Fiscal Policy in Capital-Based Macroeconomics with Idle Resources

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Abstract

While Roger Garrison's time structure of production model has been mostly used to theoretically and empirically analyze business cycles, other potential venues have not been explored. The effects of fiscal policy is one of these applications. We show how Garrison's model can be used to analyze the effects of fiscal policy in the presence of idle resources. This analysis yields two important results. Particularly, our application of Garrison's model shows that even if, starting with idle resources, fiscal policy manages to reach potential output, the result is imbalances in resource allocation in the economy's structure of production.

I. Introduction

Roger W. Garrison (2001) developed a framework to challenge the efforts of John M. Keynes (1936) and his followers, especially those bound to the IS–LM model. Garrison's main contribution to this type of macroeconomic modeling is adding the time factor with the aid of the Hayekian triangle to represent a "time structure of production" (explained later). Garrison follows Hayek's insight in pointing out that there can be a disequilibrium in the time structure of production *even if* the macroeconomic aggregates suggest full employment. Garrison's model is mostly used to illustrate the effects described by the Austrian business cycle theory (ABCT) and to

compare, within this model, the ABCT with other business cycle theories like monetarism and Keynesian theories.[1]

Garrison's framework, however, can be applied to scenarios other than a monetary policy-induced business cycle. In fact, Garrison (2001, chap. 5) remarks on the expected results of a fiscal, rather than monetary, policy. His model has been extended to different applications like the Phillips curve, equilibrium with unemployment, and open economies (Kollar 2008; Ravier 2011, 2013).[2]

Keynesian policies, however, resort to fiscal policy and not only to monetary policy. The fiscal policy tool has remained largely understudied in Garrison's framework. In this paper, we contribute to filling this gap in two ways. First, we use Garrison's model to show the effects of fiscal policy rather than the usual effects of an expansionary monetary policy that derives from the ABCT. Second, we assume the presence of idle resources rather than starting from an assumed equilibrium with full employment. The reason for this is that Keynesian policies are assumed to be useful in the presence of idle resources, not in equilibrium, when the problem that Keynesian policies seek to fix is already solved. We demonstrate that Garrison's model shows that even with idle resources, there is a misallocation of resources in the time structure of production when a Keynesian stimulus is put in place. We note that this is not the traditional use of Garrison's model, and we expect that this setting contributes to a better dialogue between competing models that do not consider full employment a plausible assumption. No attempt, to the best of our knowledge, has been made to capture in Garrison's model the effects of fiscal policy with the same starting condition assumed by Keynes.

Section 2 summarizes Garrison's treatment (2001, chap. 5) of the effects of fiscal policy. Section 3 modifies his treatment by assuming idle resources and that government expenditure is allocated to public investment. Section 4 repeats the exercise in the previous section but assumes that government expenditure is allocated to consumption. Section 5 compares the time structure of production with full

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[1] For a comparison of the ABCT with other business cycle theories (not in the context of Garrison's model) see Sechrest (1997) and Shah (1997).
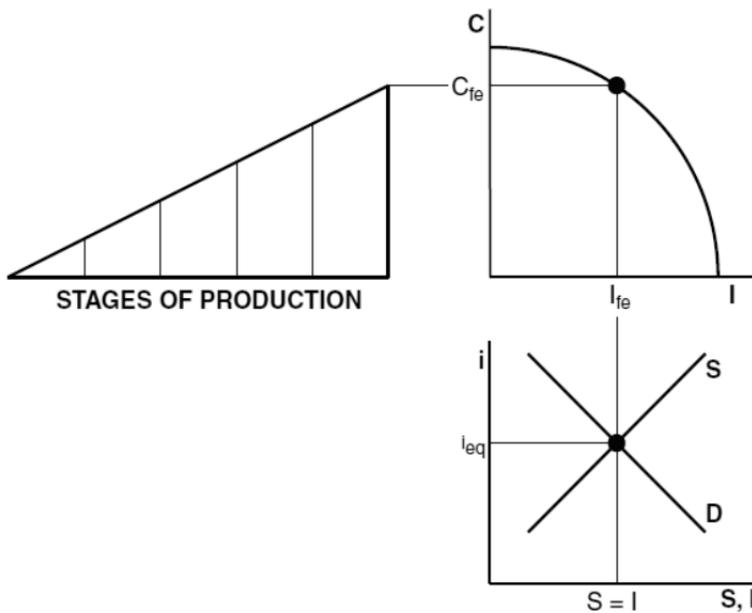
[2] Garrison's is only one of a number of different potential representations of the ABCT. Garrison's model should not be confused with the ABCT itself. For a sample of a different treatment of the ABCT, see Cachanosky and Lewin (2014a), Cachanosky (2014), Hoffmann (2010), and Mulligan (2006, 2014).

employment under Keynesian policies and under a free economy. Section 6 concludes.

II. Garrison's Treatment of Fiscal Policy

The value added of Garrison's model (figure 1) is that with a set of simple graphs, he systematizes the relationship between key variables like savings, investment, interest rate, consumption, the production possibility frontier (PPF), and time. Garrison, then, can show that economic imbalances may occur in one dimension (i.e., time) but remain concealed on other dimensions (level of GDP).

Figure 1. Garrison's model

Source: Garrison (2001, fig. 3.7)

　　The graph at the bottom of figure 1 represents the market of loanable funds. The equilibrium in this market defines the level of savings (which equals investments) and the interest rate level. Note that this model simplifies a term structure of interest rates into one representative interest rate. With the PPF (shown in the graph above the market of loanable funds graph), the level of investment defines the level of consumption. To the left of the PPF is the Hayekian triangle. The vertical axis captures consumption, and the horizontal axis captures the "time structure of production" composed of

different stages of production.[3] The stages of production are assumed to be ordered in a way that the production of the first stage is used as an input in the second stage of production, and so on until the final stage, consumption, is reached. The slope of the triangle is defined by the market interest rate. Therefore, as we move from left to right, the slope of the triangle shows the minimum value added required by each stage to compensate for the opportunity cost of the time taken to produce (for simplicity, the slope of the triangle, by being a straight line, does not assume compounding interest). The left corner of the triangle shows the total period of production and the middle of the base of the triangle shows the average period of production. Surely, a healthy economy that is in equilibrium also requires that resources are efficiently allocated along the different stages of production to avoid bottleneck effects and overproduction of particular capital goods.[4] This way, Garrison's model ties shocks to the market of loanable funds to the PPF and also to the time structure of production.[5]

In chapter 5, "Fiscal and Regulatory Issues," Garrison introduces the public sector into the model to show the consequences of fiscal policy on the economy. Garrison is not questioning well-established effects like crowding out, but complements the treatment of this effect with the time structure of production captured in the Hayekian triangle. Among the possible scenarios of fiscal policy, Garrison studies the effects of inert spending (i.e., monuments to political leaders) or consumption.

If the government issues debt, the demand curve in the market for loanable funds shifts to the right, increasing the interest rate and the quantity supplied of loanable funds traded. This shift has two consequences. One, the rise in the interest rate discourages consumption (and encourages savings); two, the government's participation in the market produces a crowding out effect. Even if

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[3] The horizontal axis does not capture pure time, but value time (or labor (units) time). For instance, one dollar (or unit of labor) invested for six years equals two dollars (or units of labor) invested for three years.

[4] For a more detailed discussion of Hayek's triangle and the average period of production (roundaboutness), see Cachanosky and Lewin (2014b) and Lewin and Cachanosky (2014).
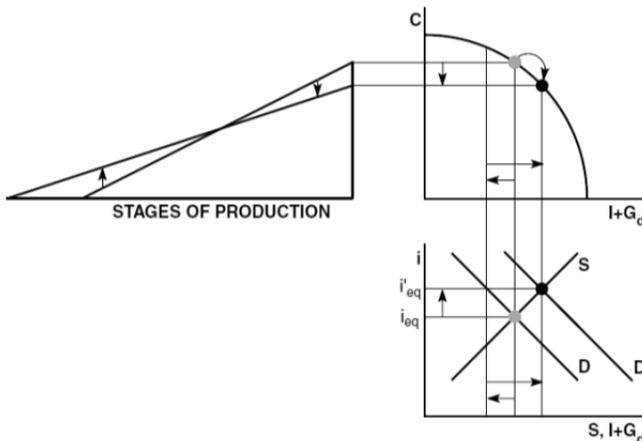
[5] Garrison's treatment of the ABCT has been the reference of most of contemporary empirical research on the ABCT (Lester and Wolff 2013; Luther and Cohen 2014; Mulligan 2002, 2005, 2013; Powell 2002; Young 2005, 2012). For studies that apply the ABCT to the housing bubble, see Iqbal and Vitner (2013) and Ravier and Lewin (2012).

total savings increase due to the rise in the interest rate, savings allocated to the private sector fall by the amount demanded by the government:

> First and most straightforwardly, the government can borrow domestically. That is, it can borrow from US citizens. Most of the population own Treasury bills and other government securities—if not directly, then through banks, pension funds, and other savings institutions. But if individuals or their savings institutions have lent money to the federal government, then that money is not available for private enterprise. Business firms, which are subject to the discipline of the market, tend to lose out when competing with the government for loanable funds. High interest rates attributable to the government's excessive demand for funds "crowd out" private investors as well as consumers. (Garrison 2001, p. 113)

Figure 2 shows Garrison's treatment of the crowding out effect and its impact on the time structure of production. The assumption is that the government issues debt to finance infrastructure investment in the early stages of production (to the right corner of the triangle). This assumption explains the apparent contradiction between a rise in interest rates and a lengthening of the time structure of production. A fall in consumption represents minor benefits for companies operating close to consumption, freeing resources to be allocated in early stages of production. Hayek's triangle presents a vertical contraction and a horizontal expansion to show these effects.

Figure 2. Borrowing to finance infrastructure

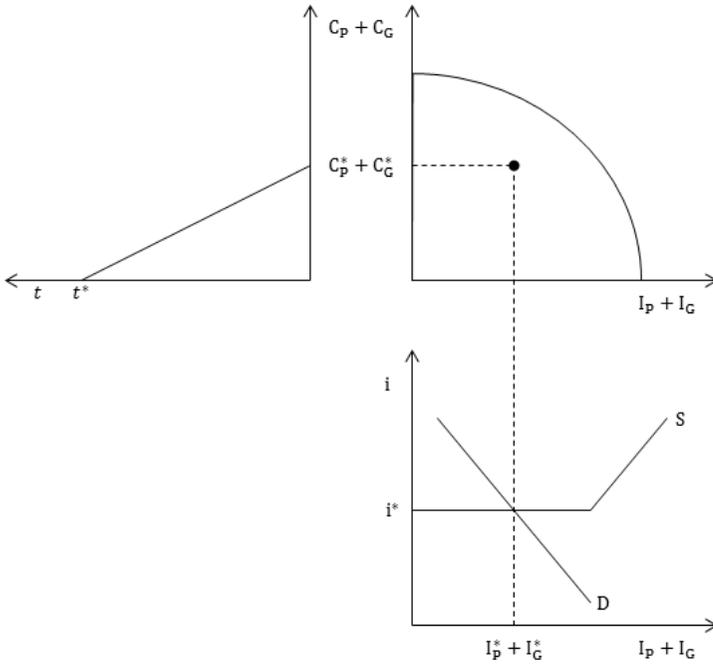

Source: Garrison (2001, fig. 5.4)

III. Government Investment with Idle Resources

Our alternative representation has an important modification. As proposed elsewhere (Ravier 2013), we analyze fiscal policy starting from unemployment or idle resources. It is in this situation that Keynesian stimulus through fiscal policy presents its strongest case, not when there is full employment. Precisely, the idea of policies that stimulate aggregate demand is to achieve full employment in the context of unemployment. Because of idle resources, and following Keynesian assumptions, we depict a horizontal supply of loanable funds. This depiction captures the fact that an increase in demand for loanable funds with idle resources should not affect the interest rate until full employment of resources is achieved; at this point, the supply curve becomes upward sloping. As a consequence, the crowding out effect disappears because the use of idle resources does not crowd out resources already allocated in the market. This setting also controls for crowding out effects and the results shown correspond to fiscal policy only.

We also modify how consumption and investment are depicted in the PPF graph. Instead of showing a trade-off between private consumption and investment, we propose a trade-off between the sum of private and government consumption with respect to the sum of private and government investment. This allows us to show not only the impact on the share of total consumption with respect to total investment and the impact on the time structure of production, it also allows us to show the share of government size (in terms of expenditures) on total consumption and investment; namely, to capture crowding out effects. Figure 3 shows our modification to Garrison's model. The economy is situated inside the PPF and consumption (C) and investment (I) are distinguished as private (subscript P) and government (subscript G).
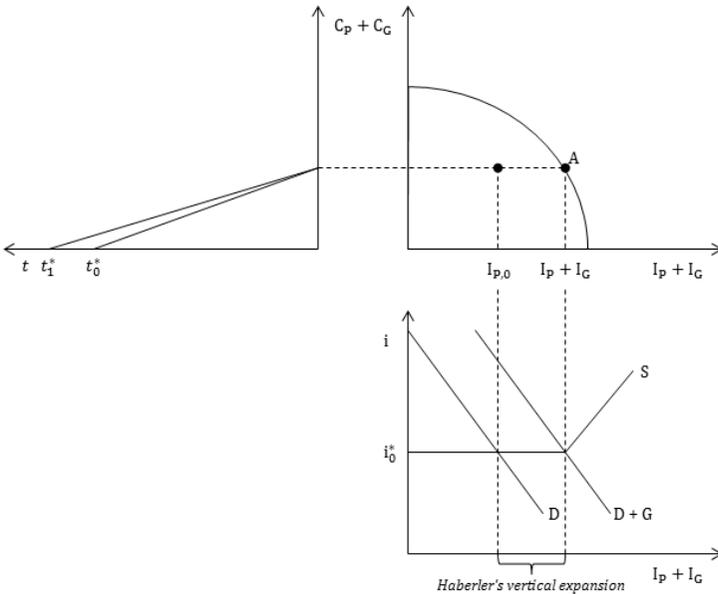
We now have a setting closer to that envisioned by Keynes. Assume now that the government increases spending by amount G and that the demand of loanable funds shifts by this amount to the right up to the point of full employment. Resources do not need to be reallocated from the private sector because there are idle resources waiting to be put into use. Figure 4 shows the result. The economy starts at a point inside the PPF and moves to point A.

Figure 3. Garrison's model with idle resources

Source: Authors' image.

Figure 4. Public spending in infrastructure with idle resources

Source: Authors' image.

If the interest rate does not change, why does the Hayekian triangle show a lengthening of the production period? Following Garrison's treatment, we assume that the investment in infrastructure takes place in the early stages of production and therefore the total period of production increases *despite* the interest rate remaining the same. The contradiction between the interest rate not changing and the slope of the triangle changing suggests that government investment is unprofitable at the market discount rates. An alternative treatment would be to assume that government spending occurs along the Hayekian triangle, rather than only during early stages of production. This would be the analogous to Haberler's (1937, pp. 110–13) horizontal distortions, where the malinvestment occurs by investing *too much at the same level of roundaboutness* instead of a vertical distortion where investment *increases the level of roundaboutness*.[6] This effect cannot be shown in the Hayekian triangle, which is designed to capture *vertical* malinvestment. In the traditional ABCT case, the lengthening of the production period occurs as a market reaction to lower interest rates. In this case, it occurs as the result of government investment in the early stages of production or in overly capital intensive projects.

In our graphs, we assume that fiscal policy stops at the point of full employment, where the economy reaches the PPF and the supply of loanable funds becomes upward sloping. To continue the fiscal policy at this point would trigger crowding out effects and an increase in the interest rate, adding more resource-allocation distortions to the ones already incurred under this policy. We do not expand on this case; we want to show the distortions that take place by allocating idle resources, not due to crowding out effects. A first approach to the crowding out effects can be found in Garrison (2001, chap. 5).

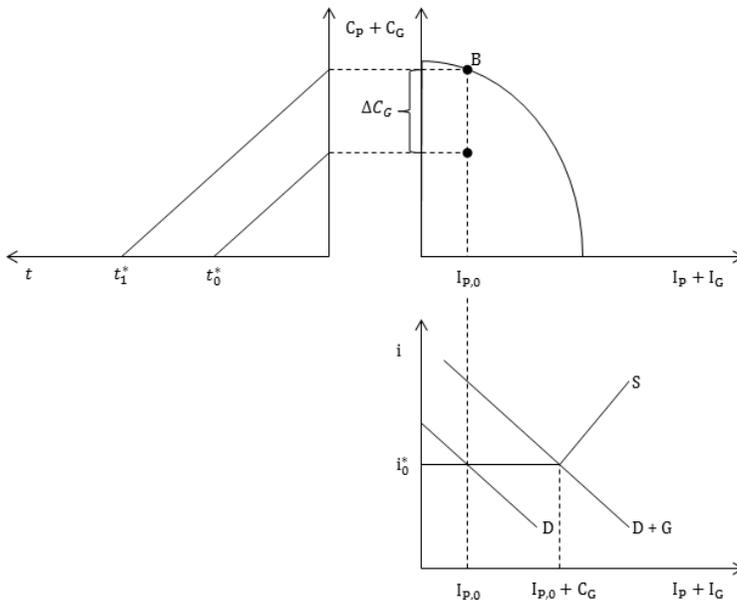## IV. Government Consumption with Idle Resources

We turn now to the case of an increase in government consumption financed through government debt. Instead of an infrastructure plan, the government spends its resources on New Year's Eve fireworks or on music recitals open to all citizens: expenditures that are not expected to increase the capital stock of the economy. The treatment of this case in Garrison's framework, however, is not as

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[6] Cachanosky (2014) uses these two types of distortions to capture the effects of the ABCT in the context of open economies with fiat currencies and exchange rates.

straightforward as the previous case because the horizontal axis in the market of loanable funds and the PPF measure investment, not consumption. Therefore, an increase in demand for loanable funds from the government implies, by construction, an increase in investment, not in consumption.

A way around an increase in the demand of loanable funds by the government meaning investment would be to leave only private consumption in the vertical axis of the PPF and add government consumption to the horizontal axis. This solution, however, defeats the model's purpose, which is to track the effects of changes in consumption and investment on the time structure of production. Admittedly open to some confusion, we propose the interpretation that the loans granted to the government are "invested" in "consumption"; therefore, the economy situated inside the PPF moves upward to the frontier as consumption increases.[7] Figure 5 shows the effects of this policy starting with idle resources. In this instance, the economy moves from inside the PPF to point *B*.

Figure 5. Public spending, consumption with idle resources

Source: Authors' image.

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[7] Despite the impact Garrison's model had in the Austrian literature, a mathematical version of this model is still lacking. A mathematical treatment of Garrison's model would allow for a more flexible treatment of the model without the constraint of the three dimensions that can be graphically represented.

The Hayekian triangle depicts a parallel expansion due to the increase in total consumption, which lengthens the period of production. In the previous scenario, there is a lengthening of the period of production because government investment is assumed to take place in early stages of production. In this scenario, the increase in consumption also makes profitable investment in early stages of production (the distance between t_0^* and t_1^*).

There is a parallel between the effects of an increase in consumption and an increase in investment. In the former case, the increase in consumption produces a lengthening of the time structure of production. With constant discount rates, an increase in consumption makes earlier stages of production profitable, and investment along different stages of production should take place such that real returns are similar for all stages of production. If it is acknowledged that this increase in investment is unsustainable, then a similar conclusion should be held when government spending is done in "investment." If capital automatically produces a return, then investment either to support higher government spending or due to more government investment should be sustainable. If, however, it is assumed that capital does not produce an automatic return, then government spending cannot be assumed to be sustainable against unsustainable investment when this is driven by consumption.
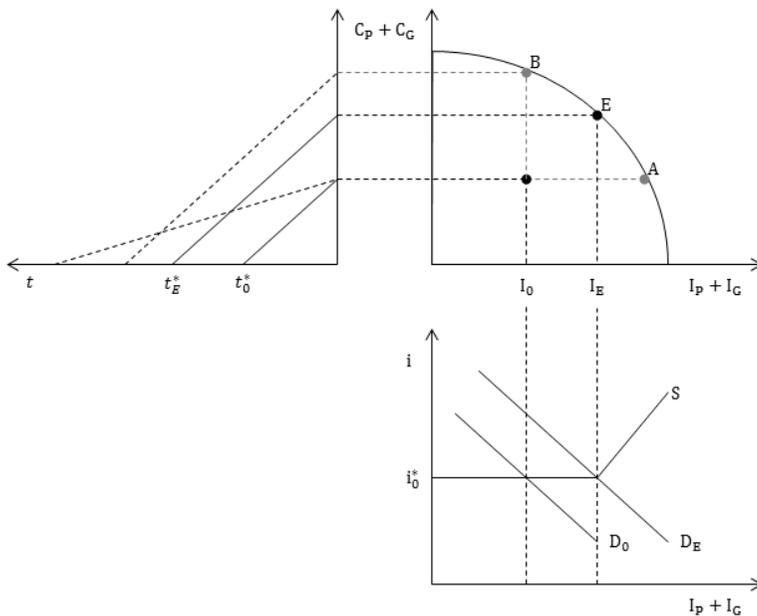
V. Market Allocation versus Keynesian Allocations of Idle Resources: Creating Jobs versus Creating Value

The Keynesian policies studied in this paper raise two issues. First, idle resources are not necessarily unemployed, but searching for the *right* employment. Namely, idle resources are "working" in discarding unprofitable projects. One may wish for the "idle" resources to have already found a profitable project, but forcing them to work through fiscal policy effects does not solve the problem of finding out where resources should be applied, it just employs them in the first (or random) project that the "idle" resource looks at next. To force an inefficient employment of an "idle" resource can have a negative effect on prospective growth rates. In other words, future growth rates depend on whether, in the long run, public investment now is more efficient than private investment later. Second, there is no guarantee that the economy would be at the right point in the PPF frontier. A stable equilibrium requires not only being on the PPF, but

having the right combination of consumption and investment of available resources.

There are two ways idle resources could be allocated. One is through Keynesian policies. The other is through market forces. In the two scenarios discussed previously, all government spending is used either in consumption or in investment. It is to be expected, however, that the market solution would allocate some idle resources to consumption and others to investment. Figure 6 shows a hypothetical market equilibrium marked with point *E* in the PPF that falls in between points *A* and *B* from figures 4 and 5.

Figure 6. Market allocation versus Keynesian allocation of idle resources

Source: Authors' image.

When compared to the market equilibrium, distortions in the structure of production are shown in the case of government investment or government consumption. In the former case, the investment in early stages of production lengthens the structure of production too much. In the latter case, the excess consumption also lengthens the time structure of production too much. In the former case, it is assumed that investment takes place in early stages of production; therefore, the lengthening of the time structure of production is greater than in the latter case. It could be argued that in the former case, the lengthening is a direct result of investing in

specific stages of production, while in the latter case, it is an indirect result of incentivizing consumption beyond market preferences. What needs to be emphasized is that the structure of production gets distorted if the economy is located in the PPF but not at the market equilibrium point. It is not only the level of output that matters, but having the right composition of output. It is not about being in the PPF (full employment), it is about being at the right point of the PPF.

Keynesian policy requires two conditions to be successful in the short run. The first is to aim at point E in the PPF, which is unknown. The second, which escapes the graphical exposition of Garrison's model, is to invest in the *right* projects. These two problems require the presence of the right relative prices, but government participation in the market affects relative prices in a way that is expected to differ from those that would move the economy to point E. If this influence is strong enough, the Keynesian policy will move the economy to any point in the PPF except point E. Even if we assume that the government knows the level of potential output, Hayek's knowledge problem precludes the government from knowing the exact location of point E because the required information exists only in the presence of a market process. Aggregate models cannot answer the second question. Garrison's framework, like Keynesian-inspired models, relies on aggregation. The PPF does not distinguish between the type of capital goods investment taking place or the particular goods being consumed. Malinvestment, not in the sense of an extension in the average period of production, but in the sense of *what type* of capital goods regardless of any effect on the Hayekian triangle, is not an observable feature in Garrison's model.

Our use of Garrison's model, however, does show economic imbalances in the time structure of production that become clear when compared to a market equilibrium. And since government deficits cannot continue endlessly, the process should sooner or later revert to producing the inverse effects in the economy. The manifestation of this effect can be a fall in output as when government cuts subsidies to activities that are unprofitable on their own.

Full employment in itself is unimportant. Creating value is what matters; policy should avoid work bias (Caplan 2007, pp. 40–45). The extreme example of hiring unemployed labor to dig and fill holes is no less valid when fiscal policies create jobs that do not look that

ludicrous at first. The psychological association we make when observing different types of jobs that look *as if* they are producing something valuable (a clerk or a factory that produces something we can see and touch) is silent on whether this job that looks productive actually fails to create value. The building of a factory and the jobs this public spending creates can be as worthless as digging holes in terms of economic value. Economic value, not physical characteristics or appearances, is what matters.

If the efficient allocation of resources depends on relative prices for alternative uses of resources, then the two cases discussed earlier show that regardless of moving the economy to the PPF, there is a misallocation of resources in the time structure of production. Namely, how resources are used in time is inconsistent with the time preference of economic agents. This is a value added that is present in Garrison's model but is absent in other aggregate models that pay no attention to time.

VI. Conclusion

Garrison's model offers a simple and clear framework to analyze the effects of different policies on the economy, particularly the allocation of resources in the time structure of production. Since production takes time, how resources are allocated in time is an economically relevant question.

While Garrison's model has been mostly used to theoretically and empirically analyze business cycles, other potential venues have not been explored. The effects of fiscal policy is one of these applications. In this paper, we show how Garrison's model can be used to analyze the effects of fiscal policy in the presence of idle resources.

The main outcome is that given a situation of idle resources, a Keynesian policy with the objective of reaching full employment produces distortions in the structure of production that remain concealed in macroeconomic aggregates. The information embedded in the Hayekian triangle is not part of key macroeconomic variables like GDP, employment, or price indices. Increasing either government consumption or government investment lengthens the production period. This lengthening is not sustainable at market prices. When the economy reaches the PPF and the Keynesian policy is discontinued, the economy reverts to a point inside the PPF because the structure of production is too long to be sustained at the discount rates (opportunity cost). In addition, it could be argued that

the fall into the PPF might be to a position farther away from the PPF or that the PPF shrinks if, in the process, the Keynesian policy has allocated resources to specific applications from which they cannot be reallocated. All of these effects contribute to a poor future economic performance or become part of a future crisis.

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