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**Notes on the Accumulation and Utilization of Capital:
Some Empirical Issues**

by

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ABSTRACT

The paper makes three contributions. First, following up on Nikiforos (2016), it provides an in-depth examination of the Federal Reserve measure of capacity utilization and shows that it is closer to a cyclical indicator than a measure of long run variations of normal utilization. Other measures, such as the average workweek of capital or the national emergency utilization rate are more appropriate for examining long-run changes in utilization. Second, and related to that, it argues that a relatively stationary measure of utilization is not consistent with any theory of the determination of utilization. Third, based on data on the lifetime of fixed assets it shows that for the issues around the "utilization controversy" the long run is a period after thirty years or more. This makes it a Platonic Idea for some economic problems.

KEYWORDS: Accumulation; Growth; Distribution; Utilization

JEL CLASSIFICATIONS: B22; O4 ; D3 ; D2

1. INTRODUCTION

As in every debate in economics or elsewhere, a significant part is related to the empirics. What is the right data to examine the questions at hand? What is this data telling us? This is also the case with regards to the question of whether the normal rate of utilization is endogenous to demand or not (for a review of this "utilization controversy," see Nikiforos [2016, 2020]).

Some obvious pieces of data that can help us answer this question are the measures of industrial production, capacity, and the related utilization measure constructed by the Federal Reserve Board (FRB). Indeed, the FRB measure of utilization has been widely used by both sides of this debate.[1]

The FRB's utilization measure fluctuates for long periods of time around the same level, which points toward an exogenous-to-demand utilization rate. Utilization driven by demand may fluctuate around a center of gravity, but this center of gravity itself is exogenous. In a previous paper (Nikiforos 2016) I argued, among other things, that the FRB data is not right for that purpose. Because of the method of its construction, the FRB measure of utilization does not capture significant changes that might occur over time. This becomes clear if one reads carefully how this measure is produced. A first contribution of the present paper is to provide a detailed examination of the FRB measure of utilization (section 2). An exhaustive treatment of the issue confirms the ambiguities surrounding the FRB measure, and that it is closer to a cyclical indicator of economic activity than a measure of long-run variations in normal utilization.

At the same time, it is important to note that a part of the recent declines in the FRB measure—the average rate of utilization in the FRB series has been lower since the early 1980s and even more so in the years after the Great Recession—can be attributed to lower

[1] See, for example, Lavoie, Rodríguez, and Seccareccia (2004) and Skott (2012), or, more recently, Gahn and González (2019) and Setterfield and Avritzer (2019).

demand. To the extent that this is the case, it confirms that utilization is exogenous to demand. However, this does not negate the inappropriateness of the FRB series for the measurement of normal utilization's evolution.

If the FRB measure is not appropriate, then what is? As I explain in Nikiforos (2016, 2019), a better measure for the long-run evolution of utilization is the average workweek of capital (AWW), which measures how many hours the capital stock is utilized over the course of a week (which, by definition, is 168 hours long). The properties of the available estimates of the AWW are briefly summarized is section 3.

In the next section I discuss the national emergency utilization rate (NEUR) that is published by the US Census Bureau. This rate is calculated based on an engineering definition of productive capacity and also avoids many of the ambiguities related to the FRB rate. At the same time, it can capture variations in utilization due to changes in intensity and speed of production, and not only the time productive capacity is used. Its examination and juxtaposition to the FRB rate confirm that the FRB rate is not appropriate for measuring long-run variations in utilization.

However, there is a more fundamental reason why the FRB measure is inappropriate. A rate of capacity utilization that is relatively stable over time is not consistent with any theory capacity utilization's determination. Even if one believes that demand does not play a role and that only technological, cost, or other factors enter in its determination, there is no reason to expect that all these other factors will change in such a way to keep utilization constant. This is another—logical—reason why the FRB measure's data, which is are stationary over long periods of time, are not the appropriate measure of the long-run trajectory of the rate of capacity utilization. This issue has passed completely unnoticed in the literature so far. It is discussed in section 4.

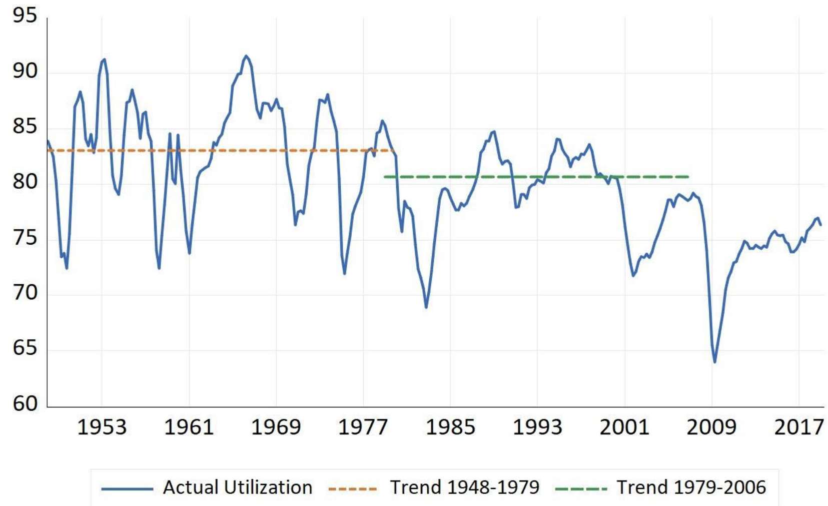
Finally, the paper deals with the question of how long the long run is. The literature here is ambiguous. In the context of the "utilization controversy," the long run is the period when all capital is "free" to take any physical form; that is, after the useful life of existing capital is over. Based on data on the useful life of capital, I show that the average useful life is around 30 years. Hence, for certain economic questions, normal utilization is relevant only in logical time but does not say much about actual historical processes. In this very long run, when the lifetime of all capital stock has expired after a shock, we need to go back to discussions in Kurz (1986) and Nikiforos (2013, 2020). However, this sort of long run often "floats above historical time as a Platonic Idea," as Joan Robinson (1979, 180) famously pointed.

2. THE FEDERAL RESERVE'S MEASURE OF CAPACITY UTILIZATION

The FRB data on capacity utilization are presented in figure 1. The picture that emerges from this data is that utilization fluctuates around the same level for very long stretches of time. For the period 1948–79 (both of them peak cycle years) it fluctuated around 83.07 percent, while for the period 1979–2006 (2006 was also a peak cycle year) average utilization was 80.69 percent.[2] Regressions for these two periods show that there is no trend in the data.[3] From an economic point of view, this constancy of utilization over 30-year-long periods of time provides support to the argument that the rate of utilization is exogenous to demand in the long run. Demand plays a role only in business cycle frequency and drives the oscillations of the data around the average.

[2] In Nikiforos (2016, sect 4.1), I use the periods 1948–80 and 1980–2007. The results are similar, but the periodization used in this paper is more consistent because it uses peak cycle years.
[3] The averages in the figure come from these regressions. For the first period the coefficient for the trend is 0.000191 with a p-value of 0.9867, while for the second period the coefficient for the trend is -0.008693 with a p-value of 0.4191.

Figure 1: The FRB Measure of Capacity Utilization



However, as I argued in Nikiforos (2016, sect. 4.2), the FRB data tend to be stable because of their method of construction and the purpose of the related measure, and therefore cannot answer how utilization behaves in the long run. As it is explained in several related papers, the purpose of the FRB measure is to capture the amount of resource *slack* in the economy (e.g., Morin and Stevens 2004). In turn, in the way the underlying data are constructed, slack is treated as a cyclical variable that can capture possible inflationary pressures and demand for capital goods (Morin and Stevens 2004; Federal Reserve 2019b). Inflationary pressures and demand for capital goods are not a function of normal utilization, but rather of the distance between actual and normal utilization.

Seen from another angle, the first sentence of the methodology section on the Federal Reserve's (2019) website reads as follows (emphasis in the original): "The Federal Reserve Board's capacity indexes attempt to capture the concept of *sustainable maximum output*, the greatest level of output a plant can maintain within the framework of a realistic work schedule after factoring in normal downtime and assuming sufficient availability of inputs to operate the capital in place." The "sustainable maximum output" definition of capacity is an economic definition—as opposed to an engineering definition.[4] It is the level of capacity that minimizes the unit costs or maximizes the profits of production. If demand or any other factor would increase both production and the optimal level of output, the change would not be reflected in the measurement of the utilization rate based on such definition of capacity.

At a practical level, the FRB utilization rate is based on the Survey of Plant Capacity (SPC) conducted by the US Census Bureau. Plant managers are asked to report the "*full production capability* of their plant—the maximum level of production that this establishment could reasonably expect to attain under *normal* and *realistic* operating conditions fully utilizing the machinery and equipment in place." As I discuss in Nikiforos (2016, sect. 4.2), "normal and realistic conditions" is an ambiguous term. If a firm operates for a long time under a single-shift (40-hour per week) system, then these are its normal and realistic conditions. If for some reason production increases and a second shift is added and is maintained for a long period of time, the two shifts are the new normal. This change will not be reflected in the reported utilization rate.

The possibility that the "definition" of normal in the plant managers' answers might change in this way was confirmed to me in personal correspondence by Federal Reserve economists who are involved in the creation of the index. In addition, there is other evidence that points toward such an interpretation of the survey's results and the FRB measure of capacity and its utilization.

Doyle (2000) provides a detailed discussion of the 1989 change in the definition of capacity in the SPC questionnaires. It was in that year that the SPC started asking about the "full production" capacity. Up until then, plant managers were asked to report "preferred" capacity, which refers to a clearly economic definition of capacity as discussed above, and "practical" capacity, which corresponds more closely to the engineering concept of capacity. She compares the surveys using different techniques and concludes that "the results point to a

[4] For references to the various definitions of capacity, see Nikiforos (2016, 438–39).

one-to-one mapping between full utilization and preferred utilization" (Doyle 2000, 2). Raddock, who for many years produced the papers on the annual revisions of the capacity and utilization measures for the FRB's division of research and statistics, writes in one of them: "production indexes, especially at major cyclical peaks provide floors and suggest ceilings in calculating the capacity indexes" (Raddock 1985, 760).

The ambiguous definition of capacity has been repeatedly highlighted. Taubman and Gottschalk (1971, 451), referring to the utilization measure based on the McGraw-Hill Spring Survey of Business Plans for New Plants and Equipment, which preceded the SPC, write that: "[it] allows each firm to define capacity as it wishes. Thus, the measure is vague and ill-defined and, while attempts have been made to correct these deficiencies, it is not clear how successful they have been."

The McGraw-Hill Survey ran from 1955 to 1988 and was the source of the FRB data for the early postwar decades. The US Census Bureau survey that is used today started in 1974, so there was an overlap of 14 years. The estimates of capacity from the US Census Bureau's surveys were adjusted to levels that maintained consistency with the McGrawHill survey: "In general, simple level adjustment achieved this broad consistency. In some cases, *both level and trend adjustments* were required because the utilization rates based on the Census survey trend lower over time than those based on the McGraw-Hill/DRI survey" (Raddock 1990, 491, emphasis added). It is important to take these adjustments into account when we try to interpret the FRB data.

In a paper titled "Assessing the Federal Reserve's measures of capacity and utilization," Shapiro (1989, 187–8, emphasis added) concludes that "[the FRB] estimate capacity so that *production does not exceed capacity* (except in rare instances) and so that *production is not chronically below 'normal' capacity utilization*. The consequence of these adjustments is, *as the Federal Reserve's documentation makes clear, that the published utilization figures should be given no cardinal interpretation*."

A few years later he adds that “the Federal Reserve Board’s capacity utilization rate provides a convenient, *detrended* source of data on production. Capacity utilization is the ratio of production to a smooth measure of capacity output. [fn. 22]: *Hence the Federal Reserve Board’s capacity utilization rate is not a direct measure of capital utilization*” (Shapiro 1996, 91, emphasis added).

All of the above show that the FRB measure of capacity utilization is not the right measure for long-run variations in utilization. This is not because of any kind of measurement error and it does not mean that it is a wrong measure. Instead, its method of construction and its purpose are different.

One final point needs to be discussed before moving on. Despite its method of construction, the FRB measure has had a slightly negative trend over the last four decades. As we can see in figure 1, the average for the period 1979–2007 is 2.4 percent below its average during the 1948–79 period. Also, over the last two recoveries the level of the rate of utilization has not recovered to its post-1980 peaks. Why is this happening? There has not been a definite answer yet. A recent note by Pierce and Wisniewski (2018) is conclusive only in *ruling out* some potential explanations (such as shifts in industry weighting, or differences between continuing and entering/exiting establishments). Bansak, Morin, and Starr (2007) attribute the decline to technical change, which makes it easier to increase or decrease production and encourages firms to install a broader margin of excess capacity. This is enhanced by high-tech-capital price declines that make excess capacity cheaper.

Another potential explanation, as I mention in Nikiforos (2016, 445), is that despite the FRB’s various adjustments, some of the decline is due to changes in the data sources and the way the series are constructed. This might have to do with the switch from the McGraw-Hill to the SPC, or changes to the SPC over time. Bauer and Deily (1988) write that “even though the Federal Reserve strives to construct capacity utilization series that are consistent over time, such consistency is difficult to achieve. Major institutional and technological changes have occurred in the past and are certain to continue in the future, possibly affecting the degree of tightness a given capacity utilization rate represents." Morin and Stevens (2004, 8–9) add that "before 1982, the SPC undercounted idle plants, and, consequently, reported industry-level utilization rates that were higher in downturns than would otherwise have been the case (although this has been difficult to detect statistically)."

Finally, the decline might also be associated with lower demand. In a related query, FRB researchers replied to me that the decline in utilization is most notable for some industries that have experienced increases in import competition, such as apparel. In the previous hypothetical example, imagine a plant that can only run in eight-hour shifts, using a certain number of workers for each shift (meaning that the shifts need to be fully staffed).[5] Permanent drops in demand that induce changes in the number of shifts will lead to a change in the definition of full production capacity. However, imagine that there is a drop in demand that is not enough to induce a switch from two shifts to one, so that the plant runs two shifts below full capacity, or a situation where the plant runs one shift and there is a drop in demand, but it is still profitable to produce. It is possible that these sorts of demand effects are captured in the FRB measure.

Notice that to the extent that this is the case, the FRB measure points toward an endogenous-to-demand utilization rate. Be that as it may, and for the reasons outlined in this section, the FRB measure is not able to capture the bulk of utilization's variation over time. This becomes obvious when we compare it with the measure of the AWW.

[5] This type of technology is usually called "pure assembly" technology (Mattey and Strongin 1997).

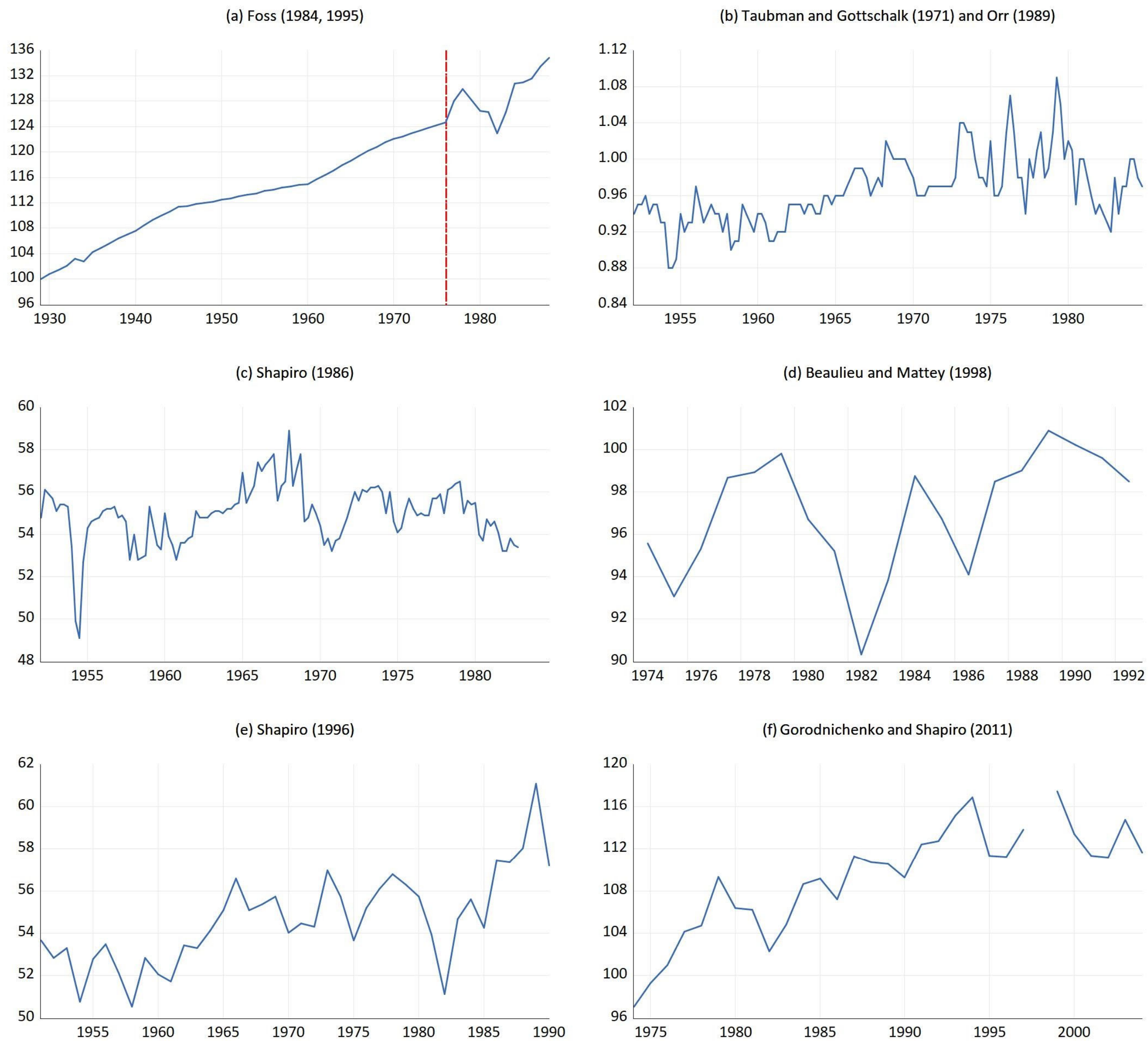
3. THE AVERAGE WORKWEEK OF CAPITAL (AWW)

The AWW is a more appropriate measure of the long-run variations of the utilization of capital. It avoids a lot of the ambiguities of the FRB measure because the maximum time a plant can run during a week is 168 hours, which provides a fixed and unambiguous basis. In turn, the rate of utilization is the number of hours a plant runs per week divided by 168. The ambiguities of the definition of "normal" conditions do not appear here.

The AWW measure is not without problems. The most important is that utilization can change either through changes in the time that capital is utilized or through changes in the speed of its operation and this measure does not take changes in a plant's operation speed into account. In principle, every plant can adjust its utilization through both time and speed. However, depending on the specific technology of production, the startup and shutdown costs of a plant may vary. Industries where these costs are high are usually called "continuous industries," and tend to adjust utilization through changes in the speed of operation. The most common examples of this type of industries are chemical plants or plants with blast furnaces. On the other hand, variations in time of operation are the margin of adjustment in industries with low startup and shutdown costs (e.g., Mattey and Strongin 1997).

Even with these qualifications, the AWW is still better suited as a measure of long-run utilization. Figure 2 presents six different estimates of the AWW by: a) Foss (1984, 1995); b) Orr (1989), who follows closely the methodology of Taubman and Gottschalk (1971); c) Shapiro (1986); d) Beaulieu and Mattey (1998); e) Shapiro (1996); and f) Gorodnichenko and Shapiro (2011). The details and the statistical properties of these series have been extensively discussed in Nikiforos (2016, 2019), so I will not get into them here. It suffices here to point out that the AWW presents a markedly different picture compared to the FRB measure of utilization.

Figure 2: Estimates of the AWW



4. THE NATIONAL EMERGENCY UTILIZATION RATE (NEUR)

Another measure of utilization that is useful for evaluating the long-run behavior of the normal utilization rate is the so-called NEUR, which is published by the US Census Bureau. This measure is only available for the period after 1989, which probably explains why it has been ignored in the related literature. It was recently unearthed in a paper by Gahn (2020).

The NEUR is also based on the Census's SPC. After asking plant managers to report their plant's "full production capability," the survey also asks them to estimate their *national emergency production*, which is much closer to an engineering measure of production.[6] The NEUR is calculated as the ratio between actual and national emergency production. Compared to the AWW, the advantage of this utilization measure is that it can also capture variations in the *intensity* of the use of productive resources and not only in the *time* they are being used.

The Census reports this estimate of utilization for the period 1989–2019, with the break in the years of the crisis (2007–9). These estimates are presented in figure 3. The left panel of the figure presents the NEUR in levels. As one would expect, NEUR is lower than the FRB rate since national emergency production is, by definition, higher than (or equal to) full production capability. At the same time, it is far less stationary compared to the FRB measure. For example, in the 1990s, the NEUR decreased by 26 percentage points, while in 2019 it was more than 14 points below its level in 1989.

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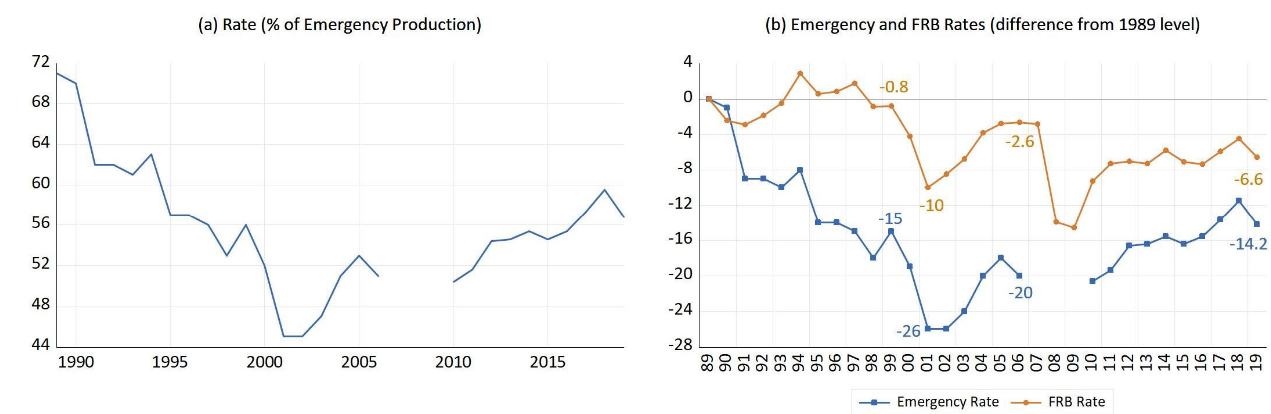
[6] More precisely, per the US Census Bureau (2018, 5), in estimating this, national emergency production managers are specifically instructed to: "(i)Assume full use of all machinery and equipment in place (including machinery and equipment that would require extensive reconditioning before they could be made operable); (ii) Assume minimal downtime and multi-work shift operations; (iii) Assume plant production as close to 168 hours per week as possible, including extra shifts (e.g., operating 7 days per week, 24 hours per day less minimal downtime); (iv) Assume overtime pay, availability of labor, materials, utilities, etc., are fully available to you and your suppliers; (v) Assume you can sell all your output; (vi) Assume your product mix can change; (vi) Assume increased use of productive facilities outside the plant for services (such as contracting out subassembly work) in excess of the proportion that would be normal during the quarter."

Figure 3: The US Census National Emergency Utilization Rate



The difference between the two measures becomes clearer in the right panel of figure 3, which plots the change in the NEUR and FRB utilization compared to their levels in 1989. As we can see, in 1998, the NEUR was 15 percentage points below its 1989 level; the FRB rate was only 0.8 percentage points lower. In 2001, at the trough of the cycle, the NEUR had lost 26 points, while the FRB rate only lost 10 points. In 2006, the year before the 2007–9 crisis, the NEUR rate was 20 points below its 1989 level, while the FRB rate only 2.8 points below. Finally, in 2019 the NEUR had lost 14.2 points, while the FRB rate only lost 6.6 points.[7]

Because national emergency production is definitionally higher than full production capability (and thus the denominator in the NEUR is higher than the FRB rate), all other things equal, a certain change in actual output would lead to a bigger change in the FRB rate compared to the NEUR. For example, assume that the full production capability of a plant is 200 units, and its national emergency production is 400. If actual output is 100, the full production utilization rate is 50 percent, while the NEUR is 25 percent. If actual output falls to 50, the full production utilization rate decreases to 25 percent (it loses 25 percentage

[7] The Census also publishes a "full production" utilization rate, which, despite some short-run differences, is close to the FRB rate. For example, in 2019, the full production rate was 6.6 percentage points below its 1989 level—the exact same change as the FRB rate.

points), while NEUR decreases to 12.5 percent (it loses "only" 12.5 percentage points). Thus, if the changes in the utilization rates were only due to changes in actual output, while the ratio of full production capability to national emergency production remained constant, we would expect the exact opposite of what we see in figure 3b.[8]

This is another piece of evidence that confirms section 2's conclusions, namely that full production capability adjusts toward actual production, therefore, by construction, the FRB rate tends to be stationary because it is based on this measure of productive capacity. Given this, the FRB rate is not an appropriate measure for the long-run trajectory of the normal rate of utilization. Using the NEUR in conjunction with the AWW can provide better insight into utilization's long-run behavior. Additionally, the differences between the NEUR and AWW can shed some light on the importance of different margins of adjustment.

5. SHOULD UTILIZATION BE STATIONARY?

The FRB measure's stability has been often used as evidence that utilization is exogenous to demand. There is a long series of contributions that in one way or another write that the stationarity of the FRB measure of utilization stands against neo-Kaleckian models that predict an endogenous-to-demand rate of capacity utilization.

However, even if utilization is exogenous to demand, should we expect it to be stationary? The theory of utilization points to a series of factors other than demand that determine utilization. The most common are related to technology, costs, and market structure (see Kurz [1986], and Nikiforos [2013], and references therein). More precisely, the related literature has identified the following determinants of utilization:

[8] Interestingly, Gahn (2020) looks at these data and concludes that the NEUR and the FRB rate are similar!

i. Capital intensity.
ii. Relative prices of labor and capital.
iii. The rhythmic variation of input prices. A special case of this is the so-called "utilization differential" (a wage premium that is paid to workers who work over the "normal" working hours).
iv. Rhythmic variations in demand.
v. Economies of scale.
vi. The degree of monopoly in the market.

All other things equal, higher utilization is the result of higher capital intensity, a higher relative price of capital, lower rhythmic variation of input prices, a lower level of economies of scale, and a lower degree of monopoly.

A stationary rate of utilization over the long run would imply that all these factors evolve in such a way that utilization remains stationary. However, it is not clear why that would happen, unless by a fluke.

If one is ready to accept that such a strange coincidence of all these factors is likely, then demand could be one of these factors as well. In this case, the stationarity of utilization is not evidence of an exogenous-to-demand utilization rate. If we do not think this coincidence is likely—and I do not see why it should be—we should not expect that utilization should be stationary in the long run.

This has a series of implications. First, it is a theoretical reason why the FRB measure is inappropriate for measuring long-run variations in utilization and justifies the analysis of section 2 of this paper from a different perspective. Second, it makes clear that the use of the FRB measure's long-run stability as evidence for an exogenous-to-demand utilization is inconsistent with the theory of utilization. For example, in the context of the utilization controversy, the FRB measure—with the qualifications discussed in section 2—is not consistent with a firm like the one described Nikiforos (2013), where demand plays a role, but it is also not consistent with the firm described by Kurz (1986), where demand plays no role.

Finally, this also implies that nonstationary equilibrium is a necessary but not sufficient condition for the endogeneity of utilization to demand in the long run. The investigation of the question of whether demand contributes to the nonstationarity of utilization is, I think, more interesting for future research. I provided a first answer in my econometric analysis in Nikiforos (2016, sect. 7), but more can and should be done.

6. HOW LONG IS THE "LONG RUN"?

The debate around whether utilization is endogenous or not refers to the long run. However, it is not clear what the precise duration of this long run is in historical time. For example, the system in Duménil and Lévy (1999) is brought to its classical long-run state through countercyclical monetary policy, which implies a long run equal to the duration of the business cycle. The same is true for those who use the FRB data as evidence of an exogenous rate of utilization because the FRB data gravitate around a certain mean over the business cycle. To put this in context, according to the US National Bureau of Economic Research's (NBER) Business Cycle Dating Committee, the average duration (trough to trough) of the 33 cycles of the period 1854–2009 was 56.2 months—slightly below five years.[9] This has increased to 69.5 months—or roughly seven years—in the 11 cycles of the postwar period (1945–2009).[10] Others have suggested a slightly higher number. For example, Vianello (1985, 71) gives a hypothetical example where an economy finds itself in a fully adjusted position and returns to a fully adjusted position "after a period of, say, ten years." Still others do not specify a number. For example, Kurz (1986, 40) writes that "it cannot be precluded

[9] The business cycle reference dates as estimated by NBER's Business Cycle Dating Committee can be found at https://www.nber.org/cycles.html.
[10] This number will further increase when the current cycle is included, since this recovery recently became the longest in the US history.

that deviations of the actual situation from the 'normal' one, may become large, and remain so for a long period of time."

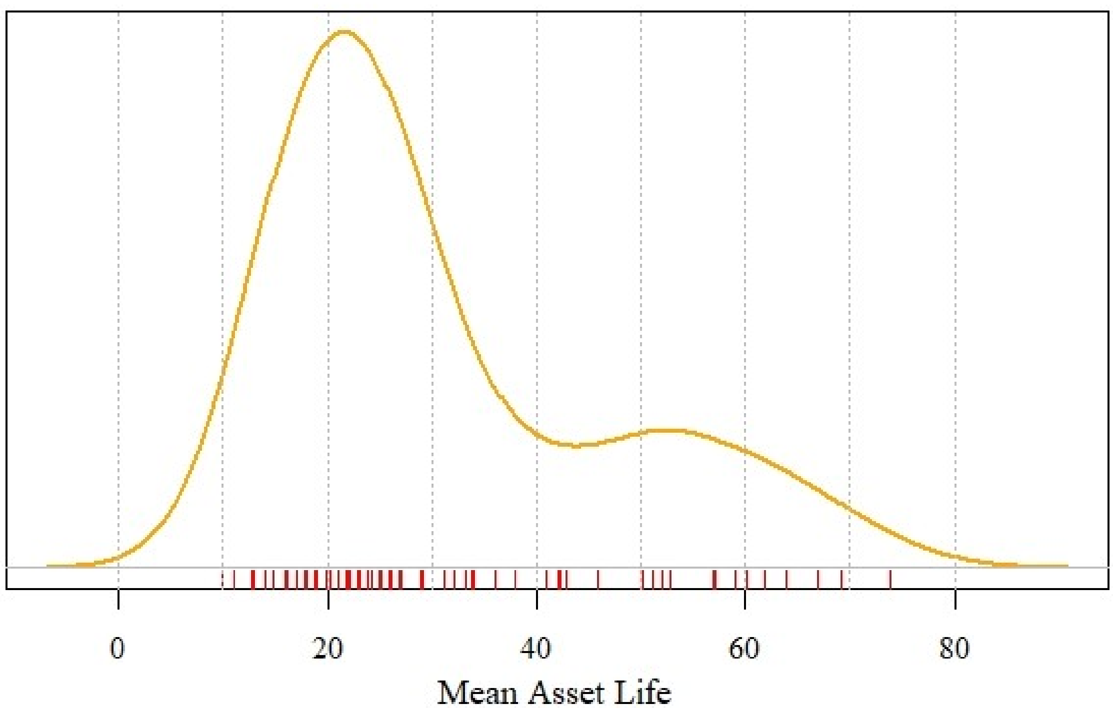
Thus, the question remains: How long? To approach this issue, one can start from the firm level. At every period of time, a firm that maximizes its profits (or minimizes its costs) makes two decisions related to accumulation and utilization, namely:

> **1.** If it will invest or not. This investment decision is affected by various factors, such as profitability, internal and external finance, the state of the firm's balance sheets, etc. Importantly, the investment decision will depend on current utilization of capital but also the useful life of the capital stock. Higher utilization will, ceteris paribus, increase the chances that a firm will invest. At the same time, the higher the capital stock's remaining useful life is, the lower the chances that the firm will invest.
>
> **2.** If the answer to the first decision is positive, then the second decision has to do with how much it will invest and how much this new capital stock will be utilized. As was explained above, these two decisions—size of investment in and utilization of the new capital stock—are intertwined.

The distinction between the two decisions is important. Since the capital stock is durable, after the firm has invested in a particular type of capital, the cost of this capital is sunk, with obvious implications for the choice of the optimal system of production. In other words, after investment has been realized, even if the firm can change its capital stock by investing or disinvesting (so that we are not in the short run where the capital stock is constant), it will tend to adjust its productive capacity to demand by adjusting its utilization much more compared to a situation where it needs to invest. It is in the latter case that there is the usual trade-off between a single and a double shift, and therefore between a lower average cost of capital and a higher cost of labor or other factors of production.

Hence, the debate about normal utilization and fully adjusted positions, and the related discussion about how the firm specifies its normal utilization (e.g., Kurz 1986; Nikiforos 2013, 2020), refers only to the second decision. It refers to a very long period, where all capital is free to take any physical form. In other words, it refers to a situation in logical time where the system is in a fully adjusted position and there is a shock that is followed by a period where time passes so that all (or most) firms exhaust the useful life of their capital and they need to invest again. An obvious way to measure the duration of this process in actual historical time is with data on the useful life of capital stock.

Figure 4: Kernel Density Estimation of the Mean Asset Lives by Industry (weighted by investment) for the United Kingdom (2000–13)



Source: Rincon-Aznar, Riley, and Young (2017: table A.6)
Summary statistics: Min: 10; 1st Quintile: 19; Median: 25; Mean: 30.57; 3rd Quintile: 39.50; Max: 74.00.

The literature on the useful life of capital stock (e.g., Blades et al. 1983; Rincon-Aznar, Riley, and Young 2017) estimates that the life of tangible assets varies from the low end of 7–10 years for "office equipment and hardware" and "motor vehicles," to more than 15–20 years for machinery, and more than 40 years for various kinds of infrastructure. Figure 4 summarizes the estimates by Rincon-Aznar, Riley, and Young (2017) for 87 industries in the United Kingdom for the period 2000–13. According to this data, the industry with the shortest average asset life is air transport (10 years). However, only 20 percent of industries have an average asset life below 19 years. The median and the mean are 25 years and 31 years, respectively. And 40 percent of all industries have an average asset life above 40 years. What these data show is that, in relation to capacity utilization, in actual historical time the long run refers to a period longer than two-and-a-half to three decades.

This has some important implications. A short run of 20 to 25 years is a pretty long short run. Given, that in actual historical time the economy is constantly subject to shocks of different types, for many economic problems, such a long run becomes irrelevant. It is probably this kind of considerations that led Joan Robinson to oscillate between looking for a theory of the long run and then repudiating Garegnani's (1978) conception of the long period as floating "above historical time as a Platonic Idea."

7. CONCLUSION

The present paper discussed some empirical issues related to the long-run evolution of normal utilization. It made three points. First, following Nikiforos (2016), it provided a detailed examination of the FRB measure of capacity utilization and showed that it should be regarded as a cyclical indicator rather than a measure of long-run variations of normal utilization. Two measures that are more appropriate are the AWW and the NEUR. Second, it explained that a relatively stationary measure of utilization is not consistent with any theory of the determination of utilization. Finally, it was argued that when we talk about the long run in the context of fully adjusted positions, we refer to a time horizon of close to 30 years or more. This puts some of the related debates into perspective. For many economic problems in actual historical time, such a long run becomes a Platonic Idea.

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