact on society. Dowd writes:

The authors argue as though slavery were merely another, more manipulable, form of labor; as though it were, one might say, institutionally neutral. And, working essentially within the methodology of neoclassical economics (with time allowed in occasionally) they have analyzed the “economic” meaning of slavery as though they were analyzing the representative firm in the long run (or even, at times, in the short run). (Dowd 1958, 441)

In other words, although Dowd agrees that slavery was profitable, he finds that result largely insignificant compared with the impact of the institution on Southern society, particularly its displacement of capitalism and its drag on economic development. In a different context, it could be argued that dealing illegal drugs on the streets is profitable, but that fixes our attention on an obvious and irrelevant aspect of this issue (of course it must be profitable

in some sense) and disregards all the real problems (e.g., crime, corruption, overdose deaths, violence, among others).

In their reply, Conrad and Meyer (1958b) do not disagree with Dowd, but rather claim that he is commenting on issues that were beyond the scope of their paper. They reemphasize that their result “means that the imminent demise of slavery in the ante bellum South must be argued on grounds other than unprofitability from now on.” This is a curious claim given such facts as the steam tractor’s development in the 1870s and its full commercialization during the first quarter of the twentieth century. Would slavery have survived this development?

The true economic question, if not the only important question, is *why* slavery was profitable. Conrad and Meyer essentially bypass the economic question. They attribute the cause of the profitability to murky and ill-defined “market forces.” As we will see, Rothbard asks the right question.

The second comment was by John E. Moes (1960). It is a brute-force frontal assault on Conrad and Meyer (1958a). He argues that the decline of slavery in Rome depended on voluntary manumission, i.e., granting a slave freedom, but that manumission was not a widespread procedure in the antebellum South. According to Moes (1960, 185) “it remained a very minor affair” for the following reasons:

1. Antimanumission laws restricting or prohibiting the freeing of slaves
2. Racial prejudice and white supremacy
3. Freed slaves’ very precarious legal status (unlike in Rome)
4. Antiabolitionist ideology turned slave owning from a business into a calling. The ideology made manumission unprofitable in a real sense due to personal repercussions from family, friends and neighbors.

Moes suggest that with free manumission, the relative inefficiency of slaves (without prospects for freedom), and the increasing diversification of the Southern economy, slavery would certainly have declined or disappeared altogether. In other words, if slaves could buy their freedom and that of their family and friends, then leased slaves would work harder and save their income to make purchases of freedom. They would try to get themselves leased by their owners

into higher-paying industries, such as manufacturing and railroads, and high-skill occupations, such as blacksmithing and telegraph operation. Based on historical experience, Moes thinks that this would have been more profitable for slave owners too, generating higher returns compared to slave-based agriculture. This argument undermines the *ex post facto* argument that the American Civil War was necessary to end slavery in the antebellum South.

In their reply to Moes, Conrad and Meyer (1960, 187) note that Moes's concerns were beyond "our original discussion of the economics of slavery in the American South." Their main concern was to test the hypothesis that slavery *as it existed* in the antebellum American South was profitable according to the "private-enterprise standards of the period." Again, they simply ignore relevant and important issues and subtly place the blame for slavery on private enterprise.

One can well image that Rothbard would be opposed to Conrad and Meyer for several reasons, methodological, theoretical, and historical, among others. Their linking of slavery with capitalist institutions would obviously be unacceptable to him or any good historian of the subject, as slavery has historically been the result of war, not commerce. Antebellum slavery was hardly a capitalist institution: African states were the largest slave hunters, the Royal African Company (founded by the English monarchy) was one of the largest transporters of slaves to the New World, and slavery only survived in the Southern states due to an extensive system of government intervention made up of slave codes, slave patrol statutes, fugitive slave laws, etc.

The first argument that Rothbard makes in the manuscript is that the true economic profits of slavery occurred in the past, when slave hunters and traders exploited the original supply of slaves. The original price would have reflected the anticipated present value of the flow of net revenues over time. The price would have also included the anticipated present value of the net revenues from slave breeding. In the long run, even slave hunting would only yield a normal market return on investment. Rothbard is arguing from a long-run equilibrium view that in the short term slave hunters could earn an economic profit while subsequent owners would only earn a normal operating profit *ceteris paribus*.

What this means is that any detection and measurement of economic profits in a short-run disequilibrium situation in the real world would be the result of some factors other than slavery *per se*. For example, both Rothbard (1960) and Moes (1960) note that antimanumission laws passed in slave state legislatures were a key element in preventing the withering away of slavery. Rothbard also notes that the constitutional measure to shut down international trade in slaves increased the profitability of slave breeding.

Other exogenous factors—including the US Constitution’s slave clause, the 1793 Fugitive Slave Act, the invention of the cotton gin in 1793, the Industrial Revolution, the expansion or strengthening of slave codes and slave patrol statutes (laws designed to prevent runaways by socializing the costs of slave security), and of course the passage of the Fugitive Slave Act of 1850—also increased the profitability of slave-based agriculture. The invention of the farm tractor, the weakening of slave codes (especially the antimanumission laws), and Southern secession and the likely repeal of the Fugitive Slave Act would all have decreased profitability and increased the likelihood of the breakdown of slavery.

Relative to Ludwig von Mises’s (2003, 239) topology of malinvestments in capital, antebellum slave labor could qualify as a capital malinvestment in three of five possible cases. First, it could be classified as labor that was economically justified at one time but in the future would no longer be justified because of the rise of new methods, e.g., the adoption of farm machinery. Second, it could become economically unjustified due to other changes in the market data, e.g., a decrease in slave security or a decrease in the demand for the product of the labor. Third, it could be classified as labor that was uneconomic but could still be used “by virtue of interventionist measures that have now been abandoned,” e.g., by repealing antimanumission laws and adapting the land tenure system to more profitably exploit the labor.

Rothbard therefore makes two main points in his note. First, slavery itself was not economically profitable past the early slave-hunting stage and was more generally inefficient; it was other factors that made slave-based cotton agriculture highly profitable in the antebellum period. Second, political forces were the primary factor keeping the system from withering away. This second point is what I

expanded on in my 1994 paper and other publications on this topic.² Therefore Rothbard (1960), Moes (1960), Dowd (1959), Hummel (1996), Tullock (1967), myself, and many others are in a tradition that concedes that slavery is potentially “profitable” but otherwise inefficient and requires government support to remain viable.

In conclusion, Rothbard, writing from the vantage point of economic theory, asked the correct economic question and provided the correct answers to the fathers of the “New Economic History” at the time of its birth. Rothbard was not opposed to mathematics or statistics in economic articles and books. In fact, in a private memo written around this time (2010a, May 1961), he criticizes two mainstream economists for the dearth of basic statistics, among other things, in their book on American history.³ Rather his primary criticism is a fundamental attack on the methodology of the New Economic History and the subsequent dangerous ideological conclusions that are drawn from it, e.g., that war does good things for society. Historiography might have been different had the editors of the *Journal of Political Economy* decided to publish his note.

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A NOTE ON THE ECONOMICS OF SLAVERY

Murray N. Rothbard

Professor Moes, in his illuminating contribution to the discussion of the economics of slavery, points out that slavery has an inherent tendency to wither away because the keen incentive of working to buy one's freedom will foster the practice of selling manumission to the slave, a practice profitable to master and slave alike.⁴ There is another economic factor operating also to make slavery unprofitable, which Moes does not mention. And this is the fact that the price of any capital good on the market, will always tend to equal the discounted value of the sum of future net earnings from that capital. In the slave economy, of course, slaves are capital. Therefore, the *price* of slaves will tend to equal the discounted value of the sum of future net returns that the master is expected to gain from exploiting the slave's labor. Any rise in returns from slaves will raise the slave price. Therefore, since the rate of net return in every business and from every piece of capital on the market, *including slaves*, tends to be the same, the profit from exploiting slave labor will be imputed backward, from the slaveholder, to the slave trader, and eventually to the slave *hunter*. Only the slave hunter, therefore, the *original* person who converted a free man into a slave, reaps a long-run economic gain from slavery; the current slave-master earns only the usual "natural interest" rate of return that every business earns in the long run.

In their reply to Moes, Professors Conrad and Meyer assert that the particular factor making slavery profitable in the South was a high return on slave breeding.⁵ But in the natural course of the market, the particular breeding-productivity of any slave would have been discounted in the original slave price that the master paid for the slave-ancestors. For the price of a slave bought from a trader (ultimately from the hunter), included the expected future value of the increase of slave population from slave-breeding. In short, slave-breeding was just another productive return which the market price of slaves would have discounted. To deny this, we

⁴ John E. Moes, "The Economics of Slavery in the Ante-Bellum South: Another Comment," *Journal of Political Economy* LXVIII (April, 1960): pp. 183–87.

⁵ Alfred H. Conrad and John R. Meyer, "Reply," *ibid.*, pp. 187–89.

would have to say that the slave hunters and traders were *systematically* and persistently less able and insightful entrepreneurs than the final slave-masters, and there is certainly no reason to make such an assumption.

In the long run, in fact, even slave-hunting will be unprofitable. For if the slave hunting business enjoys the extra imputed profit of slave-exploitation, then more people will flock to slave hunting and the increased competition will raise the costs of slave-hunting, and lower slave prices, until the long-run fate of net return is no greater in slave hunting than in any other industry. And this is why the business of slavery can only continue to be profitable when the supply of slaves is replenished suddenly and fitfully, from non-market resources, e.g., from wars, which can surmount, for a time, the limiting forces of competition.

It should be clear that the supply of new slaves will come only from two sources: external people newly-enslaved, and domestic breeding. For it is difficult to see how any stable society can exist where *domestic* free citizens are continually enslaved. Such a condition would certainly bring about a perpetual “war of all against all” with everyone trying to enslave everyone else, and an end to any sort of civilization. The newly-enslaved must therefore originate from beyond the borders. War, of course, is an ideal method of building fresh supply, because the ethic engendered by wa[r]⁶ leads to the idea that the one’s prisoners are one’s to command. When, therefore, as Moes, Conrad, and Meyer agree, the drying up of external sources of supply caused slavery to decline in the Roman Empire, this too demonstrated the inherent economic weakness of slavery, and the natural tendency of the backward-capitalization of slave prices and the equalization of rates of return, to eliminate the exploitation-gains of slavery. A system, in short, where no one—master or even slave-hunter—gains, and the slaves themselves definitely lose, is a system where new supply will dry up and the incentives of voluntary manumission will cause slavery to wither away. Only prisoners taken in war can temporarily reverse this decline.

In the case of slavery in the South, Moes has pointed out how anti-manumission laws greatly slowed the process of decline. There

⁶ Original reads “way.”

were also other factors. After 1808, the outlawing of the slave trade paradoxically made the withering process much more difficult, for it meant an effective crippling of the slave market. With the slave market hobbled, domestic slaveholders could only increase their supply by domestic breeding—and any increase in the rate of breeding could no longer be fully capitalized backward in the prices of purchased slaves. Hence, the gains from higher productivity of breeding were no longer imputed backward to the slave traders and slave hunters. Thus, given a rise in breeding rates, the constitutional prohibition of the slave trade helped perpetuate slavery at home. Before 1808, another factor delayed the onset of competitive decline and kept the slave trade profitable longer than it would have been. For many slaves were not so created by the slave-hunters, but instead were bought from their existing “slave-masters,” the tribal chieftains of Africa. And since the tribal chieftains were outside the market framework, and were therefore poor entrepreneurs, the slave traders were able to reap great gains from the trade and leave the chieftains with a much lower return than they could have obtained. Of course, even these gains would have been competed away in the long run, but the fact the chieftains were the original enslavers delayed the process of eliminating the exploitation-gains of slavery.

Conrad and Meyer conclude their reply by chiding the Roman Empire for not realizing the rich gains of slavery, presumably from slave-breeding. But [A. H. M.] Jones has shown, in an important and neglected article, that slave-breeding in the Roman Empire, after the Pax Romana had ended the great wars (as well as that other main source of external slaves—piracy), was a costly and ineffective business. When not breeding, after all, the female slaves were largely a net liability, while children were *per se* a total loss, especially since so many children of ancient days died before reaching working age. That slave breeding was a shaky affair may be seen by the government laws and regulations trying to prop it up. For example, Rome decreed in 52 A.D. that if a free woman cohabitated with a slave, the slave’s owner was entitled to claim ownership of her—and her subsequent offspring. Here was a clear-cut attempt to prevent slaves from breeding outside of the slave framework. Moreover, the emperors decreed that any infants of free parents abandoned and brought up as slaves could not be reclaimed by their parents unless the latter repaid the costs of

rearing the children. Augustus would not free any of his personal slaves until they had produced slave-sons to substitute for them in his service. In such ways did the Roman Empire try to shore up the dwindling supply of bred slaves.⁷ Even aided by these laws, breeding was unsuccessful, and slavery gave way to the processes of voluntary sale of manumission.

⁷ A.H.M. Jones, "Slavery in the Ancient World," *The Economic History Review* IX (April, 1956): pp. 185–99, especially pp. 190–97. Jones also points out that only widespread piracy, kidnapping, and perpetual inter-tribal wars permitted slavery to flourish in Athens.

THE WEALTH EFFECT AND THE LAW OF DEMAND: A COMMENT ON KARL-FRIEDRICH ISRAEL

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ABSTRACT: Karl-Friedrich Israel (2018) sees “obvious tension” in a book chapter (Salerno 2018) in which I argue that the Hicksian income effect plays no role in the causal-realist approach to the demand curve. Israel’s reconstructed “wealth effect” is an effort to solve this perceived problem. This comment addresses the expositional gap in my analysis, and resolves the perceived tension. I then outline the problems with Israel’s proposed solution, which involves a wholesale reconstruction of demand theory that, in the end, implies a denial of the law of demand.

1. INTRODUCTION

In his article, “The Income Effect Reconsidered,” Karl-Friedrich Israel (2018) perceives a tension in a book chapter (Salerno 2018) in which I argue that the Hicksian income effect plays no role in the causal-realist approach to the demand curve. In section 2, I address the ambiguity in my exposition which leads to this perceived tension and show how it can be readily resolved. Section 3 presents a critical

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analysis of Israel's attempt to solve the problem by drastically minimizing the substitution effect in favor of a reconstructed "wealth effect," which Israel (2018, 384) claims is "more fundamental" to demand analysis. In section 4, I consider Israel's reformulation of the wealth effect in more detail and argue that it implies a denial of the law of demand. Section 5 offers concluding remarks.

2. THE CAUSAL-REALIST DEMAND CURVE: A CLARIFICATION OF ASSUMPTIONS

When I derived the demand curve in my original article I assumed that the following remained constant: 1. the buyer's value scale; 2. the prices of all other goods; 3. the buyer's stock of money balances; and 4. the purchasing power of money. The third and fourth assumptions together imply that the buyer's real money balances are constant. I argued that the stock of real money balances must remain unchanged for units of money to attain an ordinal ranking against goods on the value scale. If the purchasing power of money and hence the stock of real money balances were permitted to vary as the money price of the good in question changed, the buyer would not be able to compare the marginal utility of goods against that of money, and a demand curve based strictly on the law of marginal utility could not be traced out. I thus maintained that there is no "income" or, more accurately, "purchasing-power" effect because the value of money does not increase (decrease) as the price of a good falls (rises) along the demand curve. I concluded that there is only a substitution effect when demand curve analysis is based on the law of marginal utility.

Israel argues that, as stated, my conclusion contradicts my second assumption that the prices of *all* other goods remain constant. As Israel (pp. 380–81) puts it,

[W]henver some money price is allowed to change *ceteris paribus*, it has a direct effect on the purchasing power of money. When a money price increases along the demand curve, then the exchange value of money and hence its purchasing power decreases, and *vice versa*. If, however, the demand curve for a specific good is itself contingent on the purchasing power of money, a price change along a given demand curve is contradictory as it destroys the underlying assumption on which the demand curve is based.

It was to avoid just such a contradiction that I explicitly stated that it is the *ex ante* or anticipated purchasing power of money *today*—based on the individual's experience of *yesterday's* structure of money prices—that is assumed constant. The expected purchasing power of money is used to establish the individual's marginal utility ranking of money relative to goods that is relevant to today's market activities. From this value ranking of goods and money is derived the individual demand curve for a particular good.

Israel (2018, 381) recognizes my inclusion of the temporal element in the analysis but rejects it as “unconvincing.” I see now that there is an expositional gap in my analysis that requires repair, but I reject Israel's proposed solution, which involves a wholesale reconstruction of demand theory that has not been thought out to its logical conclusion. Before proceeding to evaluate Israel's attempt to resolve the “obvious tension” in my argument, let me present the simple and obvious solution that is ready to hand.

In order to maintain the expected purchasing power of money constant along the demand curve it is necessary only to restrict my second *ceteris paribus* assumption to the prices of closely related goods and to interpret the fourth assumption as implying that the general prices of all other goods move inversely to the price of the good in question so as to offset the change in the value of money entailed by the initial price change. This is simply another way of saying that the relation between the supply of money and the demand for money remains constant. Thus interpreted, the assumption of a constant purchasing power of money is no more unrealistic than assuming that all prices but the price of the good under consideration remain constant while the value of money varies. In fact, Milton Friedman ([1949] 1953, 51), following Marshall, considers this assumption as one—although not his preferred—way of generating the “income-compensated demand curve.” Accordingly, he assumes that the price of “the commodity in question” changes while holding the prices of “closely related commodities” constant but allowing the “average” price of “all other commodities to rise or fall with a fall or rise of the price of [the commodity in question], so as to keep the ‘purchasing power of money’ constant.”¹

¹ Austrian economists would of course replace Friedman's concept of an “average” of prices of all other commodities with that of an “array” of particular prices of all other commodities.

Revising the set of assumptions underlying my approach in this way has the virtue of enabling analysis of the substitution effect in isolation from the purchasing-power effect. From an economy-wide perspective, this demand curve construct allows the economist to analyze the effect on a good's price of a change in its supply (a movement along the demand curve) in abstraction from the effect on its price of a change in money demand or money supply (a shift in its demand curve). For if we allow the purchasing-power effect to manifest itself when, for example, the price of a good falls along an individual's demand curve, then it implies that either the *overall* demand for money in the economy has risen or supply of money has fallen.

Now this solution does not deny that a change in the price of a good may cause both a substitution effect and a wealth or purchasing-power effect. It merely permits the two effects to be analyzed separately in order to isolate the operation of the law of marginal utility. Holding the purchasing power of money constant permits the substitution effect to be portrayed as a movement along the demand curve. With respect to the purchasing-power effect, under my revised set of assumptions, we would treat this effect as we would any change that exogenously alters an individual's real money balances, that is, as a "real balance effect." For example, in the case of a fall in price, real balances would rise, causing a rightward shift of the agent's demand curves for various (normal) goods including the good in question. Using this analysis, we could also show, for example, that in the case of a big enough drop in the price of an inferior good that absorbs a large part of a household's budget, the purchasing-power effect (shift to the left of the demand curve for the inferior good) outweighs the substitution effect (a movement down along the demand curve), which would result in less of the good being purchased by the household at the lower price. This allows us to explain Giffen's Paradox without invoking an upward-sloping demand curve.

Alchian and Allen (1977, 69) give a very similar analysis of the "income effect." As the price of a good falls, there occurs what they call an "expenditure-releasing effect"—that is, an increase in the purchasing power of money—because less money now is spent on the good at the initial quantity demanded. This "released purchasing power" causes a rightward shift of the individual's

demand curves for (normal) goods, including the good whose price has fallen. The substitution effect is then represented as a sliding down along a higher demand curve.²

3. A CRITIQUE OF ISRAEL'S SOLUTION

Israel offers a very different resolution of the tension he perceives in my article. He suggests that what must remain constant is "the opportunity costs of expending a given sum of money in exchange for the good in question" or, more precisely, "the purchasing power of money with respect to *other* goods that the person values and might want to acquire." He argues that the fulfillment of this condition will lead to the "important assumption" for deriving the demand curve, namely, a fixed ordinal ranking of money and the good in question. There are several problems with Israel's approach.

First, a fixed ordinal ranking is exactly what results from my revised set of assumptions above. With the purchasing power of money constant, the relative ranking of units of money and units of the good demanded will remain unchanged. Second, Israel (2018, 282) is curiously reluctant to explicitly state the assumptions about the external, objective conditions that underlie the internal or subjective prerequisite for deriving the demand curve, namely, that "the subjective value of money does not vary relative to the subjective value of the good in question." He explains his disinclination to do so by asserting that because a fixed ordinal ranking is subjective "we cannot boil this assumption further down." But this is a *non sequitur*. Surely we can specify which objective conditions in the economy are or are not consistent with this assumption. For example, allowing the prices of a good's complements and substitutes to vary would be *inconsistent* with maintaining intact the individual's ordinal ranking of the good in question and money. Israel (2018, 283) seems to realize this when he acknowledges that his precondition of a fixed ranking is consistent with Hicks's assumption that all other prices in the economy are constant. He then appears to back off such a strong assumption two sentences

² For a similar analysis, see also Alchian and Allen (1972, 69–70) and Alchian and Allen (2018, 119–20), although these treatments do not explicitly mention the important concepts of the "expenditure-releasing effect" and "released purchasing power."

later by declaring, “strictly speaking, what has to be held constant for the construction of the demand schedule are the opportunity costs of expending money on the good in question, whatever the influencing factors of this subjective notion may be.” Later in his article, Israel (2018, 394, 396) seems to reverse his field yet again by explicitly using the Hicksian assumption in an example in which he derives the demand curve and then conceding in his conclusion that his own “assumption for the derivation of the demand curve essentially boils down to Hicks’s original assumption.”

Israel’s strange reluctance to clarify the assumptions he uses in deriving the demand curve is inconsistent with causal-realist analysis, which is predicated on a tight and consistent connection between single-market or “partial equilibrium” analysis and general interdependence analysis. As the prominent monetary theorist, Arthur Marget ([1938–1942] 1966, 166), pointed out:

To say that the “demand schedules for particular industries can only be constructed on some fixed assumption of the nature of demand and supply schedules of other industries” is to say nothing more than... what has come to be called “partial equilibrium” analysis *is continually subject to the limitations imposed upon it by “general equilibrium” analysis of the Walrasian type.*³ [Emphasis is in the original.]

In any case, Israel’s failure to fully and forthrightly state the assumptions underlying his derivation of the demand curve renders his solution inadequate at best. If he does not completely embrace Hicks’s assumption, then he needs to provide a different assumption about the constancy or variation of other prices in the economy that are required for the fixity of the ordinal ranking of money and the good in question. If he is unable to articulate an alternative assumption, then I think he is compelled to assume the constancy of the purchasing power of money as I have explained above.

³ Marget ([1938–42] 1966, 170, fn. 55) is here using the term “general equilibrium analysis of the Walrasian type” in a loose sense that includes Austrian-type general interdependence analysis. He thus notes the similarity between the early 20th-century American “Austrian” price theorist Herbert J. Davenport and his “system” and that of the Lausanne school in Davenport’s “insistence in stressing the limitations set by the fact of the general interdependence of prices to [partial equilibrium] analysis.”

This brings me to the third problem with Israel's solution, which is closely related to the second. Israel (2018, 396) accepts my point that causal-realist demand analysis entails that "money is treated as an actual good that is valued as such and that is demanded or retained. It is not simply a numeraire." But once it is admitted that money as a valued good plays a key role in deriving the demand curve, assumptions about its own supply and demand *must be made explicit*. According to Israel (2018, 380–81): "When a money price increases along the demand curve, then the exchange value of money and hence its purchasing power decreases, and vice versa." In Israel's analysis, therefore, a variation of the price of the good along the demand curve involves a disturbance in the market for money balances. If the price of the good in question falls, it does so because either: 1. There has been an increase in the reservation demand for money on the part of other buyers who increased their cash balances by reducing the market demand for the good; or 2. The overall supply of money in the economy has contracted with a particular incidence on those who were former purchasers and who reduce their demand for the good.

Israel neglects to state the assumption about the market for money balances necessary to his argument that the purchasing power of money changes as the price of the good in question varies along the demand curve. But once this assumption is explicitly stated, it raises the question of why the demand curve cannot be derived simply by assuming that the price of the good in question varies solely as a result of a change in relative demands for goods in the economy while leaving the market for money balances undisturbed.⁴ The demand curve yielded by the latter assumption, which is the one I propose above, would be different from the demand curve derived using Israel's method of tacitly supposing changes in the market for money balances.

For Israel, the change in quantity demanded associated with the change in price thus conflates two factors: the effect of the law of marginal utility and the real balance effect. It is precisely because purchasing power and substitution effects are in reality

⁴ We would of course need to assume, as mentioned above, that the change in relative demands does not affect the prices of direct substitutes and complements of the good in question but only of unrelated goods.

inextricably intertwined that we assume that the purchasing power of money remains constant along the demand curve. This enables the causal-realist theorist to isolate the two effects for purposes of analysis. The effect of a price change on substituting between goods is illustrated as a movement along the demand curve; the effect of a variation of real money balances is shown as a shift of the demand curve. This *analytical* distinction is especially useful in explaining the step-by-step process of adjustment to a change in the money supply in a closed economy or the balance of payments in an open economy in which both effects play a crucial role (Hayek [1937] 2008, 351–66; Salerno [1984] 2010).

Marget ([1938–42] 1966, 301), an early critic of the Hicksian income effect, supports this point by arguing that the “response of a given consumer’s demand for a particular commodity” may differ depending on whether it is induced by “an increase in ‘real income’ as the result of a fall in the money price of a given commodity” or by “a change in the level of money income with money prices remaining the same.” The Hicksian approach, which is based on “the interpretation of a fall in a given money price as an increase in the ‘real income’ of income recipients,” brings with it “pitfalls” associated with the index-number problem. According to Marget ([1938–42] 1966, 301), these pitfalls are avoided by

...the ‘older’ method of dealing with the effect of a fall in a given money price *in relation* to income.... For, according to this method, the fall in a given money price is regarded as affecting the quantity of particular commodities demanded either by causing a movement along a given demand schedule or by changing the conformation [i.e., shape] or position of a given demand schedule. [Emphasis added].

Israel ignores such considerations of analytical practicability because, at bottom, his position rests on a single-minded quest for greater realism in the derivation of the demand curve. But the demand curve is a mental construct just like the Evenly Rotating Economy (ERE), and the assumptions for constructing both are chosen by the theorist for analytical convenience. An economy operating under the complete absence of uncertainty and change as depicted by the ERE is not only unrealistic but unrealizable and self-contradictory. And yet this construction of a static economy enables us to disentangle the dynamic real-world phenomena

of profit and interest for separate causal analysis. Similarly, the individual demand curve is merely a tool of thought that permits us to disentwine and separately analyze the substitution and real balance effects of a price change. The unrealism of the assumptions of the ERE and the demand curve are irrelevant to their respective functions. After all, the Hicksian assumption that all other prices remain constant in the face of a change in the price of one good is also highly unrealistic. For it heroically assumes that a change in the market for money balances exerts its full effects in the market for a single good, while leaving all other markets for goods undisturbed. Why is it somehow less realistic to assume that the purchasing power of money remains constant along the demand curve?

In fact, realism of assumptions has nothing to do with the matter because the demand curve is a mental construct, which selectively embodies some elements of action while abstracting from others. As Mises (1998, 65, 237–38) describes it,

An imaginary construction is a conceptual image of a sequence of events logically evolved from the elements of action employed in its formation. It is the product of deduction, ultimately derived from the category of action, the act of preferring and setting aside. In designing such an imaginary construction the economist is not concerned with the question of whether or not it depicts the conditions of reality which he wants to analyze. Nor does he bother about the question of whether or not such a system as his imaginary construction could be conceived as really existent and in operation. Even imaginary constructions which are inconceivable, self-contradictory, or unrealizable can render useful, even indispensable services in the comprehension of reality....

Furthermore, as Rothbard (2009, 576 fn. 15) insightfully points out, “The constructs are imaginary because their various elements never coexist in reality; yet they are necessary in order to draw out, by deductive reasoning and *ceteris paribus* assumptions, the tendencies and causal relations of the real world.” Thus, the demand curve does not exist in reality because changes in prices cannot *coexist* with the absence of income or wealth effects. Yet the demand curve, despite the unrealism of its assumptions, is essential to grasping the separate effects on the quantity of the good demanded of a change in its own price and a change in all other factors, including the purchasing power of money, despite—or rather, because of—the fact that these factors operate together

to produce a composite effect in reality. Indeed, when the fictive assumptions that underlie the derivation of the demand curve are successively dropped, we retain the truth of an inverse relationship between price and quantity demanded. We then add to it further truths utilizing shifts in the demand curve to elucidate the causal relations between the demand for a good and changes in prices of closely related goods, future price expectations, the stock of money balances, and so on. Proceeding in this manner, we achieve progressively closer approximations to an account of the full reality of the pricing process.⁵

Philip Wicksteed ([1933] 1957, 439–527) presented the most profound and extensive analysis of the nature and function of the demand curve encountered in the literature. He clearly recognized that the method of imaginary constructs was necessary in deriving individual demand curves, or what he called “total utility” curves. Wicksteed ([1933] 1957, 474) argued that the curves: 1. are “purely abstract,” to be derived in the absence of other causes “that might be supposed in actual experience” to change the price or quantity demanded of the good under consideration; 2. are “isolated,” in that “we cannot conceive of a system of such curves” for a given individual “to be valid simultaneously”; and 3. are not constructed so that we can “read on them the effect of a rise or fall in the consumer’s income.” All these curves can do is “represent the subjective value attached by a consumer to each increment of the commodity, or the amount he would purchase at any given price.” And yet, he asserted, “their form has a high theoretical significance.”

In particular, Wicksteed emphasized that that an individual demand curve for a commodity cannot coexist with changes in the individual’s “total resources” or “income.” Thus, for Wicksteed ([1933] 1957, 482–85), as price increases along the individual demand curve toward its intersection with the price axis, we assume the individual’s “total resources or income are to remain

⁵ Thus, as Rothbard ([1957] 2011, 105 fn. 4) points out, unrealistic assumptions are useful and necessary when they are employed “as auxiliary constructs, not as premises from which empirical theories can be deduced.” In contrast, the false assumption of a horizontal demand curve facing the individual firm cannot be dispensed with without rendering the distinction between pure and monopolistic competition and the concept of monopoly power empirically meaningless. On the latter point, see Rothbard (2009, 721–22).

the same, but that this particular market is to be closed to him," i.e., the price rise surpasses his maximum buying price for the first unit. But if income is assumed to change as a result of the price movement, the demand curve vanishes because "this will affect the whole system of his scale of preferences." And this is true whether income varies as a result of exogenous factors or as an endogenous effect of the movement along the demand curve, because "every curve is changed by a change in the supplies of other commodities *as well as that to which it specially refers*." In the phrase I emphasized in the foregoing quotation, Wicksteed is referring to the additional supply of the good purchased at a lower price due to the income effect. In considering two demand curves for the same good for the same individual under the alternative suppositions that the person is "rich" and "poor," Wicksteed concluded, "The two curves... would have no significant relation to each other." In other words, an income effect, which renders an individual richer or poorer, is inconsistent with the derivation of a given demand curve.

Wicksteed ([1933] 1957), 486–87) also considered the effect of changes in the expected purchasing power of money caused by a variation of price along an individual demand curve to violate *ceteris paribus* assumptions:

[A]n attempt to trace an individual demand curve back towards the origin [i.e., the price axis] is legitimate, and its results are interesting, suggestive, and enlightening in proportion as the condition "other things remaining the same" is observed.... [Such] curves must depend for their construction on imaginative estimates of the value we ourselves should under present conditions attach to small increments of the commodity at given margins; not on attempts to reconstruct conditions that might really raise the market price to a high figure.

Here the "conditions" that Wicksteed is referring to are those in a besieged city in which the price of a staple such as bread suddenly rises substantially due to the good's greater scarcity. A *ceteris paribus* demand curve for bread cannot be constructed if, as is realistically the case, this rise in price evokes expectations of an imminent rise in the prices of related goods and an impending collapse of the purchasing power of money and shrinkage of real incomes.

Wicksteed ([1933] 1957), 487) anticipated and responded to the objection that the restrictiveness and unrealism of the underlying

assumptions of the demand curve make it worthless for analysis of real-world phenomena:

It may well be asked whether a method that needs so much guarding and explaining is worth adopting at all. The answer is that the principle of declining marginal significances is absolutely fundamental. The doctrine of surplus value in the thing bought over and above the value of the price paid [i.e., consumer surplus] is an inevitable deduction from it. The awakened mind must, and as a matter of fact does, speculate upon it.... It is intimately connected with the relations of Economics to life. A want of a clear understanding of it brings perpetual confusion into our speculations and entangles the student in perplexities and contradictions.

4. ISRAEL'S WEALTH EFFECT: OVERTURNING THE LAW OF DEMAND

Israel (2018, 384–95) appears to enmesh himself in such “perplexities and contradictions” when he attempts a radical reformulation of the derivation of the demand curve based on what he terms the “wealth effect.” According to Israel (2018, 384) the wealth effect is “a type of income effect” and is “more fundamental” than the substitution effect, which manifests itself “only in cases where demand is price elastic.” Israel goes beyond the neoclassical conflation of the substitution and income effects and enshrines the wealth effect as the core of demand analysis. In his zeal for realism, Israel (pp. 396–97) characterizes the demand curve as a concept directly intuited from raw experience,

...an easy and direct illustration of a very real phenomenon that most people intuitively understand, namely, that consumers are made better off when a given good can be acquired at a lower money price. The wealth improvement with respect to the cash balance may be used to finance an increase in the quantity of the good demanded.

In lieu of a detailed analysis of the wealth effect, the explanation of which takes up more than half of Israel's article, I will restrict myself to two general comments. First, as argued above, the demand curve, at least in causal-realist theory, is a heuristic device that is designed to elucidate the operation of the law of marginal utility in the pricing process by tracing out the effect of a change of

price on the quantity demanded, while all other factors influencing the amount of the good purchased are impounded in the *ceteris paribus* clause. In Israel's formulation, in contrast, the demand curve mainly illustrates the direct effect on quantity demanded of a change in wealth, albeit a change caused by a change in the price of the good itself. The wealth effect, Israel (2018, 384) asserts, "...is a direct consequence of any price change along the demand curve." But, as Wicksteed ([1933] 1957, 474, 483–84) emphasized, one cannot "read on [demand curves] the effect of a rise or fall in the consumer's income" because a variation in wealth "will affect the whole system of his scale of preferences." This holds true even if wealth varies exclusively as a result of a change of the price of the good to which the demand curve "specially refers."

This brings us to a second objection to Israel's conception of the demand curve. While arguing that the wealth effect dominates the substitution effect in determining the shape of the demand curve, he presumes that the demand curve is downward sloping. Let us take the example that he gives of a farmer's demand schedule for beer, which is presented in Table 1. The farmer is supposed to be initially endowed with 200 monetary units and to trade them for volume units of beer, let us say dollars and liters, respectively.⁶

Table 1.

Price (\$)	Quantity Demanded (Liters of Beer)	Total Expenditure (\$)	Cash Balance Remaining (\$)
100.00	1	100.00	100.00
40.00	2	80.00	120.00
20.00	3	60.00	140.00
11.25	4	45.00	155.00
6.00	5	30.00	170.00
3.33	6	19.98	180.02
1.42	7	9.94	190.06

⁶ Israel (2018) uses euros and *Masskrugs*.

Now if we assume prices of all other goods remain constant, as Israel does, then a decline in the price of beer brings about an increase in wealth. That is, at the same quantity demanded, a lower price enables the buyer to afford more preferred combinations of beer, other goods, and retained cash balances. However, Israel's demand schedule implies that the buyer would always *either* use a portion of this "released purchasing power" to increase the amount purchased of beer *or* maintain the quantity demanded of beer constant and expend the entire windfall on additional units of other goods or building up his cash balance or both. Israel thus illustrates the wealth effect with discrete, downward-sloping demand curves with vertical segments, as exemplified in the demand schedule in Table 1.

In causal-realist theory, however, a change in an individual's wealth revolutionizes his preference scales and, therefore, the entire structure of his demand curves. As Wicksteed ([1933] 1957, 483) wrote:

[L]et us suppose that a man's income increases or diminishes. This will obviously affect the whole system of his scales of preference. Possibly "pop and cockles" [i.e., clams] may completely fall out of his list of purchases, and "champagne and oysters" may appear on it; but in an ordinary case... while some modes of expenditure will probably be dropped and some almost certainly introduced, a large number will be extended.

In other words, an individual's demand curves for a given good before and after winning \$10 million in a lottery or receiving a \$10,000 bonus from an employer are derived from different preference scales and therefore bear no relationship to one another. In theory, this is also true of an increase in *real* money balances accruing to an individual as a result of the "wealth effect" caused by a fall in price of a particular good in his budget. Thus Israel's assumptions that the purchasing power of money is not constant along the demand curve and the wealth effect dominates the substitution effect conflict with his presumption that demand curves are always downward sloping with vertical segments. In fact, the demand curve may just as well be configured like the one depicted in Table 2 as the one in Table 1, with upward-sloping segments of the curve reflecting differences in scales of preference at varying levels of wealth. At the price of \$11.25 per liter the buyer may reduce his beer consumption below the quantity demanded at

\$20.00 or \$40.00 per liter because the additional wealth in the form of “released purchasing power” permits him to attain the higher level of satisfaction of a top tier bottle of bourbon and a beer chaser.⁷ At \$6.00 per liter, his beer purchases increase because he is able to attain an even more preferred combination of goods and money balances that includes displaying his generosity by buying a round of beer for his friends at his local pub. A price of \$3.33 per liter would put him in the position to enjoy a more preferred bundle of consumption goods and cash balances that includes one quick beer with friends and treating his wife to dinner at a new restaurant.

Table 2.

Price (\$)	Quantity Demanded (Liters of Beer)	Total Expenditure (\$)	Cash Balance Remaining (\$)
100.00	1	100.00	100.00
40.00	2	80.00	120.00
20.00	3	60.00	140.00
11.25	1	11.25	188.750
6.00	5	30	140.00
3.33	1	3.33	196.67
1.42	2	2.84	197.16

We conclude that when the wealth effect, as Israel describes it, is proposed as the fundamental concept of demand analysis, the presumption that the price of a good and its quantity demanded, *ceteris paribus*, move inversely to each other no longer holds. In addition, the substitution effect thus becomes completely extraneous. The latter effect is not necessary to explain the response of quantity demanded to changes in price, even along elastic segments (e.g., between \$11.25 and \$6.00 in Table 2) as Israel claims. It may be fully explained by the change in wealth. The substitution

⁷ As noted above, (p. 5) Alchian and Allen (1977, 69) calculate released purchasing power as the difference between the total expenditure on the good at the initial higher price and the new lower price *for the quantity demanded at the higher price*. For example, based on Table 2, if the price for a liter of beer falls from \$20.00 to \$11.25, then total expenditure on 3 liters of beer falls from \$60 at the price of \$20.00 to \$33.75 at the price of \$11.25, yielding released purchasing power of \$26.25.

effect can only be offered as a definite explanation for the shape of the demand curve when “wealth” or real cash balances and, hence, the scale of preferences remain unchanged.

4. CONCLUSION

Israel is to be credited for pointing out my lapse in expounding the assumptions underlying the derivation of the causal-realist demand curve. His insightful criticism has led to what I hope is a more satisfactory exposition. However, as I have tried to demonstrate, Israel’s attempt at a wholesale reconstruction of demand theory in the space of a few pages of a comment is both unnecessary and not carefully thought out. It reflects a misleading and self-defeating quest for realism that, in the end, leads—unwittingly—to a denial of the venerable law of demand, one of the most important and useful theoretical constructs for interpreting economic reality. That said, I am not completely dismissing Israel’s conception of the wealth effect as valueless for economic analysis. But in order to persuade mundane, workaday economists of its value, he needs to reframe it strictly in terms of its analytical usefulness rather than invoking an appeal to realism as the pivot of his argument.

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A NOTE ON SOME RECENT MISINTERPRETATIONS OF THE CANTILLON EFFECT

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JEL CLASSIFICATION: B11, B53, E31, E51

ABSTRACT: Book (2019) claims that Austrian economists attach too much weight to Cantillon's discussion of monetary redistribution, while Sumner (2012a, 2012b, 2012c) argues that it makes very little difference how new money is injected. In this note, I critically review these arguments, finding that they are unconvincing. The Cantillon effect matters, and the Austrians correctly analyze it.

I. INTRODUCTION

It may seem that the Cantillon effect is an easy-to-grasp and noncontroversial concept.¹ After all, the observation that helicopters do not drop money and that money goes into the economy in an uneven manner—that is, some people get new money earlier or get more of it—should not elicit doubts. However, almost two hundred years since its formulation, the Cantillon effect still causes

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¹ I intentionally write about “the Cantillon effect,” not “Cantillon effects,” as this is the original term coined by Mark Blaug (1985).



a lot of confusion. The most recent example is Joakim Book's article "The Mythology of Cantillon Effects" (2019), in which he argues that the weight some Austrian economists "attach to Cantillon's monetary redistribution is greatly exaggerated." Another case is Scott Sumner's series of blog posts (2012a, 2012b, 2012c) in which he claims that it does not matter how money is injected into the economy. The aim of this brief note is to critically review Book's article and Sumner's posts.

II. BOOK'S MYTHOLOGY OF CANTILLON EFFECTS

Book acknowledges that "by introducing new money into the system, early receivers are benefited at the expense of late receivers." However, he points out that Cantillon's analysis of monetary redistribution is based not on central bank fiat money, but on a gold standard: "For Austrians, usually strong proponents of hard money, commodity-money regimes, and monetary policy rules, it is ironic that the monetary-redistribution analysis that so endeared him to Austrians is based entirely on a gold standard."

Hence, the alleged problem with the Austrian view is that it incorrectly considers the Cantillon effect "a fundamental evil unique to fiat central bank systems," while in reality "every monetary system includes Cantillon effects." Book has it right that "Cantillon effects are universally valid occurrences of any monetary economy." But his claim that Austrians are not aware of this fact is false. Surely, the first-round effect is a result of any uneven increase in money supply, but that does not mean that the Cantillon effect is irrelevant or that various possible ways in which the money supply in a given economy can be increased have the same results.

On the contrary, the great merit of the Austrian school is to notice that there are differences in the outcomes of monetary inflation, depending on its variant—in particular, whether new money is introduced into the economy through market or nonmarket channels. As I point out in my book *Money, Inflation and Business Cycles: The Cantillon Effect and the Economy*, in the former case,

money supply increases as a result of voluntary activities of market participants involved in the production of money (or its transfer from abroad) under private ownership. Market production of money is

undertaken for profit, which can take place on a completely unhampered market only by adequately meeting the needs of the money users, as a result of providing an appropriate amount of universal medium of exchange of appropriate quality. This means that such production has a balancing effect. If the increase in money supply is too big, prices will rise to the point where the purchasing power of the money produced will drop to the level at which further production will no longer be profitable. Market production of money is therefore subject to a self-regulating profit-and-loss mechanism. In contrast, the creation of money can be practically unlimited. While in the case of fiduciary media, there are some physical or institutional limits resulting from the limited amount of money proper, on the basis of which they are issued, in the case of fiat money, there are no such restrictions. Its supply can be increased until the monetary system collapses. (Sieroń 2019, 66)

Book's second charge is that "Austrians also overstate their case, at least as far as Cantillon's writing is concerned; to our 'man of mystery' monetary redistribution does not inevitably set the economy on a path of unsustainable boom and bust—relative prices, wealth, and consumption desires adjust."

Book has it right again. But nobody claims that each increase in the money supply and its related Cantillon effects trigger the business cycle. Yes, the Austrian business cycle theory says that the creation of money is responsible for the business cycle, but *only if* the newly created money is introduced into the economy through the credit market. We could even say that that theory is essentially an analysis of one particular variant of the Cantillon effect, as "it examines how the increase in money supply by a particular channel—the credit channel—affects the specific price: the interest rate, leading to changes in the structure of production" (Sieroń 2019, 46).

The last point I would like to address is Book's claim that "to Cantillon all new money had the same redistributive and uneven effects, regardless of whether it was first spent in the real economy or entered the credit markets, reducing interest rates." This statement is blatantly false. In general, Cantillon was perfectly aware that what is important for the economy is not only the fact that money supply increases, but also the way it happens. He stated:

The proportion of the dearness which the increased quantity of money brings about in the State will depend on the turn which this money will impart to consumption and circulation. Through whatever hands

the money which is introduced may pass it will naturally increase the consumption; but this consumption will be more or less great according to circumstances. It will be directed more or less to certain kinds of products or merchandise according to the idea of those who acquire the money. Market prices will rise more for certain things than for others however abundant the money may be. (Cantillon 1959 [1755], II.VII.6)

In particular, Cantillon acknowledged that the increase in the money supply does not always lower interest rates, because it depends on how the monetary inflation occurs. He wrote:

If the abundance of money in the State comes from the hands of money-lenders it will doubtless bring down the current rate of interest by increasing the number of money-lenders: but if it comes from the intervention of spenders it will have just the opposite effect and will raise the rate of interest by increasing the number of Undertakers who will have employment from this increased expense, and will need to borrow to equip their business in all classes of interest.

Hence, if Cantillon understood that the increase in the money supply lowers interest rates in some cases while raising them in others, he could not have believed that new money has the same redistributive and uneven effects in both cases.

III. SUMNER'S CLAIM THAT IT DOES NOT MATTER HOW MONEY IS INJECTED

Book is not the only economist who has recently misinterpreted the Cantillon effect. Another is Scott Sumner, who, in a series of blog posts (2012a, 2012b, 2012c), argues that it makes very little difference how new money is injected, or, to be more precise, who gets the new money first.² He supports his thesis with three arguments: (1) the new money has no more purchasing power than the existing

² Sumner (2012a) presents four scenarios of the increase in the money supply: (1) newly injected base money is used to buy Treasury bonds from banks; (2) newly injected base money is used to buy Treasury bonds from nonbank securities dealers; (3) newly injected base money is used to buy Treasury bonds from individuals at a special auction excluding bond dealers; (4) newly injected base money is used to pay the salaries of government workers, and as a result less money is borrowed by the Treasury. The Treasury then creates and donates a Treasury bond to the Fed. Sumner then argues that the effects are virtually identical in all cases.

money; (2) the new money is sold at fair market prices; (3) when the central bank purchases assets, the money is just swapped for securities, so the recipient of new money is no wealthier than before the transaction.³

Let us analyze these arguments. First, it is true that each monetary unit is the same and one cannot distinguish the new and old money. However, the point is that price inflation is a sequential process. Hence people whose cash balances increase before the prices adjust to the monetary injection have more purchasing power than people whose cash balances increase after the prices adjust, even if all monetary units have the same purchasing power. Or, the point is that the monetary injection dilutes the purchasing power of the whole money stock, even if all monetary units have the same purchasing power.

Second, it is true that the central banks do not give away money for free, but purchase assets in the secondary market, swapping money for securities. But Sumner misses the point. The crux of the problem is that when the central bank creates money, it, just like a money counterfeiter, enters the market with some unearned purchasing power. This enables the central bank to possess more assets and to exert greater influence on their prices, affecting not only the price level, but also the structure of prices. Sumner suggests that for the sellers of assets, the central bank purchases are just one of many transactions, so they are no wealthier than before. Abstracting from the fact that individuals benefit from exchanges, the point is that the central bank's transactions are special because they introduce the new money into the economy and thus are inflationary. The whole idea of the Cantillon effect is that during monetary inflation, it's better to spend money before rather than after price adjustment. Those people who get money first rather than those people who get money last have simply more chances to do it.

³ However, central banks introduced quantitative easing to boost asset prices and create the wealth effect. Sumner (2012a) also believes that one cannot "distinguish between cash injected into the 'real economy' and cash injected into financial markets. Cash doesn't go into markets at all; it goes into the pockets of people and businesses. There is no meaningful distinction between cash going into the 'real economy' and the 'nominal economy'." Of course, Sumner has it right that money goes into the pockets of people and businesses. However, the continuously growing money supply, which hits financial markets in the first place, systematically ends up in the pockets of people and businesses operating in these markets first.

IV. CONCLUSION

Although the Cantillon effect describes the simple idea that new money enters the economy at specific points, it still causes some confusion. Two recent examples are Book's and Sumner's objections. Both critiques are invalid.

Book correctly notes that the Cantillon effect occurs under every monetary regime, but that does not negate the particularly negative effects attributed by the Austrians to the increase in the supply of fiat money under central banking. This realization of the Cantillon effect, especially if new money enters the economy via the credit market, is particularly harmful, which only strengthens the case for the detailed examination of how exactly the new money enters the economy.

Sumner does not claim the Cantillon effect occurs under every monetary system, but he does claim that it does not matter, as the economic effects do not depend on who gets the new money first. He believes so because he treats central banks' purchases as just swapping one asset for another. However, in reality, central banks increase the money supply through asset purchases that change the cash balances of certain institutions. These sellers value then each monetary unit less and therefore increase their spending, leading to changes in the relative-price structure and production and to fluctuations in the cash balances of the next agents, which in turn leads to repeating the cycle in subsequent rounds (Sieroń 2019). Hence who gets the new money first definitely matters.

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THE RELEVANCE OF BITCOIN TO THE REGRESSION THEOREM: A REPLY TO LUTHER

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JEL CLASSIFICATION: B53, E42, E49

ABSTRACT: Given Bitcoin's apparent lack of non-monetary uses, Luther (2018) argues that its emergence as a medium of exchange invalidates the regression theorem, or at least severely limits its relevance to identifying which commodities could emerge as media of exchange in the absence of State intervention. However, this view misinterprets both the regression theorem itself and the problem it was developed to address. The goal of the regression theorem was not to identify which commodities could become monies, but to provide a subjectivist explanation of the purchasing power of money. To do this, it requires only that some individuals valued the good in question before its use as a medium of exchange, not that it had some objective pre-monetary use.

I. INTRODUCTION

The emergence of Bitcoin and other private cryptocurrencies over the past decade has posed a number of interesting questions for economists, and practitioners in the Austrian tradition have

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embraced the opportunity to judge these peculiar case studies against the established canon of Austrian monetary theories, and vice versa (Selgin 2014, Livera 2019). In particular, much attention has been paid to the relevance of cryptocurrencies to Ludwig von Mises's famous regression theorem (Davidson and Block 2013, Murphy 2014, Šurda 2014). One recent addition to this literature by Luther (2018) is representative of much of the broader conversation in that it judges the use of private cryptocurrencies as media of exchange to be a threatening counterexample to the validity of the regression theorem, while offering a novel and interesting justification for this familiar conclusion.

Luther argues that, due to Bitcoin's lack of obvious non-monetary uses, Austrian economists are left with two equally plausible conclusions to choose between: one can concede that Bitcoins actually are "intrinsically worthless,"¹ or one can reason that, since the regression theorem requires that media of exchange must have first had some non-monetary use, Bitcoin therefore *must* have had some pre-monetary use, even if that use was the mere satisfaction of the peculiar tastes of its early adopters. The first of these two conclusions, Luther argues, entirely invalidates the regression theorem, while the second preserves its validity by severely limiting its scope and prescriptiveness to the point of practical irrelevance. Specifically, Luther argues that the "practical relevance" of the regression theorem, which Bitcoin has swept away, was "in (1) distinguishing which items might emerge as money without government support and (2) offering suggestions as to how the government might launch a money that could not emerge naturally" (Luther 2018, 40).

Luther's argument is worth addressing not only for its own particular claims, but also because it rests on a misinterpretation of the regression theorem which is not uncommon in the broader conversation on cryptocurrencies. Mises's goal when formulating the regression theorem was not to explain the origin of money, nor to comment on which particular commodities could and could not spontaneously emerge as monies, nor even to advise governments

¹ Luther uses the unnecessarily confusing term "intrinsically worthless" to mean lacking in "value apart from any role the item might play as a medium of exchange" (Luther 2018, 33).

on how to launch fiat monies, but specifically and exclusively to provide a *subjectivist explanation of the present purchasing power of money*. To do this, it requires only that the commodity in question was subjectively valued and exchanged by individuals prior to its use as a medium of exchange, not that it had some objective pre-monetary use.

II. THE GOAL OF THE REGRESSION THEOREM

Mises's goal when developing the regression theorem was to explain the purchasing power of money using Menger's subjective marginal utility theory of value. Previous authors (Helfferich [1903] 1923, 577) had considered such an application of subjectivism impossible without falling into circular reasoning: money has purchasing power because individuals value it, but individuals only value money *qua* money because it has purchasing power. In order to break out of this circularity, Mises's regression theorem famously introduced the time dimension, arguing that individuals in fact value acquiring money in the present because they expect it will have purchasing power in the future, an expectation informed by the observable array of prices in the past.

Anticipating the criticism that this merely pushed the circularity problem backwards into an infinite regress problem, Mises emphasized that this regress did in fact have a concrete starting point at the time before the commodity² in question was used as a medium of exchange, and was simply traded directly against other commodities on account of its own subjective valuation by consumers (Mises [1912] 1953, 120–21; Mises [1949] 1998, 405–08). "At this point the theory must hand over all further investigation to the general [subjective marginal utility] theory of value" (Mises [1912] 1953, 120).

Luther's assertion that the goals of the regression theorem extend beyond this explanation of money's purchasing power leaves us in the difficult position of attempting to prove a negative, especially given that his own interpretation of the purpose of the regression

² In this context, "commodity" should be taken broadly to mean something subjectively valued by individuals, rather than denoting a good with any particular physical characteristics.

theorem is more an underlying assumption of his paper than one of its explicit, fully-stated arguments. However, in addition to our above summary of what the goals of the regression theorem were (and, by extension, were not) several other pieces of circumstantial evidence combine to undermine the persuasiveness of Luther's interpretation of the goals and "practical relevance" of the regression theorem.

Perhaps most fundamentally, the view that the regression theorem was an attempt to explain the origin of money and "which items might emerge as money without government support" (Luther 2018, 40) sits ill at ease with the fact that Mises subscribed to Carl Menger's theory of the origin of money ([1871] 2007, 257–62; 1892), which he included uncritically in both *The Theory of Money and Credit* ([1912] 1953, 30–34) and *Human Action* ([1949] 1998, 398–404), going so far as to describe Menger's theory as "irrefutable" in the latter work (*ibid.*, 402).

Furthermore, Mises's exposition of the regression theorem in *The Theory of Money and Credit* takes place in an entirely different section of the book from his discussion of the origin of money, separated by nearly 100 pages. In *Human Action*, Mises's discussion of the regression theorem takes place in a section explicitly marked as being concerned with "the determination of the purchasing power of money" (*ibid.*, 405), rather than with its origins or the question of which particular commodities could become monies. After having completed his exposition of the regression theorem in *The Theory of Money and Credit*, Mises explicitly states that "the preceding investigation" had been "concerned to explain the origin of the *objective exchange-value* [i.e. the purchasing power] of money" ([1912] 1953, 123, emphasis added), rather than having been an attempted explanation of the origin of money, or what particular qualities a commodity must have to become money. Mises further stressed that the regression theorem does not claim that a money's present purchasing power is strictly determined or solely explained by the ratios at which consumers exchanged it prior to or apart from its role as a medium of exchange ([1949] 1998, 407), which handles any objection that the regression theorem is unable to account for Bitcoin's high purchasing power now relative to the humble rates at which it was originally exchanged against other goods.

None of these facts could, in isolation, be said to prove the negative that the regression theorem has no relevance to the question of which particular types of commodities are capable of emerging spontaneously as monies. However, they all tend much more toward the view that the goal of the regression theorem was to provide a subjectivist explanation of the purchasing power of money, rather than to distinguish “which items might emerge as money without government support” (Luther 2018, 40).

III. THE KEY REQUIREMENT OF THE REGRESSION THEOREM: SUBJECTIVE VALUE OR OBJECTIVE USE?

In his article, Luther (2018, 39) explicitly distinguishes between a commodity’s subjective valuation by individuals and its objective non-monetary uses, pointing to the latter as supposedly the more relevant to the question of whether Bitcoin violates the regression theorem:

There is no denying that some people valued bitcoin prior to its use as a medium of exchange. But the question is not *whether* people valued bitcoin; it is *why* people valued bitcoin. Did they value it because it had nonmonetary uses? [Emphasis original.]

If it were true that the regression theorem required that the money commodity must have had some *objective use* prior to its use as a medium of exchange, in order to have gained purchasing power, then it could conceivably be argued that Bitcoin still threatens the regression theorem regardless of that theorem’s original goal. However, this is flatly not the case. Indeed, Mises repeatedly and explicitly emphasizes that “the original starting-point of the value of money was nothing but the result of *subjective valuations*” ([1912] 1953, 121, emphasis added). In this light, the idea that Bitcoin first gained purchasing power because individuals exchanged it directly due to their “peculiar preferences” (Luther 2018, 41), rather than due to any objective use, not only fails to threaten, but falls entirely in line with the regression theorem.

This subjectivist nature of the regression theorem is admittedly shrouded somewhat by Mises’s unnecessarily confusing use

of the word “industrial” to denote the qualities of the monetary commodity that might lead an individual to value it aside from its use as a medium of exchange.

However, a closer reading reveals that even this objective-sounding word masks a decidedly subjective definition: “to use it for industrial purposes, i.e., either for *consumption* [the direct satisfaction of one’s subjective preferences] or for production” (Mises [1949] 1998, 406). This further emphasizes that it is subjective value, not objective uses, that the regression theorem requires a commodity to have originally possessed, in order to explain its purchasing power as a medium of exchange.

IV. CONCLUSION

Luther (2018) misinterprets the purpose and requirements of the regression theorem in a manner that leads him to significantly overestimate “the constraint the regression theorem imposes on the set of potential monies” (2018, 42). The goal of the regression theorem was not to delimit which particular commodities can and cannot emerge as a money, but to explain the purchasing power of money using the subjective marginal utility theory of value. To do this, it requires only that the commodity in question was subjectively valued by individuals, and hence directly exchanged, prior to its use as a medium of exchange, not that it had some objective pre-monetary use. In light of this, it should be clear that the supposed threat posed to the regression theorem by the emergence of Bitcoin as a medium of exchange has been significantly overstated.

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BOOK REVIEW

NARRATIVE ECONOMICS: HOW STORIES GO VIRAL AND DRIVE MAJOR ECONOMIC EVENTS

ROBERT J. SHILLER

PRINCETON: PRINCETON UNIVERSITY PRESS, 2019, XXI + 377 PP.

BRENDAN BROWN*

Robert J. Shiller in his new book focuses on an issue of fundamental importance to understanding economic and financial market cycles—the rise and fall of narratives. The book is full of promise, written by an author acclaimed for his pioneering work in applying psychology research about impaired mental processes in decision-making to economic and financial market analysis.

A well-known proposition of modern psychology, termed the *representativeness heuristic* by authors Daniel Kahneman and Amos Tversky (1973), is that people form their expectations based on the prominence of an idealized narrative rather than estimated probabilities. Shiller gives the example that we judge the danger of an emerging economic crisis by its similarity to a remembered story of a previous crisis rather than by any logic.

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Much of this book is about how economic narratives form, spread, and eventually fade. But there is an aim beyond that. In Shiller's own words, "A key proposition of this book is that economic fluctuations are substantially driven by contagion of oversimplified and easily transmitted variants of economic narratives." He draws on medical evidence about the spread of infectious diseases to develop his thesis.

The speed and extent with which a narrative penetrates a population (for example of global investors) is determined by the contagion rate relative to the recovery rate. The latter in this context means forgetting or losing interest in the presumed facts disproving the narrative. The contagion rate can be greatly lifted by the endorsement of a celebrity (who may in some cases be its originator).

There is much in the book about the narratives that form in various asset markets. Given Shiller's renowned research into the housing market, the reader will likely be drawn to his analysis here. The author identifies price index publication as a trigger to narrative creation. According to Shiller, the start of data agglomeration on stock market indices triggered greater contagion and the origination of narratives about equities from the 1930s onward, and he attributes the same role to the Case-Shiller data on US housing prices from the 1990s. Indices and their movement become a trigger to regular storytelling by journalists.

Shiller concludes that narrative economics should have a key role in economic theory. To understand both secular and cyclical developments, we must identify the economic narratives that are powerful and active contemporarily, and how they are waxing or waning. Collecting better information about changing narratives should begin now. Shiller does not suggest that this is a simple endeavor. Narratives mutate, recur, and are often complex. Optimistically, though, he asserts that economic research is already on its way to finding better quantitative methods to understanding narratives' impact on the economy.

Unfortunately, the author's citation of narratives that have played key roles in past economic and financial outcomes is far from convincing. And there is an elephant in the room that the author ignores totally—the powerful role of monetary disorder, whether in forming the narrative or determining its contagion rate, or as a competitor to the narrative in providing an explanation for economic and financial fluctuations. Shiller's focus on disease

epidemiology and his ignoring or downplaying of money's role leaves readers questioning his propositions in two ways.

First, surely there are powerful groups in the political economy whose purposes the spread of a narrative serves well. These groups, whether business or political, out of self-interest might apply propaganda techniques to help a narrative spread. For example, we can think of monopolists in search of a narrative to justify their huge actual or potential profits. Similarly, the promoters of highly valued new enterprises (the so-called unicorns) in Silicon Valley may be delighted that a narrative is going viral in which their innovation will be the new road to El Dorado. A narrative in which digitalization forms the basis of a third industrial revolution, analogous to steam power in the first one or electricity in the second, could suit both fine groups fine.

Second, monetary inflation's impairs normal rational skepticism in the marketplace and thereby might give a major fillip to the contagion power of certain narratives. Yet Shiller makes no mention of this possibility. That is odd, especially in the context of the present cycle, during which central banks have been pursuing radical experimentation, meaning that investors are faced with negative returns on money and government bonds. A hunger for yield becomes evident among interest income famine investors. This desperation and its corollary—susceptibility to speculative storytelling—are consistent with the psychological evidence behind prospect theory (see Kahneman 2011). According to this theorem, if someone is presented with a choice between a certain loss or a bad bet with some chance of gain, and whose actuarial value is greater than the certain loss, he or she will take the gamble.

The researchers into prospect theory do not make the following point. Rather than admitting to ourselves that the bet is bad, we latch on to speculative narratives. We discard our normal rational cynicism, so turning the bad bet into a good bet in our minds (see Brown 2017). For example, turning to the third industrial revolution narrative above, interest income famine investors might be over-gullible, overlooking serious flaws and downsides in the new technology as reflected in the generally disappointing growth of living standards (on average, over the whole population).

Beyond these two troubling aspects, Shiller is prone in this book to cite certain economic judgments as final and universal that are far

from settled. Some readers may feel that Shiller is a John Maynard Keynes enthusiast, exaggerating the power of narratives attributable to that economist. To be fair, however, it is a fact that Keynesian narratives, whether in original or mutated (neo-Keynesian) form have penetrated far into economic (including monetary) policy-making around the globe. Shiller understandably seeks to explain this penetration in line with his principles of narrative economies.

The author does suggest that the contagious success of Keynesian economic narratives depends on any factors other than inherent brilliance. As well as stressing the importance of Keynes's celebrity status, Shiller mentions the role of the Hicksian IS-LM diagram in propagating Keynesian economics. The resemblance of its two schedules to the well-known supply and demand curves of simple price theory has indeed been crucial. But Shiller does not consider explicitly the attraction of Keynesian doctrine to politicians seeking to win elections by fine tuning the economy or by ignoring red ink in the budget resulting from tax cuts and increased outlays. It is no wonder that such governments and their advisors are keen to propagandize Keynesian narratives.

In general, however, Shiller tends to exaggerate the spread of narratives, underestimating the heterogeneity of opinion in the economy and the marketplace, even when these seem very powerful.

Let's give some illustrations of the above reservations concerning narrative economics as Shiller develops them in the book.

Shiller quotes the spread of the message in Keynes's polemic *The Economic Consequences of the Peace* (1919) as an example of an economic narrative that had tremendous power, which he attributes in part to the role of Keynes as a celebrity (including his membership in the Bloomsbury Circle). For Shiller this narrative was based on substantial truth: "Keynes was right (about the fatal consequences of reparations as demanded in the Treaty). World War Two began amongst lingering anger twenty years later and cost 62 million lives."

But Shiller fails to mention the huge flaws in the 1919 polemic: for example, Keynes failed to consider the possibility of an economic miracle in Germany that would pull in huge amounts of foreign capital (as occurred from 1924–28, albeit eventually blighted by the fantastic asset inflation fueled by the Federal Reserve). Although the unquantified reparation demands in the Peace Treaty did initially

result in a massive bill, presented to Berlin in 1921, the Dawes Plan (1924) scaled these demands down hugely.

Undoubtedly the reparations narrative formed a key part of the National Socialist propaganda campaign in the years 1929–30. (Germany and its creditors were then negotiating a new reparations deal, the Young Plan.) Yet the success of that propaganda, and more generally the rise of Hitler (who became Chancellor in January 1933), reflected fundamentally the calamitous bust of the global bubble with the Weimar Republic at the epicentre. The source of the bubble had been the huge monetary inflation (camouflaged in goods markets by rapid productivity growth and an abundance of commodity supplies) generated by the Federal Reserve between 1921 and 1928.

The spread of the Keynesian narrative about the disaster of reparations in *The Economic Consequences of the Peace* depended in large part on its appeal to two powerful political groups—the nationalists (including National Socialists) in Germany, who could cite a celebrity English economist to validate their view that reparations were unacceptable, and US isolationists, who scored early success in their opposition to the Versailles Treaty and collective security via the League of Nations.

We should also note that in the marketplace of 1919–21, Keynes's narrative was far from dominant. There was a huge tide of speculators buying Reichsmarks in the belief they had become so cheap that only recovery could lie ahead (see Brown 2011). Keynes himself lost a fortune (almost going bankrupt) in shorting the Reichsmark at this time, believing his own narrative.

Let's move backwards in history to the 1890s. Shiller maintains that the depression (and high unemployment) during much of this decade stemmed from the narratives about the bimetallist controversy that were being spread. Bryan's Cross of Gold speech in 1896 was the epitome of a campaign advocating bimetallism that had already been waged for several years. Implementation would mean a major devaluation of the dollar against gold (and thereby the European gold currencies).

Shiller argues that an emotional bimetallist narrative about the hardships that much enterprise (including farmers) and ordinary working people would face if "Eastern intellectuals" had their way and the dollar stayed on the gold standard seriously aggravated

general economic pessimism and thereby the weakness of the economy in these years. But there is an alternative hypothesis that Shiller does not consider.

The lack of confidence in the US remaining on the gold standard was reflected in a drain of gold and cash (the latter somewhat irrational) from the banks, a trigger to the great crash of 1893 (see Rothbard 2002). The drain forced interest rates up, adding to the forces of recession in the economy—analogous, though not identical, to the effect of speculation on the US exiting the gold standard on the length and duration of the Great Depression. Shiller's discussion of gold narratives in this book includes the unquestioning recitation that the gold standard was a cause of the Great Depression, which is jarring for readers aware of the strong counterarguments.

Similarly jarring is the author's exclusive focus on narrative as the causal factor in the housing bubble and bust in the US from 2002–07. Shiller argues that the spread of narratives about housing prices always rising, the homeownership revolution, and the profit to be made in “flipping” all generated the bubble. But he makes absolutely no mention of President Bush's nomination of Ben Bernanke to the Fed Board in 2002 or of his getting Alan Greenspan to sign on to a great monetary inflation ahead of the 2004 elections. Shiller subsumes these facts under a radical departure in US monetary history, “breathing inflation back into the economy.”

And no mention is made of the preceding great monetary inflation of 1995–99, during which the housing bubble had started to ferment. This inflation stemmed from the Greenspan Fed's response to downward pressure on reported goods and services inflation (due to a productivity surge), by leaning against a rise of interest rates.

Further back, when Shiller recounts how the US economy suddenly rebounded from the Great Recession of 1920–21, he stresses narratives about “a return to normalcy.” But why is there no mention of the first great contracyclical monetary experiment of the Federal Reserve at that time (Rothbard 1972), which under tremendous political pressure made a huge injection of monetary base into the system? The same political forces resulted in the Fed unofficially turning toward price stabilization for the rest of the decade, even during a period of rapid productivity growth, which would fuel one of the greatest asset inflations in US history.

It is fine that Shiller advocates a major research drive into narrative economics. But if this is not to be a flawed endeavor, it must be built on a monetary pillar, and one which is well founded.

Shiller and his disciple researchers should examine one of the biggest narratives, false in the long run but self-fulfilling in the short run, and repeated tirelessly in much of the financial media. According to this narrative, central banks can improve economic outcomes through their rate manipulations and nonconventional tools. This narrative is not totally new. Part of the boom-or-bubble psychology of the 1920s was built on the narrative that the recently created Federal Reserve had the power to stabilize the economy and avoid the financial turbulence of previous eras. Similar narratives may be found in the 1960s, with the wonders of a new Keynesian Fed, and in the 1990s, with the Great Moderation due to the Maestro at the Fed. Nothing less than a ruthless and comprehensive criticism of such major monetary narratives should be expected from Shiller and his disciples in forging ahead with the new subdiscipline of economic narratives.

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BOOK REVIEW

INDEBTED: HOW FAMILIES MAKE COLLEGE WORK AT ANY COST

CAITLIN ZALOOM

PRINCETON: PRINCETON UNIVERSITY PRESS, 2019, VIII + 267 PP.

JEFFREY DEGNER*

In early spring, the scene repeats itself in households throughout America. A high school senior rushes home to open the mailbox and feverishly empties it, waiting for that fateful word from the admissions office from the college or university of their choice. This form of spring fever is filled with the an even greater level of anxiety than the “promposal” and has far reaching consequences for the future hopes, dreams, and financial standing of these students and their families. What happens after the exhilaration of receiving a favorable reply from the admissions office is the focus of Caitlin Zaloom’s *Indebted: How Families Make College Work at Any Cost*.

The upshot of Zaloom’s work is to describe the agonizing financial decisions that families have to make, both before and after an admissions office has sent the all-important acceptance letter. For

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many in the US, the most important letter they are waiting for is not from the admissions office, but rather from the financial aid office of the college or university they wish to send their precious children off to. The self-styled “economic anthropologist” (p. 203) dives into the depths of parents’ and students’ concerns as they navigate the economic environment surrounding their college experience.

Zaloom gives a compelling anthropological vision of the struggles that families face in providing financial support to their undergraduates. But even more astounding than these heart-wrenching stories is Zaloom’s lack of economic understanding of both the causes and solutions to the difficulties that families face in funding the higher education of their children.

The positive aspects of *Indebted* are found in the method of discovering what families are thinking as they seek to finance higher education. Zaloom admits the potential drawbacks of the interview-based approach while defending its strengths. This is a fair admission, as it describes the fundamental problems that accompany anthropological methodology. Specifically, she is concerned about the lack of communication and understanding about family finances that exists between children and parents. As a solution to what she saw as students’ lack of knowledge regarding family finance, she sought out further interviews with the parents of those students. This was certainly a good adjustment, and led to some intriguing anecdotes and data points.

In the opening chapter, Zaloom explains the anthropological method of interviewing middle-class families, whom she defines as those who “make too much money or have too much wealth for their children to qualify for major federal higher education grants, and if they earn too little or possess insufficient wealth to pay full fare at most colleges” (p. 4). What she discovers is that such families view financing higher education as both a moral and economic imperative. She rightly points out that higher education financing is a type of speculative investment which aims to keep children in the ranks of the middle class or hopefully make them better off. Zaloom calls this reality a form of “social speculation.” This form of speculation is a foundational expression of what motivates parents to send their young off to the higher education system (p. 27).

When Zaloom begins to write about the “moral mandates” surrounding higher education funding, she takes on a tone of

indignation. She laments that due to the financial pressures of college funding parents are forced to remain in the households where their children live. In one section of chapter 3 entitled "Gaming the System," she describes how some families have evaded the seemingly unfortunate cultural norm of biological parents living with their children. She recounts the story of a student whose parents divorced when the student was young. The adults parted ways and the father, who apparently wished to avoid making child support payments, produced as little income as possible. Meanwhile, the mother entered a lesbian relationship and the child lived in that household under a dual custody arrangement. When the mother and her partner suspected that they would make "too much" income to receive substantial federal aid, they agreed to falsify the child's residency statement on the Free Application for Federal Student Aid (FAFSA) and to claim that the child was residing with the deadbeat father for the majority of the time. This falsification afforded the child a beneficial federal aid package that allowed the child to attend college. Zaloom carefully avoids making any kind of moral judgment on this sort of fraud. Instead, she describes it as an example of finely tuned and shrewd use of "bureaucratic skill" to sidestep the alleged injustice of the FAFSA's implied expectations regarding nuclear families and savings. Furthermore, she bemoans the fact that the FAFSA form and the "student-finance complex" do not sufficiently provide for such living situations (pp. 87–89). The indifferent tone that the author takes towards such perverse incentives is one of the more remarkable features of the book.

Zaloom isn't just frustrated by the "moral mandate" regarding family structures. She also expresses frustration that families are "subjected to moral instruction" that might require them to consume less and to save money. This surly tone reaches a crescendo at the close of chapter 3, when Zaloom claims that middle-class values regarding personal privacy conspire with the state to impose oppressive "moral mandates that press, silently but powerfully, on students and their families" (p. 94). The dramatic tone certainly befits a narrative that seeks to expose injustice. However, it fails to help the reader understand the true injustice and the true causes of the price increases that are faced in higher education.

In her chapter entitled "Enmeshed Autonomy," Zaloom decries what she calls a shift in political morality that has put the financial

responsibility on the shoulders of middle-class families. This statement raises the question: in which era in US history did families did not finance higher education? Although she never answers this question, she does begin to attack the view of education as a form of human capital formation. It is with this criticism that she begins to unveil her fundamental economic error. Decrying the idea that a college education primarily benefits the individual and their family, she claims that this view was a novelty of the 1980s and that prior to this college education was viewed as a public good. Providing no evidence that this was the case, she begins to blame the rising price of tuition on alleged cuts to state-based grants and an alleged failure to live up to this public good ideal.

Zaloom plants the seed to convince the reader that college education ought to be considered a public good in chapter 2, “Best-Laid Plans.” In it she cites a single study by the allegedly nonpartisan Center on Budget and Policy Priorities (CBPP) (Mitchell, Leachman, Saenz 2019). She claims that the study demonstrates that state-level support for colleges and universities began declining “as early as the 1960s” (p. 39), when in fact the CBPP study only records funding from 2008–18. This data set simply cannot be used to support such a sweeping claim. Furthermore, two days prior to the CBPP report’s release (which only used ten years of data), a study presented by the Texas Public Policy Foundation (TPPF) took data from the same source and traced it further back, to 1980, when Zaloom’s alleged “political morality” shift took place. What the TPPF found (using the admittedly questionable CPI-U measurement) was that for over thirty-eight years funding had increased by four dollars per student in real terms (Gillen 2019). Although the longer-range data shows little change over several decades, what is striking is that both studies agree that average per student funding had been cut by over \$1,000 from 2008–12, during the recession years. Zaloom’s use of the CBPP study while ignoring the TPPF’s broader study—which was released at virtually the same time—does not lend credibility to her specific economic claims.

Chapter 5 details the challenges presented in terms of “Race and Upward Mobility.” Zaloom gives a brief historic tour of how private citizens and abolitionists began the process of educating former slaves and their children in the historically black colleges and universities (HBCUs). Zaloom surprises the reader by detailing how

the introduction of the Higher Education Act (HEA) of 1965 actually served to make college less affordable for African Americans. That legislation, signed by Lyndon Johnson, further guaranteed direct federal support for HBCUs. Zaloom then describes how the HEA has actually coincided with the disproportionate debt load carried by black students today. In fact, despite the HEA's promise of college affordability for minorities, it has saddled minority students and their parents with unprecedented amounts of federal debt (pp. 125–30)

Reflecting positively on her claim to be an economist, Zaloom admits that these promises of federal aid going toward HBCUs caused them to experience a boom. What she fails to note is that this led to HBCUs raising their tuition prices while failing to attract the endowments that traditionally white colleges experienced. So, within fifteen years of Johnson's legislation, HBCUs had become dependent on such funding, and the need for individuals and families to borrow to meet these escalating prices (which were caused by the HEA in the first place) meant ever-increasing debt for minority families.

This phenomenon led to the introduction of the Parent Loans for Undergraduate Students (PLUS) program, introduced by the Clinton administration in 1994, which would simply exacerbate the policies set in place by Johnson nearly thirty years earlier. Although she briefly mentions this legislation, Zaloom again fails to observe the basic economic reality that when demand increases with the help of government-backed credit while supplies of enrollment spots understandably remain inelastic, the rate of increases in tuition prices will outpace the promise of the initial lending amount.

Despite her egregious lack of economic understanding, Zaloom does reveal the pain that this predictable economic phenomenon causes among minority families. This is one of the strengths of her work as she paints a vivid picture of the lack of purchasing power that is visited on these families. On the other hand, Zaloom's fifth chapter also emphasizes her most consistent flaw. Specifically, she fails to make the connection between the federal government's promises of affordability through aid of various types and the inevitable price increases that they incite in the factor markets for higher education. Instead, she blames the unsubstantiated shift in political morality for the fact that tuition prices outpace other prices in the economy. This sort of vague attachment of changing mores to price

increases is an unfortunate feature that reckons Zaloom as a very good anthropologist but as an utter noneconomist.

“Cultivating Potential” is the chapter in which the author raises the question of the ultimate purpose of the college experience. In short, Zaloom rejects the notion that the purpose of college is to equip oneself for gainful employment. She belittles the idea, saying that it requires students to “commit to a career path and stick with the jobs that corporations need them to do,” as though this were a negative for the student or for society. On a positive note, Zaloom does identify the spurious notion that a liberal arts education prevents students from obtaining work for the fallacy that it is and hails employers’ increased demand for the “soft skills” that many liberal arts students provide in spades. Zaloom stops short of saying that the purpose of college is for young people to “find themselves.” Instead she writes with some nuance, saying that its purpose is to “liberate them to nurture the potentialities” that they might possess. In the same paragraph, she moves ever so slightly toward the real culprit of oversized college prices, concluding that “The debt loads and repayment schedules with which they contend are the result of political choices.” This tantalizing economic statement is never followed through, however, as she once again fails to identify the causal relationship between promises of government-backed loans and their causal link to inevitable price increases (pp. 162–70).

This failure to understand the economic causes and effects finds its final disappointment in the concluding chapter, entitled “A Right to the Future.” As the language suggests, Zaloom views the private good of a college education as a public good. This simple but devastating economic error has its roots in externality theory, which claims that if the benefit to society outweighs the costs to it, the public should foot the bill. Unfortunately, this form of analysis is shattered by Zaloom’s own definition of the benefit of college, which is to create the mere, “*possibility* of intellectual growth, *solidarity* among peers, and ultimately... unconstrained *prospects*” (emphases added). If this is in fact what the benefit of a college experience amounts to, even as an ideal, it’s no wonder that Zaloom admits that such an outcome should require forced taxation and redistribution (pp. 190–92).

The strengths in this work are found in the stories of real families and their experiences. These stories would be better used to attack the systems that have actually caused a boom in the prices of tuition, room and board, and textbooks. This requires theoretically and empirically accurate economic conclusions, which Zaloom fails to provide. What would be most beneficial is for economists to explain the causal nature of how government-backed payments for private goods that have inelastic supply (whether through taxpayer funds or by inflationary fiduciary media and lending) drive price increases. The politically motivated promises of payments that cause the heart-rending stories that Zaloom provides are the real story of “economic anthropology” that needs to be told.

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BOOK REVIEW

THE BITCOIN STANDARD: THE DECENTRALIZED ALTERNATIVE TO CENTRAL BANKING

SAIFEDEAN AMMOUS

HOBOKEN, N.J.: JOHN WILEY AND SONS, 2018, XVIII + 286 PP.

KRISTOFFER M. HANSEN*

From time to time, bitcoin enthusiasts vent their frustration at the preference of benighted investors for gold. At the time of writing, the digital assets management company Grayscale Investments, LLC, has launched another crusade against the barbarous relic, encouraging investors to #DropGold. The seriousness of their marketing campaign can be judged from the fact that their main arguments are that one, gold represents the past (after all, Nixon dropped gold already in the '70s!) and two, gold is physically very heavy.¹

In such an environment, it is always with some trepidation that I read a new book on bitcoin. Is this going to be a fanatical screed or a thoughtful study that tries to advance our knowledge?

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¹ See Drop Gold, Grayscale Investments, LLC, 2019, <https://dropgold.com>.



Happily, Professor Ammous of the Lebanese American University has written a book that falls squarely in the latter category. Treating bitcoin from the point of view of Austrian economics, Ammous not only discusses it in terms of monetary theory but also relates it to the theory of the market economy as a whole. His assessment of bitcoin is conservative but still optimistic. Bitcoin is not necessarily an alternative to gold, he argues, but it can function as a global reserve currency and disrupt the role of central banks.

The Bitcoin Standard goes over all the basics of money, investment, and production, the role of time preference, the importance of sound money, and the history of money before he introduces bitcoin. Although this may seem roundabout, there is a clear and reasonable method to this approach: we must know what money is and how society functions before we can understand what possible function bitcoin could have in the modern economy.

Along the way, we are treated to Ammous's very amusing descriptions of modern art:

A stroll through a modern art gallery shows artistic works whose production requires no more effort or talent than can be mustered by a bored 6-year-old. Modern artists have replaced craft and long hours of practice with pretentiousness, shock value, indignation, and existential angst as ways to cow audiences into appreciating their art, and often added some pretense to political ideals, usually of the puerile Marxist variety, to pretend-play profundity. (pp. 100–01)

And:

Only with unsound money could we have reached this artistic calamity where the two largest economic, military, and political behemoths in the world were actively promoting and funding tasteless trash picked by people whose artistic tastes qualify them for careers in Washington and Moscow spy agencies and bureaucracies. (p. 102)

There is also an acerbic commentary on Keynesians and Monetarists woven through the book. Ammous's brutal putdown of Friedman and Schwartz's *Monetary History of the United States* alone is worth the price of the book:

it is an elaborate exercise in substituting rigor for logic. The book systematically and methodically avoids ever questioning the causes of

the financial crises that have affected the US economy over a century, and instead inundates the reader with impressively researched data, facts, trivia, and minutiae. (p. 121)

The book is thus very entertaining as well as enlightening, but also, at times, very frustrating. For although Ammous presents economic theory and history lucidly, it seems that at times he does not get it exactly right. There are three points that merit critique in particular: some aspects of monetary theory, of monetary history, and of the theory of banking.

When it comes to monetary theory, Ammous begins quite correctly with the state of barter and the problem of the double coincidence of wants. He goes on to present a theory of salability, showing the different criteria that a good medium of exchange needs to fulfill: salability across scales, across space, and across time (pp. 2–4). These clearly correspond to the classic criteria for a good medium of exchange: divisibility, portability, and durability, and his presentation of them is very lucid. The problem arises when we turn to the supply of money. Here Ammous focuses on the relation between stock and flow, existing supply and current production of the monetary commodity. This relation, he says, is a good indicator of how hard or sound a money is, and monetary history shows how harder money wins out over easier money—up to and including the displacement of silver by gold. Gold has a much higher stock-to-flow ratio than silver; it is therefore a better money and was eventually chosen as money on this basis (pp. 5–7, 19–25).

This telling of monetary history is, however, not entirely correct, and the claims about the importance of the relation between stock and flow are specious.² Let's take the last point first: money is always demanded to be held—it is always in somebody's cash balance. Any commodity that is used for monetary purposes will therefore exist in large quantities, spread out between the different holders of money, and the very fact of its being used as money will lead it to have a high stock-to-flow ratio.

Present production obviously cannot be expanded infinitely, since this would mean that the factors of production are not scarce.

² With thanks to Chris Calton.

Rather, production of the money commodity will be directed by the search for profits on the part of entrepreneurs, and in the long run the law of costs will hold—meaning that there is no special profit to be gained from producing money and increasing the money supply. What will happen is that increased production of the money commodity will cause an excess supply of money at the given price or purchasing power of money (PPM). If the commodity is only used for monetary purposes, all that would happen is that the increased supply of money would lead to a fall in PPM and an increase in the quantity of money demanded until demand and stock were again equal. However, both gold and silver are commodities that also have use value in consumption and production. A higher supply leading to a lower PPM would therefore lower the opportunity cost of using the money for a nonmonetary purpose, and the commodity would flow from monetary holdings to consumption and industrial use. Not only would this increase production of consumer goods and thereby the satisfaction of consumers, it would also mitigate the effect of increased production of the monetary commodity on the PPM and on monetary demand.³

All this is not to say that there is no meaningful distinction to be made between hard and easy, sound and unsound money. But focusing on the stock-to-flow ratio is, to my mind, a red herring; the important distinction is between a money that can be increased at will (fiat money), and one that must be produced like any other commodity. That silver has (and had) a lower stock-to-flow ratio than gold is therefore not a reason to conclude that it is a less hard form of money—it may simply be used more for nonmonetary purposes than gold is and was. Figure 3 on page 33 of the book itself gives clear confirmation that the proportion of stock to flow is not important: it depicts the gold/silver price ratio from 1687 to 2017. What is remarkable is the stability of the ratio, with very little fluctuation from year to year (within the band between 14 and 16) until the early 1870s. Now, what changed in the early 1870s? There were no source discoveries or advances in mining that radically changed the stock-to-flow ratio of silver. There was, however, a radical change in the monetary systems of the industrial world, as virtually all countries

³ On the workings of the gold standard, see Salerno (2010), Skousen (1996), and White (1999).

adopted a monometallic gold standard, leading to the virtual disappearance of monetary demand for silver.⁴ But if stock-to-flow ratios are of crucial importance, why did silver have an almost constant value in terms of gold until it was demonetized even though it does not have the same stock-to-flow ratio?

This brings me to the problems with Ammous's description of monetary history. He describes the evolution of money and especially the change from silver to gold as a consequence of the gradual realization of the inherent superiority of the gold standard. There is no mention of Gresham's law or of the problems of bimetallism. It would be much closer to the truth to say that the gold standard was the unintended consequence of monetary manipulations and attempts to set a legal ratio between the prices of gold and silver, first in England at the Royal Mint,⁵ then in France after Napoleon. When Germany and the Scandinavian countries adopted the gold standard in the early 1870s, it was a conscious governmental decision, not the spontaneous outcome of an unimpeded market process.

The other reason for the dominance of gold, according to Ammous, is the growth of banking and specifically the fact that it was necessary to centralize gold holdings, first in banks and then in central banks, in order to facilitate payment (pp. 37–38). This argument, I must confess, baffles me. Now, it is true that international clearing and settlement is a good way to minimize the need to transport gold between countries, and it is also true that this clearing increasingly took place between central banks—but it is quite a leap to say that therefore gold holdings had to be centralized. Banking is not the only way to facilitate clearing, as merchants can facilitate it just as well through the use of bills of exchange. Indeed, perhaps the first discussion of clearing and international trade, by Richard Cantillon, is conducted in terms of bills of exchange drawn on correspondent banks (Cantillon 2010, 195–201). The growth of banking systems pyramided on top a central bank cannot be explained by the need to store gold in clearinghouses, as a decentralized system could function just as well, if not better. The history

⁴ The interested reader can check this development by referring to Officer and Williamson (2020).

⁵ See Cantillon (2010, 213–16), for a contemporary discussion of the policies of the Royal Mint critical of Newton's role.

behind the growth of central banking is, rather, one of government privilege given to banks seeking profit through credit expansion, and of government involvement in this business to get a share of those profits. Ammous is clearly familiar with banking theory, and it is a shame that this part of the book is not informed by it.

Finally, this brings us to Ammous's case for bitcoin. What role can bitcoin play in the modern economy? The discussion of the pros and cons of bitcoin is both clear and frank. The advantage of bitcoin is seen against modern banking institutions: with bitcoin, we need not rely on trust in third parties of dubious repute to facilitate payments around the world (p. 208). This can be done simply via the medium of bitcoin. Although it is not strictly correct to say that it eliminates third parties—the whole network becomes, in effect, the third party to any and all transactions—it is correct to assert that the need for trust is completely eliminated. The discussion of possible challenges to bitcoin is also very convincing, although some will certainly be upset with Ammous's dismissal of alternatives to bitcoin as inherently inferior.

Does this mean that bitcoin will replace cash? The conclusion arrived at is, surprisingly, no. It is simply too expensive to transact in bitcoin, especially since we can expect transaction fees to rise as demand for bitcoin increases. There are also inherent constraints to the technology, which limit how many transactions can be performed. The bitcoin network will never, in Ammous's estimation, be able to compete with the likes of Visa and Mastercard when it comes to processing payments (pp. 233–34). It will simply be too costly in terms of processing power. The role of bitcoin, argues Ammous, will rather be to settle transactions between large institutions such as central banks. Here it is superior, because there is no need for trust in a third party, and auditing is extremely cheap—anyone can look at the blockchain. A supporting infrastructure will then be built around bitcoin that allows the common man to exchange using tokens or through institutions based on bitcoin. The growth of the lightning network that is being adopted now is one possible way that this can come about, but how exactly digital cash based on bitcoin will be made available is up to entrepreneurial experimentation.

Although he argues convincingly, Ammous's conclusion fails to persuade in the end. It seems to rest on the spurious problem of

centralized gold holdings criticized above, and on seeing trust in third parties as a problem. But there is no reason that trust should be a problem—on the market, we trust third parties all the time, and generally without issues. The problem is government control over and involvement in monetary affairs. Governments and privileged banks have again and again proven themselves untrustworthy, as they have engaged in destructive and antisocial policies again and again, while bamboozling the general public. In the absence of government involvement, it does not seem probable that bitcoin would win out over gold as the money of choice of a free society.

This does not mean that bitcoin is useless, or perhaps just a speculative bubble fed by easy money and ideological fervor. Ammous has pinpointed exactly what the function of bitcoin is in the present context: just as owning money in general is a hedge against uncertainty, so too is owning bitcoin a hedge against a specific kind of uncertainty. Owning bitcoin is a way to get around capital controls and embargoes, and other obstacles governments place in the way of free exchange. In short, owning bitcoin is a hedge against what Robert Higgs called regime uncertainty (Higgs 1997). As such, it will regrettably prove very useful for many people in the foreseeable future.

Its weaknesses notwithstanding, however, *The Bitcoin Standard* is a book well worth reading. Ammous's treatment of bitcoin, though marred by some of the issues I have criticized above, is very good, and any blockchain enthusiast would do well to consider Ammous's strictures on the utility of blockchain technology. The book is full of many thought-provoking remarks about the relations between money and a host of economic and social issues, about art, about the family, and about the impact of easy money on food quality. One is left feeling that a whole monograph could be written on each of these topics. Above all, Ammous has succeeded in producing a book that clearly demonstrates the possible usefulness of bitcoin under present conditions.

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BOOK REVIEW

BEYOND BREXIT: A PROGRAMME FOR UK REFORM

THE POLICY REFORM GROUP

LONDON: SAGE PUBLICATIONS, 2019, 93 PP.

GEORGE PICKERING*

Despite its name, *Beyond Brexit: A Programme for UK Reform* is only partially a book that addresses the economic consequences of Britain's exit from the European Union. In many respects, and certainly when it is at its most broadly relevant and boundary pushing, it is about the economic consequences of the Great Recession of 2007–09 and of Britain's long retreat from the forefront of the global economy in general.

The book—which consists of a series of essays compiled by the newly established Policy Reform Group and published in volume 250 of the *National Institute Economic Review*—includes contributions from sixteen different authors on a broad range of key policy areas. These include everything from macroeconomic policy to housing, to infrastructure, to climate change, to foreign policy, to

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inequality—a breadth of subject matter which structurally reflects the sort of political manifestos the book is hoping to influence. The book's introduction, attributed to the Policy Reform Group as a whole, argues that the current politico-economic crisis surrounding Brexit requires the adoption of a national industrial strategy “for the decades ahead,” with the purpose of the book being to “launch a serious debate about what such a strategy should look like” (p. 2). The dry and occasionally technical language in which the book delivers its proposals gives an indication of the type of audience that it hopes to spark debate among, although several of the policy proposals made are deceptively broad and qualitative in nature.

Indeed, *Beyond Brexit* is somewhat slight in its use of economic theory or detailed technical justifications to support its proposals, partly as a result of its orientation toward policymakers rather than academic economists, but partly also due to the restrictive brevity of many of its chapters. Each chapter is tasked with presenting a sweeping program of reform for an entire broad area of the British economy or political system, including numerous specific policy proposals, but all in an average space of only around five pages per chapter. The book as a whole could have benefited considerably from a more extended presentation of its ideas, to enable the contextualization of its proposals in economic theory in addition to the granular, fact-by-fact presentation that it affords. However, the book's repeated appeals to “evidence-based” policymaking suggests that the relative absence of Austrians' preferred theoretical approach was more likely an intentional decision than a mere matter of space limitation.

As mentioned at the outset, the book's most surprising aspect is the relatively little attention it gives to issues specifically and exclusively related to Brexit, much to its own benefit. The task of addressing Brexit directly is left primarily to the two chapters on international trade, while other chapters tend to address issues which have been major areas of discussion in British economic policy since at least the 2008 financial crisis, if not before. In the preface, National Institute of Economic and Social Research (NIESR) director Jagjit S. Chadha contextualizes the book as a response to the current “break-down of the liberal rules-based consensus” (p. 1), which had guided politico-economic decision-making from roughly the demise of Keynesian

demand management in the 1970s until the Great Recession.¹ In the context of this breakdown, *Beyond Brexit* presents a series of policy approaches neither too near nor too distant from the current mainstream, such that their potential to be adopted into the new consensus, whenever it arrives, can easily be imagined. This marks the book's relevance as extending far beyond Brexit and the present moment in time, with potential interest for economists of all countries.

This broader relevance is especially apparent in the first chapter, in which Russell Jones and John Llewellyn, both of Llewellyn Consulting, address the growing difficulties faced by countercyclical monetary policy since the 2008 crisis in Britain and elsewhere. Over a decade after the crisis, the Bank of England's key "bank rate" of interest remains at only 0.75 percent, leaving little room for orthodox credit expansion when the next recession arrives, while even the unorthodox policies adopted after 2008 have also "become less effective over time" (p. 9).² Jones and Llewellyn suggest that still more unorthodox policies could conceivably be adopted to address the next recession: an extension of Large-Scale Asset Purchase programs, a temporary overshooting of inflation targets, a transition to a cash-free economy, taxation or subsidization of currency itself, or a negative 10 percent interest rate on bank deposits held at the Bank of England. However, the authors ultimately judge these proposals to suffer from a number of drawbacks, including the potential diminution of government seignorage revenues, possible inflation of asset bubbles, encouragement of risk taking, and the general fostering of the impression that the state is becoming "increasingly intrusive and predatory" (p. 10). Indeed, Jones and Llewellyn even offer a brief critique of conventional monetary policy, with which Austrians could likely agree:

¹ Furthermore, Russell Jones and John Llewellyn, in chapter 1, perceptively mark Brexit itself as just another aspect of this broader breakdown the pre-2008 politico-economic consensus (p. 8).

² Unconventional monetary policies adopted by the Bank of England since 2008 have included quantitative easing, the introduction of the Funding for Lending Scheme, corporate asset purchases, and enhanced liquidity support in the form of wider collateral, long-term repos, the discount window facility, and the Special Liquidity Scheme. See Joyce (2013) and Lyonnet and Werner (2012).

Even “pure” interest rate policy has real and financial side-effects, not least on resource allocation, asset prices, risk tolerance, and the distribution of income and wealth. Such effects would likely become more substantial still, were monetary policy to break new ground (p. 9)

Unfortunately, however, rather than critically reassessing the framework of central banking and a government-managed mixed economy itself, the authors instead engage in a vain attempt to break new ground on the decidedly closed frontier of the old paradigm. Acknowledging that the years since 1970 have seen the breakdown in isolation of both fiscal fine-tuning and conventional monetary policy, Jones and Llewellyn instead point to a combination of these two approaches as the way forward. This would involve maintaining the current 2 percent inflation target while simultaneously adopting substantial automatic fiscal stabilizers (variations in subsidies, taxes, and transfers), which should be fiscally neutral over the course of the cycle. The authors further argue for a significantly enhanced role for discretionary fiscal policy, including such proposals as internationally coordinated relaxation of fiscal standards³ and the use of preapproved shovel-ready infrastructure projects which could be started and stopped again at short notice, as business fluctuations require. In support of such projects, they argue for the establishment of an operationally independent but state-funded National Infrastructure Bank, which is one of the book’s most frequently reoccurring proposals.

Jones and Llewellyn further advocate raising public spending from its current “historically low” levels up to the EU average of around 47 percent of GDP, which they justify by appealing to the aging of the population and the fact that “the public are strongly in favour of transfer payments” (pp. 12–13). This latter point highlights a shortcoming of the book as a whole from the perspective of value-free economics. The book very deliberately presents itself as a politically neutral exercise in technocracy, yet its goal of policy advocacy leads it unavoidably into normative statements and the smuggling in of its own value judgements, occasionally explicitly, such as in the

³ Confusingly, Jones and Llewellyn assert that organizing this sort of relaxation in an internationally coordinated manner would lead to less of the information, decision, and implementation lags which usually prevent timely action at the national level (pp. 10–11).

aforementioned statement justifying transfer payments with public desire, but more often implicitly. Austrians in the Rothbardian tradition would likely not judge such normative statements to be objectionable *per se*, as long as they are grounded in a coherent and rationally defensible ethical system (Rothbard [1976] 2011). However, the briefness of this book and its chapters leaves many of its proposals unbacked even by a fully elaborated economic justification, let alone an ethical one, giving an impression of arbitrariness to many of its normative statements.

Chapter 2, written by John Martin of University College Dublin, addresses the longstanding issue of Britain's "productivity gap" compared to the rest of the world, which seems to have grown significantly since 2008.⁴ Martin suggests an expansion of government investment in ongoing training for workers, although he admits that such policies tend to be expensive while only increasing per capita income in the long run. He also advocates the expansion of trade apprenticeships for young people, despite the fact that such schemes have been attempted unsuccessfully in Britain many times before, a fact which he acknowledges but does not address. Perhaps the most interesting aspect of this chapter is how many of its smaller, offhanded comments inadvertently illustrate the gulf between Austrian and mainstream perspectives. For example, Martin breezily asserts that the British economy suffers from "few distortions to the private sector induced by state involvement" (p. 19), while also noting that "firms have responded [to rises in the UK minimum wage] by reducing profits, increasing prices, cuts to non-wage costs, the restructuring of workforces and pay structures," which he regards as an "overwhelmingly positive judgement on the minimum wage" (p. 18).

Chapters 3 and 4 cover the issues of international trade and mark the book's only direct and extended commentary on Brexit itself. Chapter 3, written by David Vines of Oxford University, Paul Gretton of the Australian National University, and Anne Williamson of Partners in Health Mexico, assesses the three possible approaches to trade Britain might take after Brexit: protectionism, negotiation of free trade agreements, or unilateral liberalization.

⁴ In 2012, output per hour worked in the UK was fully 21 percent lower than the G7 average (Office for National Statistics 2012).

The authors ultimately judge all three possibilities to be flawed, and hence advocate remaining in the European Union's single market and customs union. Their primary objection to unilateral trade liberalization is that it would be "highly disruptive... [to those] currently favoured by relatively high assistance" (p. 26), but no consideration is given to the potential benefits of resource reallocation away from protected industries. Chapter 4, written by Alexis P. Lautenberg of Covington and Burling, argues that the EU will likely severely restrict British services trade with Europe if the former alters its regulatory regime away from EU standards to any significant extent.

Chapters 5 and 6, written by diplomat Jeremy Greenstock and former National Security Adviser Mark Lyall Grant, respectively, address the issue of foreign policy, and advocate a more active and outward-looking role for Britain in terms of both "soft power" and military capability.

Chapter 7, written by Tim Besley and Richard Davies of the London School of Economics, advocates the adoption of a new comprehensive industrial strategy, urging Britain not to be squeamish about supporting its businesses with "activist policies" (p. 48), as many of her trading partners already do. However, this chapter emphasizes the importance of not straying from markets lightly, even going so far as to invoke F. A. Hayek, and stresses that interventions should only be undertaken when "justified by carefully-argued market failure arguments" (p. 47). This sentiment is reflected at many other points in the book, with policy proposals often being tempered by qualifications along the lines of "only when deemed necessary," or "only under certain circumstances."⁵ However, such considerations are unlikely to restrain politicians, who stand to benefit from the new powers these policies imply. In its striving for an apolitical and technical tone, the book is unable to address the perverse incentives facing the politicians it is seeking to influence. In placing its seal of approval on these policies with only weakly stated qualifications, the book may be licensing politicians

⁵ For example: "It may become necessary even to embrace central bank financing of public expenditure or tax cuts. The government would be well advised to consider, in advance, under what circumstances, and subject to what constraints, it might be wise to entertain such departures" (p. 3).

to implement these new policies in ways of which even its authors would not approve.

Chapter 8, written by Dimitri Zenghelis of the Bennett Institute for Public Policy at Cambridge University, addresses the potential difficulties and benefits of decarbonizing Britain's economy. This chapter almost falls into the common mistake of emphasizing the benefits of renewable technology so strongly that the reader is left wondering why the advocated government intervention is even necessary. However, this is avoided by appealing to the supposed market failure of inertia and transfer costs, which would prevent Britain from claiming a first-mover advantage in the new green economy unless the government intervenes. Specifically, Zenghelis advocates a "strong and comprehensive carbon price signal" to guide consumer and producer behavior, as well as regulations and direct planning for "non-price-sensitive" sectors (p. 58).

Chapter 9, also by Russell Jones and John Llewellyn, advocates a significant increase in public infrastructure spending, arguing that such spending could be implemented countercyclically, and even that such an increase in spending could *reduce* government debt in a low interest rate environment. The authors acknowledge the considerable cost overruns and inefficiencies typically associated with public infrastructure spending but attribute this problem exclusively to worker skill shortages in the UK, without discussing the calculational issues endemic to government provision of unpriced goods. Strangely, they also include without comment a list of five current or proposed public infrastructure projects⁶ whose total cost, according to their own figures, will amount to 32.6 percent of current UK GDP—a fact seemingly ill at ease with the rest of their argument.

Chapter 10, written by Kate Barker of the major house-building company Taylor Wimpey PLC, addresses the issue of Britain's ongoing housing crisis by advocating the construction of 1 million new social homes over the next ten years at an estimated cost to the taxpayer of £200 billion. Barker also advocates replacing the government's current Help to Buy scheme with a simple capital

⁶ Namely the HS2 railway, Northern Powerhouse Rail, the Hinkley Point C nuclear power plant, Crossrail 2, and the expansion of Heathrow Airport.

sum gift to young people, which could be, but need not be, spent on a house. The space limitations of the book's chapters are particularly apparent in Barker's brief and unsupported assertion that a lack of low-price housing is *the* cause of the UK's current homelessness crisis,⁷ a complex, multifaceted issue which is here presented briefly and without further comment. However, her observation that "the fall in long-term real interest rates has been a major driver of the increase in all asset prices" (p. 70) does fall in line with Austrian insights.

Chapter 11, an additional contribution from Jones and Llewellyn, addresses the issue of inequality, for which it identifies six causes: globalization, technological change, the increased market power of large firms, declining trade union membership, favoritism toward the London financial sector, and inability of antitrust policy to deal with modern tech companies. Of particular interest is the chapter's brief critical assessment of universal basic income, which the authors judge would not only be extremely expensive, but also a driver of unemployment and potentially "social decay" (p. 80).

In chapter 12, Angus Armstrong of NIESR argues that greater taxing and spending power should be devolved to Britain's regional assemblies, and Martin Donnelly of Oxford University in the following (and final) chapter further argues that such devolution could bolster the perceived legitimacy of the British government.

Beyond Brexit is certainly encumbered by a number of shortcomings, not least of which is its restrictive brevity, and few of its policy proposals can be expected to find sympathy with economists of the Austrian school. However, its strength is in its direct engagement with the current transitional moment in mainstream economics, and it is entirely conceivable that the policies and approaches that it advocates could play a part in the formation of the next consensus. Although its adjacency to the familiar arguments of the current mainstream might not invite immediate attention, *Beyond Brexit* does present some genuinely novel approaches, especially in the area of countercyclical policy, with which critical engagement may soon be necessary.

⁷ According to Barker's own figures, the number of rough sleepers in England has increased by more than 150 percent over the past nine years (p. 70).

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BOOK REVIEW

PROSPERITY AND LIBERTY: WHAT VENEZUELA NEEDS...

RAFAEL ACEVEDO (ED.)

MIAMI: ECONINTECH, 2019, XVII + 153 PP.

DAVID GORDON*

Rafael Acevedo is a distinguished Venezuelan economist, now in part-time residence at Texas Tech University, who is deeply concerned about the future of his native country. Socialism has brought Venezuela to rack and ruin, and if the country is to recover, a move to the free market is essential.

Many have said the same thing, but Acevedo has done much more than bemoan his country's fate and point to the obvious remedy. He is the head of a think tank called Econintech, and he and his collaborators have proposed detailed plans for the reconstruction of Venezuela from its present state of wreckage.

In *Prosperity and Liberty*, Acevedo has gathered together a number of these plans, as well as essays by eminent scholars who tell Venezuela's sad tale and compare the situation of the country with what has taken place elsewhere.

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A vital point made in the book is that Venezuela's descent into disaster did not begin with the overtly socialist regime of Hugo Chávez. To the contrary, the relatively free economy that had existed before 1958, albeit under a political dictatorship, was gradually supplanted by interventionist policies that brought with them massive corruption and a decline in economic growth. Though Venezuela is blessed with immense natural resources, oil deposits foremost among them, these did not suffice to fend off disaster.

Given the economy's poor performance, what was to be done? One might think the answer obvious, a return to a freer economy, but unfortunately another path gained popularity. Advocates of this path said that Venezuela's economic problems resulted not from too much socialism, but rather from too little of it. As Acevedo and Luis Cirocco note in an illuminating essay,

Over time, the gradual destruction of economic freedom led to more and more impoverishment and crisis. This, in turn, set the stage for the rise of a political outsider with a populist message: Hugo Chávez. He was elected in 1998 and promised to replace our "lighter" socialism by a form of hard socialism, which he called "the revolution of the 21st century" and which only magnified the problems we had faced for decades. He was able to pass an even more anti-private property constitution. Since Chávez's death in 2013, the attacks against private property continued, and Chávez's successor, Nicolás Maduro, keeps promising more of the same. The government has turned toward outright authoritarian socialism.

Students of Austrian economics will not be surprised that the socialist program has failed completely. The most overt sign of economic chaos is the country's extraordinary inflation rate. Essential consumer goods are at best in short supply, and the entrepreneurial spirit, a key to economic growth, has been stifled. Small wonder that many have fled the country, and many among those who remain cross the border to engage in black market exchanges. It must be said, though, that the contributors to the book fail to address the dire effects of American economic sanctions on the Venezuelan people.

The disaster that has resulted from socialism is by no means confined to the economic sphere. Those who openly challenge the regime have been arrested and sometimes tortured as well, and

again, this should come as no surprise. As Bob Lawson and Ben Powell pointed out, "In his 1944 book *The Road to Serfdom*, Friedrich Hayek argued that a competitive capitalist economy is necessary to sustain democracy, and that once a country becomes 'dominated by a collectivist creed, democracy will inevitably destroy itself.'" The reason is simple. "Centrally planned economic systems necessarily concentrate economic power in the hands of government planners, who can punish dissent through their economic edicts." (Lawson and Powell 2019)

If Hayek accurately depicted the road to serfdom, our pressing question becomes: what is the road to freedom? The answer does not lie in the deposing of Maduro and his replacement by his rival Juan Guaidó. He is, sad to say, also a socialist, though not so extreme a one as Maduro, and his program would not rescue Venezuela from the economic doldrums. I should add, though the contributors to the volume do not state this directly, that it would be a path of folly to install Guaidó by force, a course of action urged by many American neoconservatives, ever eager to mind the business of other countries.

As Ron Paul has trenchantly remarked about the recent CIA-backed effort to oust Maduro,

While US Administrations engaged in "regime change" have generally tried to mask their real intentions, this US-backed coup is remarkable for how honest its backers are being. Not long ago the National Security Advisor to the president, John Bolton, openly admitted that getting US companies in control of Venezuelan oil was the Administration's intent. Trump Administration officials have gone so far as mocking the suffering of Venezuelans when a suspiciously-timed nationwide power failure heightened citizens' misery.... Was the US behind the take-down of Venezuela's power grid? It would not be the first time the CIA pulled such a move, and US officials are open about the US goal of making life as miserable as possible for average Venezuelans in hopes that they overthrow their government.

The starvation blockade imposed on Venezuela, denounced by the eminent international lawyer Alfred de Zayas, has brought about great suffering. Most Venezuelans, even those not favorable to Maduro, naturally resent efforts by foreigners to order them to change their government, and they remember with bitterness the

CIA-orchestrated coup against Chávez in 2002. Support for such efforts, even in the name of opposition to socialism, plays into the CIA's efforts, dating from the inception of that agency, to promote at all costs global American hegemony.

Political and economic salvation for Venezuela can come only from the Venezuelan people themselves. They cannot be "forced to be free" but must seek, if they have the wit and wisdom to do so, the guidance of experienced free market economists such as Acevedo and his coworkers at Econintech.

What is the best way to establish a free market economy? Acevedo with penetrating insight accepts the counsel of the greatest Austrian economist of the latter half of the twentieth century, Murray Rothbard. Economic reform must be extensive and fast, not creeping and piecemeal: "Freeing only a few areas at a time," Rothbard said, "will only impose continuous distortions that will cripple the workings of the market and discredit it in the eyes of an already fearful and suspicious public."

It is heartening that Acevedo and his colleagues have learned so much from the Austrian school, and he and his colleagues have made abundantly clear the best course of action for Venezuela. It is a course of action that only the Venezuelan people themselves can take.

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BOOK REVIEW

ECONOMICS IN TWO LESSONS: WHY MARKETS WORK SO WELL, AND WHY THEY CAN FAIL SO BADLY

JOHN QUIGGIN

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The Australian economist John Quiggin is dissatisfied with Henry Hazlitt's great book *Economics in One Lesson* and in his new book endeavors to set its author straight. He says of Hazlitt. "His One Lesson contains important truths about the power of markets, but he ignores equally important truths about the limitations of the market." (p. 4) Learning about these limitations is the second lesson that Quiggin wants to teach us.

Quiggin's foray against Hazlitt misses its target, in no small part because of a problem with the key concept in the book, "opportunity cost," as he applies it to Hazlitt. He defines the concept in this way: "The opportunity cost of anything is what you must give up so that you can have it." (p. 3) So far, so good, but now the difficulty in his

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case against Hazlitt arises. He applies the concept as it is used in neoclassical economics, but Hazlitt was an Austrian and does not use the concept in this way.

Quiggin takes as his benchmark a state of neoclassical equilibrium, or at least something close to this. He says, “Let’s restate Lesson One: Market prices reflect and determine the opportunity costs faced by consumers and producers.... But the simple story above embodies a lot of assumptions about the way markets work.” (pp. 40, 42). Under these assumptions, there are no mutual gains from trade.

In a perfect competitive equilibrium, prices exactly match opportunity cost. There are no “free lunches” left. More precisely, any additional benefit that can be generated for anyone in the economy must be matched by an equal or greater opportunity cost, where opportunity cost is measured by the goods and services forgone, valued at the equilibrium prices. (p. 43)

He explicitly applies his understanding of Lesson One to Hazlitt:

When economics is done properly, Hazlitt argues, the answer is always to leave the market alone. So, the One Lesson may be restated as: Once all the consequences of any act or policy is taken into account, the opportunity costs of government action to change economic outcomes always exceed the benefits.” (p. 3)

Quiggin’s strategy against Hazlitt is to argue that there are many cases where the neoclassical model fails to apply. In these cases, the opportunity cost to individuals deviates from the opportunity cost to society.

Quiggin has misunderstood Hazlitt’s argument in *Economics in One Lesson*. If we turn from Quiggin’s distillation of the book’s lesson to what Hazlitt actually says, we do not find the claim, based on the assumption that the economy is in neoclassical equilibrium, or close to it, that “the opportunity costs of government action to change economic outcomes always exceed the benefits.” To the contrary, Hazlitt discusses a number of particular cases in the real-world economy. In each of these, he shows that interfering with the free market often has bad consequences. For example, he says about minimum wage legislation:

Yet it ought to be clear that a minimum wage law is, at best, a limited weapon for combating the evil of low wages, and that the possible good to be achieved by such a law can exceed the possible harm only in proportion as its aims are modest. The more ambitious such a law is, the larger the number of workers it attempts to cover, and the more it attempts to raise their wages, the more likely are its harmful effects to exceed its good effects. (Hazlitt [1946] 1979, 134–35)

Hazlitt wrote his book for a popular audience, but Quiggin, a skilled and learned professional economist, does not understand it properly because he reads it through the blinders of an assumption about what Hazlitt “must” be saying.

Quiggin applies the concept of neoclassical equilibrium to Hazlitt’s most famous chapter, the parable of the broken window. In the parable, which Hazlitt took over from Bastiat, a young hoodlum throws a brick through the window of a baker’s shop. People in the crowd imagine that this will help business, since the baker, in order to replace the window, will give money to a glazier, who will spend it on things he wants, and so on. Hazlitt asks readers to remember that, had the window not been broken, the baker would have bought a new suit, so there is no gain to the economy in breaking a window.

This is easy to grasp, but here is what Quiggin does with it:

The argument is compelling at first, but there’s a subtle problem. Implicit in the crowd’s reaction is the assumption that glaziers are short of work. If... glaziers have more jobs than they can handle, then there is no extra window—at best, the shopkeeper’s order simply displaces some other, less urgent, repair. Similarly, for Hazlitt’s riposte about the tailor to work, there must exist unemployed resources in the tailoring industry, so that the shopkeeper’s suit represents an addition to output. If not, the additional demand from the shopkeeper will raise the price of suits marginally, just enough to lead some other customer to buy one less suit. That is, the story implies that the economy is in recession, with unemployment across a wide range of industries. (p. 167)

In other words, there are only two possibilities: either there is a neoclassical equilibrium, with its stringent conditions, or there is a recession. Quiggin misses entirely the Austrian view of the process by which entrepreneurs adjust production to meet consumers’ changing demands. The absence of a neoclassical equilibrium is

not a recession, but the ordinary course of the economy. Unless the hoodlum can anticipate consumers' demands better than capitalist entrepreneurs, breaking the window will not better serve consumers.

But what if the economy really is in a recession or depression? Do we not then need increased spending to stimulate the economy? Quiggin, an ardent Keynesian, certainly thinks so, and if he is right, Hazlitt's argument fails under these conditions and the crowd is right about the broken window.

Here we confront an odd fact. Hazlitt wrote a large book, *The Failure of the "New Economics"* ([1959] 2007), in the course of which he criticizes the Keynesian view that recovery from depression depends on an increase in consumers' spending. Hazlitt in particular challenges the Keynesian "multiplier," about which Quiggin observes, "It's difficult to get an intuitive sense of the numbers involved in fiscal policy. The key idea is that of the 'multiplier.'" (p. 292) Quiggin has read the book and criticizes some of the contentions in it, but he never addresses these central points.¹

In more than one respect, Quiggin's knowledge of Austrian business cycle theory is lacking. He tells us that "Hayek was not particularly notable among the critics of *The General Theory*. The supposed Hayek-Keynes contest really reflects Hayek's latter-day reputation as the prophet of market liberalism and the 'Austrian school' of economics." (p. 36, note 5) Quiggin is correct that Hayek, to his later regret, did not write a response at the time to *The General Theory*, but there was indeed a contest between the two economists. Hayek wrote a devastating critical review of Keynes's *A Treatise on Money*, and Keynes criticized Hayek's view of the business cycle and encouraged Piero Sraffa to do so as well.

Not done with his criticism of Hazlitt, Quiggin raises another point as well.

Hazlitt doesn't spell out the starting point for his analysis. However, his analysis is based on the implicit claim... that there is a natural distribution of private property rights, and that this natural distribution exists prior to any government activity such as taxation and the payment of welfare benefits. This is nonsense. It is impossible to disentangle some

¹ Quiggin does not cite or list in his bibliography the collection of essays Hazlitt edited, *The Critics of Keynesian Economics* [1960] 1995.

subset of property rights and entitlements from the social and economic framework in which they are created and enforced. (p. 138).

Hazlitt was a rule utilitarian who did not accept natural rights. For him, it is essential to a free and prosperous economy that people have stable legal rights to property, but he does not make the assumption Quiggin attributes to him.

Quiggin says that we should learn a Second Lesson besides the lesson Hazlitt taught, but this second lesson to a large extent consists of casting Hazlitt's lesson aside. Readers would be well advised to stick to Hazlitt. He does not require emendations that reinstate the interventionist fallacies he challenged.

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BOOK REVIEW

THE MARGINAL REVOLUTIONARIES: HOW AUSTRIAN ECONOMISTS FOUGHT THE WAR OF IDEAS

JANEK WASSERMAN

NEW HAVEN, CONN.: YALE UNIVERSITY PRESS, 2019, XIII + 354 PP.

DAVID GORDON*

Janeke Wasserman, who teaches history at the University of Alabama, has written a useful but deeply flawed book. Useful, because Wasserman has brought to light substantial archival material on the background of the Austrian school, but deeply flawed on two counts. First, Wasserman is beyond his depth when he writes about theoretical issues. In particular, he does not understand Mises, but his lack of knowledge is apparent elsewhere as well. Second, he obtrudes his political opinions on readers in a way that must generate skepticism about his presentation of his archival research.

Wasserman distinguishes a number of stages in the history of the Austrian school. I do not propose to discuss these in detail but will mention only a few highlights. In general, Wasserman stresses the

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networks among the leading Austrians. They all knew each other and, though often at odds, they tended to support one another in times of crisis. Further, the cultural ferment of Vienna affected them:

The exchange of ironical barbs and clever repartee reflected the mode of the Austrian School specifically and modernist Vienna in general. The famed literary critic and cultural icon Karl Kraus best embodied this spirit.... Good polemics demanded satire and unfairness. It also was not enough to win one's dispute with intellectual foes: one had to best adversaries in style. Schumpeter and Böhm [Bawerk] excelled in these arts and used the tools of the *Gymnasium* and coffeehouse to great effect. (pp. 79–80)

Schumpeter and Mises are often, and correctly, viewed as rivals who had little use for each other, but one of Wasserman's most valuable insights is that they sometimes worked together. "Schumpeter encouraged Mises to speak out on Austrian monetary problems in the Austrian Political Society, where the two made common cause against the wartime government." (pp. 100–01)

Wasserman rightly notes that Schumpeter's *Capitalism, Socialism, and Democracy* is best read as a defense of capitalism:

While capitalism in its current, desiccated form seemed destined for collapse, this need not transpire. Deploying a satirist's wit and an ironist's pen, *Capitalism* revealed that Schumpeter believed just the opposite. Capitalism may sow seeds of its own destruction, but it still constituted the surest guarantee of prosperity and democracy.... Schumpeter also leveled a hearty criticism against his economist colleagues, whose static models of perfect competition and complete information, of partial and general equilibria, possessed little explanatory power for a dynamic world.... *Capitalism, Socialism, and Democracy* is one of the greatest and subtlest apologia for capitalism and elitist liberalism ever written. (pp. 177–78)

If Wasserman deserves praise for his treatment of Schumpeter, unfortunately the same is not true for his account of Mises. He adopts uncritically the perspective of Hayek, who varied in his estimation of Mises, and of Gottfried Haberler about *Nationalökonomie*:

Hayek conceded that the book showed a glaring ignorance of recent developments.... Hayek's critique followed the lead of Haberler, who had argued for years that Mises was no longer a significant economist and that his work offered no insights for anyone who had learned economics

since the Great War: “If one had studied the classics and Marshall in 1912, then one would have learned nothing from Mises.” (p. 172)

Had Wasserman consulted the book itself, he would have found that it includes references to Haberler’s then contemporary work on international trade theory and to Hayek’s work, also then recent, on the business cycle and the socialist calculation argument. Matters become even clearer if one examines *Human Action*, the English expansion and revision of the German treatise. In it, Mises responds to Haberler’s criticism of Austrian business cycle theory and dissents from Hayek on the Ricardo effect.

Even more important, though, are Wasserman’s mistakes about praxeology. He says,

Mises’s most controversial assertion was his insistence on the a priori quality of the praxeological axiom...This unremitting stance, which denied explanatory power to inductive reasoning or empirical observations, left many scholars cold...Moreover, it did not seem that praxeology was supple enough to address contemporary problems. (p. 213)

Incredibly, Wasserman appears to attribute to Mises the odd view that every statement about economics can be deduced from the action axiom. Instead, of course, Mises developed praxeology as a deductive science that economists could use to help explain particular events. Doing so does not preclude empirical investigation but rather requires it.

An even worse misunderstanding is this:

Mises’s elevation of economics to the status of logic had great seductive power. If all of Mises’s economic assertions could be deduced from his core tenet—“Human action is purposeful behavior”—then decisions that impeded the smooth functioning of human action violated scientific law and human will. (pp. 213–14)

This does not follow at all, and only someone bereft of ability to reason logically could think it did. If all actions are purposeful, then actions that impede other actions are also purposeful.

Wasserman’s incompetence in theoretical issues is not confined to mistakes about Mises. He rightly says that *The Theory of Games and Economic Behavior* is difficult, but at one point he quotes a long sentence, which I shall not reproduce here, and says of it:

As a further example take one of von Neumann's more straightforward explanations from early in the book, the elements of a game... [Then follows proposition 6.2.1.] Virtually no economists at the time were familiar with set notation or group theory, rendering this passage incomprehensible to its intended audience. (p. 189)

In fact, the proposition is easy to understand and requires no knowledge of group theory or set notation. It says no more than that a game consists of a fixed number of moves, where a "move" is a choice among given alternatives, and Neumann provides symbols for these statements.

Here is another example of Wasserman's ignorance, though here I am captious. He says, "Röpke attracted the support of Hayek and the Italian éminence [sic] grise social scientist Benedetto Croce" (p. 200). To call Croce a "social scientist" is jarring. Croce was a leading light of Italian idealist philosophy, as well as a historian and man of letters, not a social scientist.

Wasserman has strong political opinions and, as I have said earlier, he obtrudes these on readers in a way that arouses mistrust about his presentation of archival material. He says,

In this spat, the Austrians of the LvMI [Mises Institute] renewed their ongoing feud with the Kochs, GMU [George Mason University,] and Cato.... The Misesians rejected the separation of economics and politics: Austrian economics implied libertarianism—of a conservative stripe. The GMU Austrians were consistently anti-interventionist and pro-market not just in their scholarship but in their politics, and many of them identified ideologically with libertarianism. They nevertheless believed that one could keep one's scholarship and politics separate. Rejecting the 'value-free' pretensions of the left-leaning libertarians—and the longer *wertfrei* tradition of the Austrian School—the LvMI bloc reached out to other marginal right-wing groups, such as states' rights organizations, historical revisionists, and neo-Confederates. (p. 280)

Murray Rothbard did not reject value-freedom in economics. To the contrary, he insisted on it, and a principal theme in his writings about policy is that economists should make clear their value commitments. In this he has been followed by Joseph Salerno, whom Wasserman assails. A grosser misunderstanding of Rothbard could hardly be imagined.

As Dante long ago said, "*non ragioniam di lor, ma guarda e passa.*" Let us look at this ill-thought-out book and pass on.

REMEMBERING ULRICH FEHL, GERMAN ECONOMIST AND PROMINENT SCHOLAR WITH A DEEP KNOWLEDGE OF AUSTRIAN ECONOMICS

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Prof. Ulrich Fehl, emeritus at Marburg University, died on November 9, 2019 at the age of 80 years. He was buried in the cemetery on Wiesenweg, Marburg. Ulrich Fehl left behind his wife Barbara and daughter Vera. Standing by Prof. Fehl's open grave, we struggled with our deep grief and admired his family's firm composure. Almost comforting as prayer and the good words of the pastor, however, was the German tradition of gathering after the funeral. Goulash soup and sandwiches, served according to old custom, brought pleasant memories of Ulrich Fehl to family, friends, former colleagues and students. Memories not only of a scientist with the broadest of scholarly interests, but memories also of a great personality of benevolence, respect for everybody and a fine dry humor, the friendly elegance with which he parried in discussion and conversation. Memories of long, never tedious, and most inspiring discourses with our academic teacher. Everyday work with Prof. Fehl came to our mind again, as when he arrived in his 18-year-old green Audi sedan at the campus always precisely 10 minutes behind the agreed time—nevertheless making it

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always exactly on time to the lecture hall. Talking on such topics in increasingly good spirits, we became aware: Prof. Fehl will be among us as long as we remember him as a man and as long as we cultivate his scientific heritage.

Ulrich Fehl was born on January 27, 1939 as the son of a miner's family in Bochum. After graduation, he first completed a commercial apprenticeship at the German oil company ARAL, now part of BP. Only then did he acquire a university entrance qualification and finally studied economics in Münster, Giessen and Nuremberg. Ulrich Fehl was already extremely well read as a young man. No wonder he easily fulfilled the strict requirements of a German government scholarship. He graduated with two degrees—business and economics. His calling, however, was to live and work as a scholar. In 1971 he received his Ph.D. from Philipps University at Marburg. His thesis, "Produktionsfunktionsfunktion und Produktionsperiode" (1973) deals with fundamental issues of Austrian capital theory. In 1981 he achieved the *venia legendi* for economics with a major elaboration on competition processes in Walrasian perspective. Carl von Ossietzky University at Oldenburg appointed him full professor of economics in 1981. Finally, Fehl returned to Marburg in 1987 to hold the chair for General Economic Theory until his retirement in 2004. He also served as director of Philipps University's Institute of Cooperatives. Fehl left behind a comprehensive scientific work, whose emphasis lies in the theory of capital, market process theory as well as Austrian and evolutionary economics.

Ulrich Fehl's methodology was much influenced by his academic teacher Ernst Heuß (1922–2010). Heuß's theory of the succession of market phases combines the theory of entrepreneurship with market development, and incorporates the development of knowledge and strategic behavior in the market place. Fehl added the total market perspective to this approach, thus achieving an important improvement. The core of his theory is the discovery and emergence of new knowledge in the process. His formal mathematical analyses also leave behind standard equilibrium theory. The focus is on learning and the resulting change in human action. This idea not only shaped his academic research, but also shaped the textbook on basic microeconomics which he published in 1976 together with Peter Oberender (1941–2015). The didactics are based on Ernst Heuß's "Grundelemente der Wirtschaftstheorie"

(1970) which—unlike the “Grundelemente”—also contains a part on macroeconomics. Fehl himself had worked on a textbook on macroeconomics that is consequently based on micro-foundations. His university lectures on macroeconomics were structured like this, but he could not finish a second textbook on this subject in his lifetime. Fehl’s didactic approach to microeconomics, however, consequently takes its starting point in the market process and dispenses of, unlike many other textbooks, a lengthy declination of the entities and categories of this subject matter.

During the 1980s, Ulrich Fehl got into personal contact with important protagonists of neo-Austrian economics such as Ludwig M. Lachmann and Israel M. Kirzner, which gave important new impulses to his reasoning on the market process. He was particularly proud of the fact that he had been invited to contribute a piece on the Lachmann-O’Driscoll problem to Kirzner’s anthology of essays in honor of Ludwig M. Lachmann on his eightieth birthday (Fehl 1986). Furthermore, Fehl dove deeply into Friedrich A. von Hayek’s work. The emergence of an economic order out of persistent equilibration and disequilibration in the market process was a truly Austrian and pivotal element in his thinking.

Ulrich Fehl’s approach to capital theory is based on the Austrian temporal methodology which may be considered as an alternative to the neo-classic capital theory. In “Produktionsfunktion und Produktionsperiode” he analyzes how far the concept of production period may be used to measure capital, given that processes of capital formation are circular, i.e. capital is used to create capital. Furthermore, Fehl evaluated the Wicksell effect in a process perspective. Another contribution to capital theory is his analysis of technical progress, employment, and production (Fehl 1975, 1976).

Connected to his chair of economic theory at Marburg University was the office of being a director of the local institute for research on cooperatives. This office opened another field of fruitful economic thinking for Ulrich Fehl. He perceived cooperatives as spontaneous associations of independent market actors with very particular modes of organization and operating challenges. Cooperatives are vehicles for problem solving and testing economic hypotheses in the market place and, hence, became part of Fehl’s research program in evolutionary economics.

Ulrich Fehl was a universally educated scholar. His teaching and writing covered the full range of micro- and macroeconomics. Holding the chair of General Economic Theory at Marburg University offered the opportunity of making full didactic use of the manifold synergies between the different branches of economics—a situation which has become rare nowadays against the backdrop of increasing specialization and intellectual fragmentation in academic life. Despite playing—at his time—the role of a master theoretician on the faculty, he always made it very clear to his students that economic theory does not have its value in itself. Rather, he always demonstrated the very practical use of economic reasoning for solving everyday problems and issues in society. Fehl transferred this straightforward approach also to the field of economic policy. The anthology “Dimensionen des Wettbewerbs” (“Dimensions of Competition”) which he edited together with Karl von Delhaes in 1997—his last major publication—frames the interaction of competition, entrepreneurial and society’s institutions in a very realistic way and demonstrates the role of these factors for the design of alternative economic systems (Fehl and von Delhaes 1997).

Ulrich Fehl’s intellectual interests, however, expanded far beyond economics and covered natural science, history, philosophy and theology. For instance, Fehl was a connoisseur of Martin Luther’s works. He loved to involve his students in witty discussions on history in front of a large map of Germany which for years used to hang on the wall of his office. Writings such as his essay on the issue of “just” pricing (Fehl 1989) or another on the relationship of thermodynamics to social order and innovation processes (Fehl 1983) reflect his ability to connect economic thought with reasoning in ethics or natural science. His broad knowledge together with his crystal-clear style of writing and teaching gave his scientific work its unique twist.

Ulrich Fehl’s numerous contributions to journals and anthologies are rather dispersed. For easier access, Kerber and Schreiter presented a collection of Ulrich Fehl’s most important contributions to economic theory on the occasion of his 65th birthday (Kerber and Schreiter 2004). A summary of his work on capital theory was published in this journal on the occasion of his 70th birthday (Engelhard 2009). Ulrich Fehl’s scientific legacy should remain inspiring for Austrian economics long after his passing.

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