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Keynes's Principle of Effective Demand reconsidered: The core of a heterodox post-Keynesian paradigm, or a fundamentalist Keynesian concept that should be abandoned?

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Abstract

Keynes's Principle of Effective Demand is widely recognized not only as a major theoretical innovation but also as one of the core concepts uniting various post-Keynesian strands. However, Keynes's own treatment of the Principle of Effective Demand — known as the Z/D model and identified by himself as central to his attempt to fundamentally refute Say's Law — has been ignored or even outright rejected by many post-Keynesians on the grounds that it remains too deeply rooted in mainstream economics.

This paper addresses such criticism by emphasizing that any evaluation of the Z/D model must take into account the paradigmatic shift Keynes sought to initiate.

JEL codes: B50, E12, E24, J23

Key words: Keynes, Z/D model, principle of effective demand

In Memoriam Paul Davidson (1930 – 2024)

1. Introduction

If one examines the development of the drafts of the *General Theory*, one will find that Keynes significantly altered the first Book 'Introduction' including the first three chapters, before the final published version. Instead of presenting his ontological understanding of the 'world we live in' and clearly contrasting it with the ontology of mainstream economics (with the paradigmatic distinction between a *'monetary production economy'* or *'entrepreneur economy'* versus a *'real exchange economy'*) as was initially intended (see Keynes 1933a), he now describes the 'Principle of Effective Demand' as a key starting point for his rejection of Say's Law (as a postulative distinguishing feature):

> *„I have been making rather extensive changes in the early chapters of my book, to a considerable extent consequential on a simple and obvious, but beautiful and important (I think) precise definition of what is meant by effective demand: -*
> *Let W be the marginal prime cost of production when output is O.*
> *Let P be the expected selling price of this output.*
> *Then OP is effective demand.*
> *The fundamental assumption of the classical theory, 'supply creates its own demand', is that OW = OP whatever the level of O, so that effective demand is incapable of setting a limit to employment… On my theory OW ≠ OP for all values of O, … This is the real starting point of everything"* (Keynes 1934: 422f.)

Keynes then describes 'effective demand' — the very concept that is so crucial in rejecting Say's Law and thus must embody the core of the revolutionary paradigm shift he had in mind — as follows:

> *„Let Z be the aggregate supply price of the output from employing N men, the relationship between Z and N being written Z = ø(N), which can be called the aggregate supply function. Similarly, let D be the proceeds which entrepreneurs expect to receive from the employment of N men, the relationship between D and N being written D = Ғ(N), which can be called the aggregate demand function. … The value of D at the point of aggregate demand function, where it is intersected by the aggregate supply function, will be called the effective demand. … this is the substance of the General Theory of Employment, …"* (Keynes 1936: 25).

It should, therefore, be clear that the Z/D concept of effective demand described here is of eminent importance not only for Keynes's theory but also for his claim to have created something revolutionary new, which rejects a fundamental postulate (if not *the* fundamental postulate) of (neo-)classical theory. All the more surprising, then, is the fact that while almost all variants of post-Keynesianism emphasize the importance of aggregate demand, they rarely refer to Keynes's Z/D concept (see Lavoie 2014, King 2012)[1]. Marc Lavoie suggests the following justification:

[1] Some confusion has arisen because Keynes, in a footnote (Keynes 1936: 55-56; fn 2), made a statement about the slope of the Z-function that is at best unclear and probably incorrect. This footnote and the attempt to explain

> *„The reason, I submit, is that most post-Keynesians felt uncomfortable with this apparatus. Keynes's treatment of price theory is deemed by many to be too closely associated with neoclassical views to be kept within a synthesis. Indeed, the endless debates about the appropriate representation of Keynes's aggregate supply function, or what has become the Z function, as well as the recursive and inconclusive debates about Keynes's classical postulates regarding the determination of employment, demonstrate that the adoption of neoclassical core assumptions within post-Keynesian economics leads only to sterile controversies, even if these assumptions are turned on their head."* (Lavoie 2014: 45).

Once again, Keynes's analysis is accused of adopting mainstream views and concepts, thereby undermining the revolutionary and heterodox character of his theory. Particularly from the perspective of Kaleckians and Sraffians, the acceptance of an aggregate production function and the neoclassical marginal productivity theory, both of which are attributed to Keynes's Z/D conception, represents a regression behind Sraffa's insights in capital theory and Kalecki's market imperfection assumptions. These elements are considered essential — and apparently *necessary* — foundations for a critique of the economic mainstream (see Hartwig 2022: 513; fn 13).

Additionally, there are interpretative issues regarding the *General Theory*, the significance of which, however, may be seen as more relevant to the history of economic thought than to theoretical importance or insight[2]. Furthermore, stability[3] and consistency issues (see Hartwig 2014) challenge the general validity of the Z/D analysis.

Taking Keynes's own assessment of the significance of the Z/D analysis seriously, the following discussion will examine the aforementioned points of criticism and evaluate the conclusion drawn by many post-Keynesians to largely ignore these aspects of Keynes's paradigm (see e.g. Lavoie 2003). Before we can do so, we need in a first step to briefly present the Z/D-concept (part 2). This will be followed by a review of stability and consistency issues raised against the Z/D concept and questioning the general validity of its deductions: lasting involuntary unemployment (part 3). A discussion of the 'Sraffa critique' should not be omitted, as it argues that Keynes and his Z/D model are just as susceptible to Piero Sraffa's rejection of the use of a 'well-behaved' macroeconomic production function as mainstream standard economics (Part 4). The paper concludes with a summary in Part 5.

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it ("what Keynes really meant really") have sparked numerous contributions to the discussion (see e.g. Ambrosi 2011, Arthmar/Brady 2009, Hayes 2007, Patinkin 1976, Patinkin 1977, Patinkin 1978, Patinkin 1979), but have yielded no definitive solution. Since my concern is not with a doctrinal-historical assessment of the Z/D model, but rather with its theoretical consistency, I avoid the 'footnote discussion' by assuming, following Nevile (1992: 256), that Keynes made a simple mistake in the footnote.

[2] See e.g. Hayes (2007), Hayes (2008), Hartwig/Brady (2008), Arthmar/Brady (2009), Ambrosi (2011), Hartwig (2013). Lavoie (2014: 45) concludes: "Indeed, the confusion about Keynes's aggregate supply function has been so great over the years that the editors of the Cambridge Journal of Economics have felt it necessary to issue a statement to the effect that they wished 'to discourage further submissions of comments on the Z function' (Editors, 2011: 635)."

[3] Starting point was an article by Don Patinkin (1949), that aroused a lively discussion: de Jong (1954a), Hawtrey (1954), de Jong (1954b), Robertson (1955), de Jong (1955).

2. Revisiting Keynes's Z/D concept

Keynes's approach in the *General Theory* appears unusual: rather than beginning by outlining his plan of argumentation and laying out conceptual and definitional foundations in order to gradually develop his intended insight — a "theory of demand and supply of output as a whole, i.e., the theory of employment" (Keynes 1936a: 85) — he first identifies and evaluates two 'classical' postulates in Book I. He then, as if in a nutshell, presents the macroeconomic determination of employment, which is central to his thinking, using the *Principle of Effective Demand*. At the same time, he defines the phenomenon that, given the acceptance of these classical postulates, he considers entirely impossible: *involuntary unemployment.*

Thus, within the first 30 pages of his work, Keynes makes it clear what the following 300 pages aim to substantiate and elaborate: his focus is on a theory of resource *management*[4] based on the Principle of Effective Demand, rather than a theory of resource *allocation*[5] rooted in the classical postulates, which at best can only explain temporary (disequilibrium) or voluntary unemployment.

Arthur Cecil Pigou, who held the Cambridge chair during Keynes's time, can be regarded as the founder of modern neoclassical labour market theory (see Pigou 1914, Pigou 1933). He describes employment determination in the labour market as an allocation problem, drawing a close analogy to price-quantity determination in other markets: The supply of labour is offered by workers in such a way that their remuneration — the real wage (w/P) — must at least offset the marginal disutility (MDL) of forgone leisure. On the other hand, labour demand links remuneration to the (marginal) productivity contribution (MPL) provided by the additional worker (or working hour).

In equilibrium, and under the assumption of competitively structured labour markets, the following holds:

$$MPL = w/P = MDL \qquad (1)$$

The left-hand side of the real wage equation represents the *first postulate* of neoclassical labour market theory, which Keynes accepts (Keynes 1936b: 17). However, he rejects the *second postulate*, which corresponds to the right-hand side of the equation (see Keynes 1936b: 17). This rejection is based on his denial of a real-wage-driven labour market, which in turn necessitates an alternative mechanism for employment determination.

A real-wage-driven labour market can only exist in a world where factor owners distribute a *given* output among themselves according to *pre-fixed* (negotiated or regulated) proportions

[4] This is how Keynes frames it: "…the pure theory of what determines the *actual employment* of the available resources has seldom been examined in great detail. To say that it has not been examined at all would, of course, be absurd. For every discussion concerning fluctuations of employment, of which there have been many, has been concerned with it. I mean, not that the topic has been overlooked, but that the fundamental theory underlying it has been deemed so simple and obvious that it has received, at the most, a bare mention" (Keynes 1936b: 4f., italic in original)

[5] In Keynes's words: „Most treatise on the theory of value and production are primarily concerned with the distribution of a *given* volume of employed resources between different uses and with the conditions which, assuming the employment of this quantity of resources, determine their relative rewards and relative values of their products" (Keynes 1936b: 4, italic in original).

— a system Keynes refers to as a barter, real-wage, or co-operative economy (see Keynes 1933b: 66f.) indicating the *allocational orientation* of the analysis. However, he does not see this characteristic as defining 'the world we live in' — a monetary, money-wage, or entrepreneur economy (see Keynes 1933a). In such an economy, workers may, at best, have some influence over the nominal wage rate, but they have no control over the purchasing power of that nominal wage (see Keynes 1936b: 13).

Keynes counters the real-wage-centred employment determination with an analysis that argues in terms of *quantities of money value* and *quantities of employment*. He considers both magnitudes sufficiently homogeneous or homogenizable to make heterogeneous goods and services aggregable and comparable[6]. At the same time, this approach creates a nominal perspective, which forces standard economics — based on real exchange relations — to reject this view as a mere 'nominal illusion'.

The calculations of economic agents — at least in cases where value is created through production — are not guided by real exchange values, meaning relative quantities of physical goods traded for each other, but rather by money values, that is, nominal units of the money good. This primarily reflects the fact that the contracts underlying economic activities are not exchange contracts but obligation contracts, which are denominated in monetary units: the legal tender.

At its core, the purpose of productive economic activity is not to generate a surplus of real, physical goods, but rather of money goods — even if their equivalent in physical goods turns out to be lower than the initial physical goods invested in production. Consider, for simplicity, a point-input, point-output investment: The initial monetary value of the investment goods at the beginning of the period was 1 million euros, let's says corresponding to a value of 10 mid-range cars. By the end of the period, the sale of the produced goods generates revenue of 1.5 million euros, representing a 50% surplus. Even if the value of money has declined and the 1.5 million euros now correspond to only 9 mid-range cars, the investment would still have been worthwhile, as the initial investment amount was repaid with a 50% surplus — where the surplus still equals 3 mid-range cars[7].

Conversely, if only 0.75 million euros were generated at the end of the period, the initial investment amount could not have been repaid—regardless of the fact that, due to interim deflation, the equivalent value at the end of the period might correspond to 15 mid-range cars. Viewing the situation in terms of relative exchange values thus amounts to a *'real illusion'*:

> *„An entrepreneur is interested, not in the amount of product, but in the amount of money which will fall to his share. He will increase his output if by so doing he*

[6] That real, physical goods can be standardized through valuation in monetary terms is easy to understand. However, the conversion of highly diverse types of labour into a homogeneous employment unit—ordinary labour—seems less obvious. Keynes takes a pragmatic yet sufficient approach for macroeconomic employment determination: nominal wages determine the value of labour. If one unit of employment (i.e., one worker or one hour of paid labour) is compensated twice as much as the lowest-paid (ordinary) employment unit, it is counted as two ordinary employment units (see Keynes 1936b: 41ff.).

[7] Whether the investment was actually worthwhile can only be determined by comparing it to the non-pecuniary liquidity premium that the sum of money carried before being invested.

expects to increase his money profit, even though this profit represents a smaller quantity of product than before. … The choice before him in deciding whether or not to offer employment is a choice between using money in this way or in some other way or not using it at all" (Keynes 1933a: 82).

In a monetary economy based on obligational, forward looking contracts, expectations about future nominal revenues being formed at a point in time, when technology comprising a very restricted number of different techniques using labour and capital in different proportions, spot prices, cultural norms, institutions, tastes and preferences, the state of confidence and past experience about changes in all these things are given, play a crucial role in managing given resources, generating income and employment. All these considerations now flow into Keynes's Z/D concept. From the perspective of producing economic units, the first question is: What minimum nominal revenue (not profit!) must an output generate in order to be brought to market?

Aggregate supply

Assuming profit maximization, at the very least, the nominal revenue must cover nominal wage costs, material costs, and a maximum level of capital costs. Under competitive conditions, capital costs include, at most, the opportunity costs of alternative uses. If market restrictions exist, an extra revenue – quasi-rent – must be achieved, the amount of which depends on the degree of market restriction.

Although it is realistic to acknowledge that imperfect competition is a common and normal market phenomenon, for further analysis, we assume fully competitive markets everywhere. This approach not only follows Keynes's method but also aims to demonstrate that the paradoxical result with respect to standard economics — involuntary unemployment as an equilibrium phenomenon — *does not depend on the assumption of imperfect markets* (see Davidson 2001: 404).

This consideration now directly leads to the aggregate supply function Z:

An individual economic production unit *i* maximizes profit by paying its workers according to their marginal productivity (the first postulate which Keynes accepts):

$$\pi_i = P_i\, Y_i(L_i) - wL_i \qquad (2)$$

where π_i = net profit, P_i = minimum required selling price, Y_i = physical output, w = nominal wage of an ordinary labour unit, L_i = number of ordinary labour units, subscript $_i$ = production unit *i*.

By differentiating equation (2) with respect to L_i and setting it to zero, we obtain the profit maximum:

$$\Delta\pi_i = P_i\, \Delta Y_i - w\Delta L_i = 0 \qquad (3)$$

$$\frac{w}{P_i} = \frac{\Delta Y_i}{\Delta L_i} \qquad (4)$$

If we now extend equation (4) by incorporating physical output Y_i and solve for nominal revenue P_iY_i , we obtain the supply function of a production unit *i*:

$$Z_i = P_i Y_i = w \left(\frac{1}{\frac{\Delta Y_i}{\Delta L_i}}\right) Y_i \quad (5)$$

Now, by substituting the tautology $Y_i = \left(\frac{Y_i}{L_i}\right) L_i$, we can derive a clear relationship between the minimum required revenue and employment in production unit *i*:

$$Zi = PiYi = w \left(\left[\frac{\frac{Y}{L}}{\frac{\Delta Y_i}{\Delta L_i}}\right]\right) Li \quad (6)$$

By aggregating all individual supply functions and recognizing that $\frac{Y}{L}$ represents the average productivity of labour (APL), and $\frac{\Delta Y}{\Delta L}$ represents the marginal productivity of labour (MPL), we arrive at the aggregate supply function Z:

$$Z = PY = w \left(\left[\frac{\frac{Y}{L}}{\frac{\Delta Y}{\Delta L}}\right]\right) L = w \frac{APL}{MPL} L \quad (7)$$

The slope of the Z-function is, therefore, determined by the nominal wage rate *w* and the technically determined ratio of average to marginal productivity of labour. Under the assumption of diminishing marginal productivity — which is certainly plausible in the short term (i.e., given a fixed capital stock and the entrepreneurial objective of determining the degree of utilization of this capital stock) — the technical ratio is greater than 1. If marginal productivity is constant — which would be the case in a long-term perspective where firms decide on optimal production size and employment levels — the technical ratio equals 1, and the slope of the aggregate supply function Z is determined by the nominal wage rate. Increasing marginal productivity, which would yield a technical ratio less than 1, would only be conceivable in cases of severe underutilization of an existing capital stock — a scenario that is unlikely to have significant empirical relevance.

Aggregate demand

Now, it must still be determined which potential employment level along the aggregate supply function Z will actually be realized. To do so, we return to the microeconomic perspective of an individual production unit *i*, which must form expectations about feasible selling prices and quantities — and thus about nominal revenues.

Naturally, the process of expectation formation is central in this context. Moreover, the partial-equilibrium approach, which assumes that these expectations are formed independently of firm *i*'s decision, is methodologically problematic. Otherwise, we would be caught in a circular reasoning problem, where the expectations of firm *i* depend on the consumption or investment decisions of other economic agents, whose decisions in turn depend on the expectations of firm *i* (and all other economic agents).

It would be overly ambitious to claim that we have a universally accepted theory of expectation formation. As a result, expectations still have an *'ad hoc'* character. However, by assuming that expectations are fulfilled — thus describing an expectations equilibrium — we aim to counter the criticism that theoretical results are merely based on specific assumptions about expectations. In other words, *the explanation of involuntary (equilibrium)*

unemployment should not simply be dismissed as a consequence of 'bad' or 'pessimistic' expectations.

For simplicity, let us assume that consumer demand arises only from wage income and that investment demand is not (directly) dependent on the level of employment. In this case, the revenues of production unit *i* are determined by the expected demand for consumption and investment goods:

$$D_i^1 = c\ w\ L + C_{aut} \quad (8)$$

$$D_i^2 = I_{giv} \quad (9)$$

$$D_i = D_i^1 + D_i^2 = c\ w\ L + C_{aut} + I_{giv} \quad (10)$$

where c = marginal propensity to consume, C_{aut} = autonomous consumption, I_{giv} = (given) investment outlays.

By aggregating the individual demand functions, we obtain the aggregate demand function D:

$$D = D^1 + D^2 = c\ w\ L + C_{aut} + I_{giv} \quad (11)$$

Here, once again, we encounter the micro-macro linkage problem — namely, the assumption that employment in all firms and sectors (whose wage income generates demand for goods and services from firm i) will increase in parallel with rising employment in firm i (see Weintraub 1957: 460, Davidson 1994: 173)[8]. This methodological device may not be entirely satisfactory, but all macroeconomic models based on microeconomic foundations are troubled with some kind of micro-macro dualism (see e.g. Lintunen/Ropponen/Vartia 2009).

Point of effective demand

By equating the aggregate supply function from equation (7) with the aggregate demand function from equation (11), we determine their intersection—*the Point of Effective Demand*. This represents the level of employment that firms in our economy intend to offer under profit-maximization constraint:

$$Z = w\ \left(\frac{\frac{Y}{L}}{\frac{\Delta Y}{\Delta L}}\right) L = w\ \frac{APL}{MPL}\ L = D = c\ w\ L + C_{aut} + I_{giv} \quad (12)$$

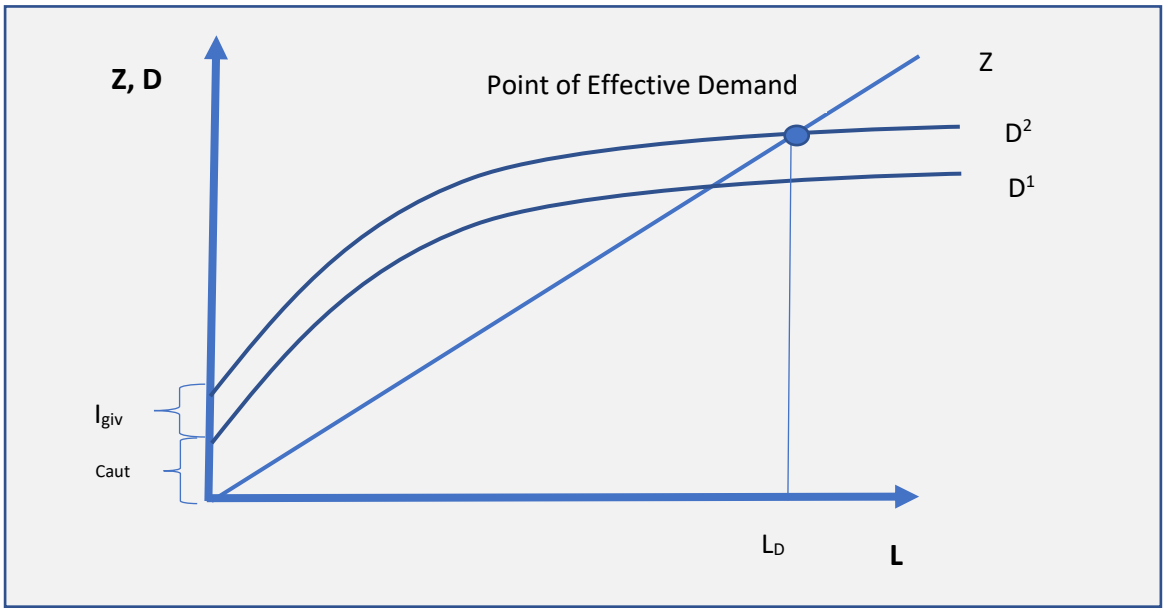
In Figure 1, this employment determination process— which solely derives the aggregate labour demand of firms— is illustrated. As (expected) investment demand is not related to employment, D^2 is simply grafted onto D^1. Moreover, constant marginal productivity — implying a long-term perspective — is assumed, along with a declining marginal propensity to consume[9]. However, these assumptions are not critically important. We could just as well

[8] It would, of course, be unrealistic to assume that the wages paid by firm i would be spent exclusively on goods produced by firm i, or that the wage income generated in all other firms would not contribute to the demand for firm i's products.

[9] The linearity of the Z-function does not necessarily have to be attributed to constant marginal productivity, but can also result when the ratio of average to marginal productivity remains constant — as is the case, for example, with a Cobb-Douglas production function (cf. Kalmbach/Kurz 1986: 22). When a Z-function is frequently drawn whose course exhibits a second derivative > 0 (see e.g. Weintraub 1961: 23 and 35; Chick 1983: 62ff.), this is more commonly explained by a rising nominal wage rate as employment increases. With regard to the particular shape of the aggregate demand curve, Kalmbach/Kurz (1986: 25f.) point out that a decreasing marginal

assume a constant marginal propensity to consume and declining marginal productivity without compromising the analytical power of the concept.

Figure 1: Keynes's Z/D Modell



Solving (12) for L gives:

$$L = \frac{C_{aut} + I_{giv}}{w(\frac{DPA}{GPA} - C)} \qquad (13)$$

Of course, this employment determination does not provide a definitive answer to the question of whether, and if so, how persistent involuntary unemployment can arise. For this, we primarily need an investment theory that is capable of explaining why the gap between full-employment income and expected consumption expenditures — which, realistically, increases as overall economic income levels rise — is not necessarily filled by corresponding aggregate investment expenditures, as the standard economic postulate of Say's theorem claims[10]. Say's theorem asserts that supply creates its own demand and explains the adjustment process through an interest rate mechanism governed by time preference.

Labour supply

Additionally, it is necessary to determine how households supply labour. The macroeconomic background for determining the investment component of aggregate demand was examined in detail by Keynes in Book IV, to which reference can be made at this point (see also Davidson

propensity to consume is not a sufficient explanation, since expected revenues consist of both a price and a quantity component. If the declining marginal propensity to consume is offset by rising prices as employment increases, then the aggregate demand function could indeed be linear — or even upward-sloping – in its second derivative. Moreover, Kalmbach/Kurz (1986: 26) consider rising prices with increasing employment to be more plausible than constant or falling prices. However, why producers should expect to successfully sell increased output (as a result of rising employment) at higher prices despite increasing market saturation is not explained and appears incomprehensible. Be that as it may, the exact shape of the Z- and D-functions is of little importance — what matters are their slopes and the relationship between them (the slope of the Z-curve must be greater than that of the D-curve), and there is no reason to assume that the slope of the D-curve systematically exceeds that of the Z-curve.

[10] This, of course, is what Keynes (1936b: 135ff) intends to do in Book IV of the *General Theory*.

2000: 7f., Davidson 2002: 635f.). However, the determination of labour supply is a different matter. Neither Keynes's *General Theory* nor general post-Keynesian literature offers concrete insights on this issue (see e.g. Spencer 2006).

Typically, it is either assumed that there is a fixed labour supply available to work at any real wage— implying a vertical labour supply function in the real wage-employment space (see e.g. Mongovi 1991: 37f., Lavoie 2003: 173, Lavoie 2006: 93)[11]— or that labour supply fluctuates with real wages in a way that forms an inverted 'S' shape: at moderate real wage levels, labour supply increases with rising real wages as compensation for lost leisure. At low real wages, labour supply increases even as real wages decline because workers need to maintain a subsistence income level. At high real wages, labour supply decreases as wages continue to rise because additional income no longer compensates for the loss of leisure (see Prasch 2000).

Alternatively, some emphasize that labour supply is indeed determined by households' utility calculations, but these calculations are influenced not only by income levels (i.e., the real wage) but also by numerous other non-material factors (see Fernandez-Huerga/Garcia-Arias/Salvador 2017).

Keynes himself devotes attention to labour supply in *The General Theory* only to the extent that he needs an understanding of it to explain 'involuntary unemployment'. In his correspondence with Ralph Hawtrey and Dennis Robertson, it becomes clear that he considered the idea of a vertical labour supply curve implausible (see Keynes 1936c: 35–37), whereas he found the trade-off between increasing *disutility of work* and higher real wages to be quite reasonable (see Keynes 1933c: 310). However, how does this align with the nominal perspective of his theory of monetary production and his rejection of the 'second classical postulate', which states that the real wage of the last employed unit of labour equals the *marginal disutility of labour*?

What is clear is that the real wage cannot be fixed by labour market participants before the production process begins. Employers and employees negotiate — depending on the collective bargaining system, this may occur at the individual, company, sectoral, or economy-wide level — over the *nominal wage rate*. This negotiation takes into account both relative pay and the expected real purchasing power of a wage unit. However, it is impossible for labour market participants to implicitly determine the real wage by setting the nominal wage.

Moreover, even if workers resist a reduction in the nominal wage rate — whether because they fear falling behind relative to other workers or groups, or because they have nominal contracts to fulfil, whose real value would increase even if their real wage income remained constant — this resistance leads to a certain degree of *nominal wage rigidity* and might even

[11] This is often justified by the argument that „for some employment and the hours worked may be a matter of effective choice (in that the alternative is tolerable), for most it is not a matter of effective choice: to put it at its strongest if the alternative is no income and starvation, then there cannot be said to be a 'choice' not to work in any meaningful sense" (Sawyer/Spence 2008: 730). This argument may have some validity if most workers have to allocate all their available (working) time just to barely reach a subsistence-level income. However, it becomes much less tenable when most workers — as in highly developed economies — only need to work a portion of their potentially available time to earn an income far above the subsistence level, allowing them to optimize their work-life balance.

make the quantity of labour supplied positively dependent on the nominal wage rate. Nevertheless, this does not apply to the real wage rate, as it is difficult to imagine — and, in any case, not observable — that workers adjust their labour supply every time the general price level changes, thereby affecting the prices of wage goods and the purchasing power of wages. Keynes summarises these considerations unequivocally:

> *„To sum up: there are two objections to the second postulate of the classical theory. The first relates to the actual behaviour of labour. A fall in real wages due to a rise in prices, with money-wages unaltered, does not, as a rule, cause the supply of available labour on offer at the current wage to fall below the amount actually employed prior to the rise of prices. … But the other, more fundamental, objection, …, flows from our disputing the assumption that the general level of real wages is directly determined by the character of the wage bargain. … For there may be no method available to labour as a whole whereby it can bring the wage-goods equivalent of the general level of money-wages into conformity with the marginal disutility of the current volume of employment"* (Keynes 1936: 13; italic in the original).

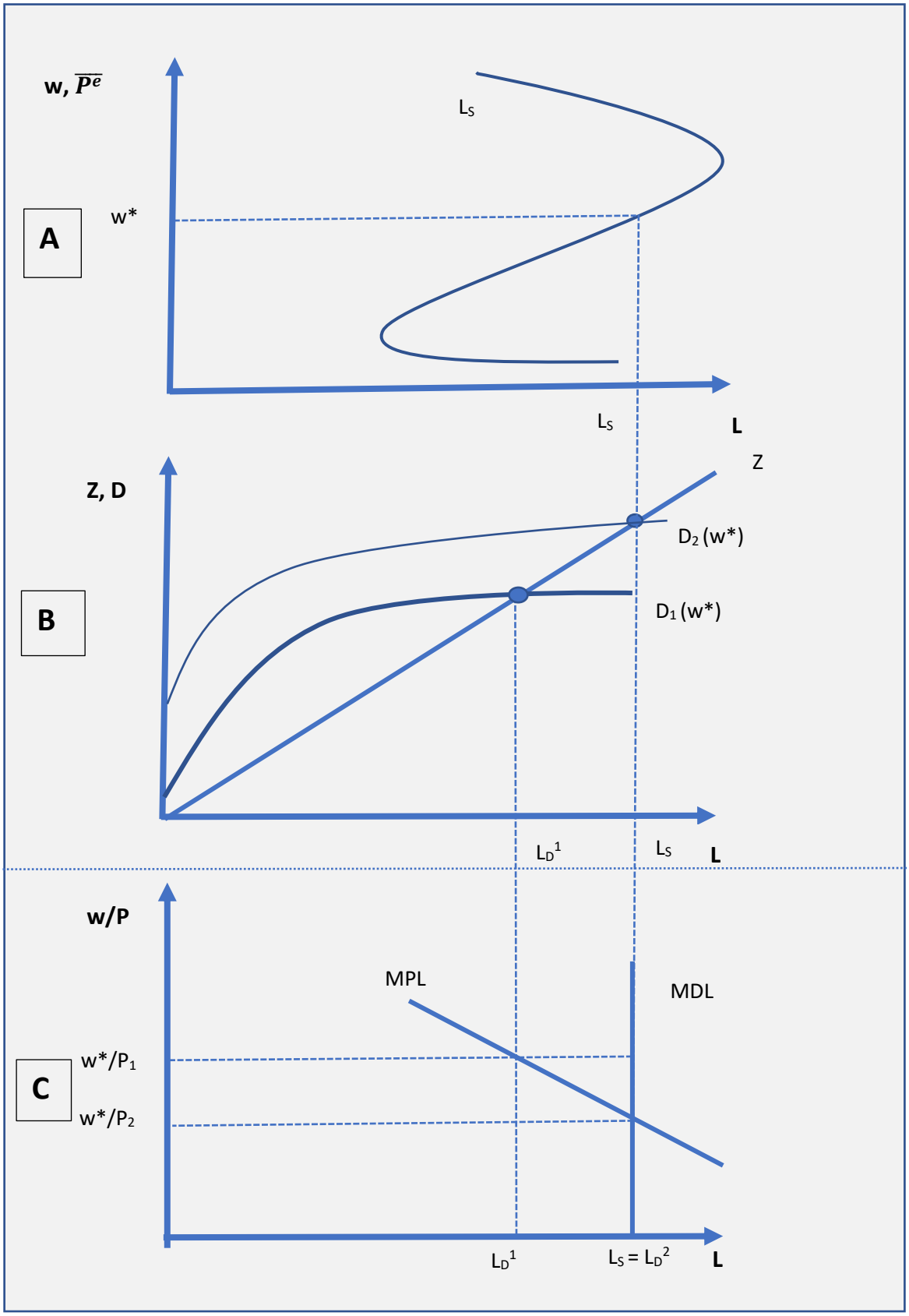
These relationships are illustrated in Figure 2: The determination of aggregate labour demand (L_D) in the Z/D model in the middle section (B) is now complemented by considerations regarding labour supply (L_S).

In the upper section (A) of the figure, labour supply is depicted as a function of the nominal wage rate. To anchor the nominal wage in real terms, it is assumed that it is set based on an expected price level ($\overline{P}^e$). Furthermore, Prasch's insights have been incorporated into the precise shape of the labour supply function, while also assuming that the sections with an 'unusual' course do not play a role under normal circumstances. However, including them in the figure can be justified by the need to present a general model, which allows for the examination of exceptional cases — such as labour supply at the subsistence income level.The determination of the prevailing nominal wage (w^*) is usually in the hands of collective bargaining partners, and workers adjust their labour supply (L_S) accordingly.

In the middle section (B) of the figure, it becomes evident that households' labour supply exceeds firms' labour demand at the negotiated nominal wage level (w^*), leading to unemployment. However, it is important to note that this outcome is neither inevitable nor well justified so far. Households could just as well offer a lower labour supply or — by pure coincidence — exactly match firms' labour demand.

And indeed, there have been historical periods of overemployment or full employment (for example, during the 'Golden Age of Capitalism' in the 1950s and 1960s). However, we focus here on the case of underemployment because it is the more socially problematic scenario and because the economic history of all highly developed economies suggests that it is the more common occurrence.

Figure 2: Keynes's Z/D model and involuntary unemployment



Involuntary unemployment

The lower section (C) of Figure 2 is separated from the rest of the illustration by a dotted line. This is meant to indicate that the relationship between real wage levels, labour supply, and labour demand depicted here should not be understood as a graphical representation of an actual market[12]. Instead, it serves only to demonstrate the invalidity of the second classical postulate and to illustrate the involuntary nature of unemployment[13]: The MPL curve reflects the technological relationship between labour input and real wages[14] — using a short time frame here to illustrate the effects of short-term employment fluctuations.

The vertical MDL curve aligns with Keynes's argument that labour supply does not respond to changes in the real wage caused by an increase in the price level, assuming the nominal wage rate remains constant. The labour demand L^D_1, determined in the middle section of Figure 2, results in a real wage rate of $w^*/P_1 = MPL$, which is an endogenous variable of the system, but not a variable that can be used for distributional policy. This satisfies the first classical postulate.

However, the second classical postulate does not hold, because at the given nominal wage rate w^* and the *endogenously determined real wage rate* w/P_1^*, the labour supply L^s willing to work exceeds the actual employment level L^D_1. The involuntary nature of unemployment becomes clear if, for example, an increase in aggregate demand — shifting $D_1(w^*)$ *to* $D_2(w^*)$

[12] This point — that we are not dealing with the representation of actual markets where real actors make profit- and utility-maximizing decisions — cannot be emphasized enough. Time and again, it is claimed that Keynes ultimately incorporated neoclassical labour market theory (see e.g. Spencer 2006: 464ff.). No, he did not. Rather, he pointed out that persistently unused labour resources—i.e., labour offered by workers but not employed by firms—are not due to workers refusing to accept the prevailing nominal wage (and the endogenously determined real wage). This is explicitly anti-neoclassical, and it does not become neoclassical simply because analytical tools are used that do not contradict every single assumption of neoclassical theory. Therefore, I strongly reject Spencer's (2006: 471) claim that "the neoclassical labour supply curve (…) gives the false impression that workers face a 'choice' whether they work or not and how many hours they work. … This stymied Keynes's efforts to distinguish his own approach from that of the neoclassical school and can be seen as one factor behind the revival of neoclassical modes of argument after the publication of the GT which eclipsed to the point of invisibility much of what Keynes had to say about the importance of effective demand…. Keynes's retention of the neoclassical labour supply curve, … , retain importance in terms of identifying the limits of Keynes's general theory of employment and demonstrate the progress that still has to be made in overcoming these limits". Lavoie (2003: 167) believes that Keynes's refusal to argue in real instead of nominal wage rates should be abandoned, "given that most of the current debate over unemployment occurs over the flexibility and the level of real wages". This argument is breath-taking: an alternative (heterodox) approach shall not be followed because it does not connect to the mainstream discourse.

[13] Patinkin (1949: 369) calls this a ‚norm of reference': "…, it is theoretically meaningless to speak of involuntary unemployment without introducing a comparison between two alternative models: the actually existing one and some designated norm. The extent of involuntary unemployment is then measured by the difference between the existing amount of employment, and the amount that would have existed under the norm."

[14] Sawyer/Spencer (2008: 719) rightly argue: „A major difficulty which has plagued macroeconomics and the discussion of unemployment arises from the status and meaning of the curve which relates the real product wage and the level of employment arising from decisions made by firms. This curve, which we will label the 'employment real wage relationship' (…) may refer to the firm level or be aggregated up to the industry or economy level. It is, of course, often called the demand for labour curve (or function, schedule, etc.) but that terminology is, in general, misleading. The general notion of a demand function (…) is that it indicates how much would be demanded at each given price and that movements along the demand function come from parametric variations in price. Yet, the employment real wage relationship does not have those features, and specifically the real (product) wage is generally set by firms as a consequence of their pricing decisions and movements along the ERWR (employment real wage relationship, A.H.) arise from, inter alia, movements in the level of aggregate demand."

in section B, while the nominal wage rate remains unchanged — leads to an increase in employment to $L^D_2 = L^s$. Since these newly employed workers were previously offering their labour at the same nominal wage and even at a lower real wage than in the initial situation ($w^*/P_1 > w^*/P_2$), they must have been involuntarily unemployed before. The results of the Z/D analysis correspond to Keynes's definition of 'involuntary unemployment':

> *„Men are involuntarily unemployed, if, in the event of a small rise in the price of wage-goods relatively to the money-wage, both the aggregate supply of labour willing to work for the current money-wage and the aggregate demand for it at that wage would be greater than the existing volume of employment"* (Keynes 1936b: 15)

This analysis has provoked criticism, which may help explain why, according to Lavoie, many post-Keynesians feel uncomfortable with the Z/D framework: One common critique is that the increase in employment-related price levels applies only in the short run under conditions of fully utilized capacity and perfect competition — but not in a longer time frame or in cases of significant underutilization of capacity with imperfect competition. In such cases, the MPL curve could also be horizontal or hump-shaped (see Sawyer/Spencer 2008: 720f.). For the core of Keynes's analysis, these refinements, however, only matter insofar as they might call into question the 'involuntary' nature of unemployment — specifically, if rising employment were accompanied by an increase in real wages. However, such a scenario would only be realistic in cases of severe (and temporary) underutilization of capacity, typically following a sharp cyclical downturn. In such a situation, it is highly unlikely that anyone would argue that the newly unemployed workers voluntarily chose to be jobless.

More importantly, it must be emphasized that the Z/D model is not a tool for primarily analyzing temporary, cyclical unemployment, but rather intended as a framework for explaining permanent, equilibrium unemployment where 'equilibrium' obviously does not refer to 'market-clearing' but a situation of fulfilled expectations.

A more substantial point – though not really a critical one - is that the Z/D model does not provide a *'definition'* in the proper sense of providing an explanation of the term of involuntary unemployment but rather a *'test'* for the involuntariness of measurable unemployment (see Sawyer/Spencer 2008: 719).

But perhaps the uneasiness of post-Keynesian economists can be better understood when considering further reservations about the Z/D model, which will be examined in the following discussion.

3. Stability and consistency problems with Z/D analysis

Is 'involuntary unemployment' dynamically stable?

The first extended engagement with Keynes's Principle of Effective Demand can be traced back to a 1949 article by Don Patinkin (Patinkin 1949), in which he poses two questions to Keynesian theory that, in his view, remain unresolved: Does Keynes's analysis overlook the

supply side of the economy and, thereby, implicit adjustment mechanisms? And what exactly is 'involuntary' about the unemployment that Keynes seeks to explain?

One could take the easy route and point out that Patinkin is not actually discussing the Z/D model, but rather the 45° model – that is, Hansen's interpretation of Keynes (see Hansen 1953), which post-Keynesians do not regard as an adequate representation of Keynesian economics (see, e.g., Weintraub 1961: 1–25), since it explicitly uses Walrasian equilibrium economics as its basis (see Patinkin 1949: 365). And yet, Patinkin's critique points to an issue that is worth pursuing even in the case of the Z/D model – namely, the question of the stability and consistency of the unemployment disequilibrium, as presented, for instance, in Figure 2.

To better understand this, we should return to the fact that the labour supply function L_S in the upper part of Figure 2 was constructed under the assumption of an expected price level $\overline{P}^e$: nominal wage demands are thus tied to an expectation of their purchasing power. Let us now assume that the level of employment resulting from the Point of Effective Demand, L_1, is lower than the labour supply L_2 at the exogenously set nominal wage rate w_1 – in other words, unemployment in the amount of $L_2 - L_1$ emerges. Using the price-setting function derived from equation (4), the price level P_1 and the real wage (w_1/P_1) are now determined *endogenously*. Three scenarios are conceivable: (1) the resulting price level P_1 corresponds to the price level $\overline{P}^e$ expected by workers, (2) P_1 is higher than expected, or (3) P_1 is lower than expected. The first case corresponds to an *expectations equilibrium* and could serve as the basis for a persistent situation. In the second case, the real wage expected by workers at the time of nominal wage setting ($w_1/\overline{P}^e$) would be higher than the realized real wage (w_1/P_1), and a reduction in labour supply could be expected. The third case, finally, would describe a situation in which the realized real wage (w_1/P_1) exceeds the expected real wage ($w_1/\overline{P}^e$). At least in cases (2) and (3), because expectations were disappointed, behavioural changes or plan revisions would likely occur. And this brings us to the consideration that Patinkin discusses — albeit within a standard-Keynesian model: Is the Keynesian result of involuntary unemployment sustainable from a dynamic perspective, or in other words: *how stable is the Keynesian solution*?

It would be incorrect to claim that Keynes did not address this issue of stability. In fact, in Chapter 19 of the *General Theory*, he extensively discusses the employment effects of a reduction in nominal wages, which could be expected if the real wage resulting from the initial situation were higher than anticipated, or also if the unemployment arising in the initial situation exerted downward pressure on nominal wages. Against the background of his analysis—in which the real wage is determined endogenously and cannot be controlled as a policy variable (e.g., through an exogenously determined nominal wage) — he arrives at the clear conclusion:

> *"There is, …, no ground for the belief that a flexible wage policy is capable of maintaining a state of continuous full employment; …"* (Keynes 1936: 267).

However, Patinkin is right in noting that Keynes did not *explicitly* discuss the change in the purchasing power of a unit of money during price level changes — later referred to as the real balance or Patinkin effect. Nevertheless, there are indications that Keynes at least *implicitly* considered the real balance effect and questioned its stabilizing function: It is based on the

assumption that money is an 'ordinary' good in the sense that it is substituted by other goods when its exchange value rises — for example, in the case of a deflation triggered by a reduction in nominal wages. It is either replaced by consumption goods, which become relatively cheaper — which should lead to an increase in consumption demand — or by capital goods, which would be equivalent to an increase in savings and thus a drop in interest rates, which in turn should boost investment demand.

Within the framework of the Z/D model, this would result in a relative shift of the D-function with respect to the Z-function and a Point of Effective Demand that determines a higher level of employment. In order to restore full employment — in the case of an initial situation of involuntary unemployment — the nominal wage reduction would simply have to be large enough. *And the rigidity of nominal wages would, therefore, be ultimately responsible for a persistent underemployment equilibrium.*

The rejection of this chain of effects is based, on the one hand, on Keynes's explanation of the particular properties of money in Chapter 17 of the *General Theory*:

> *"The second differentia of money is that it has an elasticity of substitution equal, or nearly equal, to zero; which means that as the exchange value of money rises there is no tendency to substitute some other factor for it; - expect, perhaps, for some trifling extent, where the money-commodity is also used in manufacture or the arts* (Keynes 1936b: 231; italics in original).

The assumption of a zero or negligible (price) elasticity of substitution certainly undermines the real balance effect. Yet, the justification for the low (price) elasticity of substitution is unconvincing, because Keynes suddenly referred to the *medium-of-exchange function* of money in this context, rather than emphasizing its *function of medium of deferred payments*, as he consistently did throughout *The General Theory* (see Keynes 1936b: 166ff. and 293). However, focusing on the means-of-deferred payment function of money, the particular characteristic of low substitution elasticity can indeed be justified — though in that case, it refers to the interest rate, not the inverse of the price level, as the 'price of money'.

This, however, leaves the question of the validity of the real balance effect unresolved — which is why Keynes had to pursue a different line of argument, one that he only hinted at but did not adequately develop. He points out that the real balance effect — in principle — can only take effect if the price level and the nominal money supply do not change by the same proportion, or put differently:

> *„If the quantity of money is itself a function of the wage- and price-level, there is indeed, nothing to hope in this direction"* (Keynes 1936b: 266).

By assuming a given money supply — or one controllable by the central bank — Keynes effectively blocked this line of argument for himself. As a result, he was ultimately forced to let the real balance effect fail on the same rocks as expansionary monetary policy[15]: *the liquidity trap*.

[15] In Keynes's words: „It follows that wage reductions, as a method of securing full employment, are also subject to the same limitations as the method of increasing the quantity of money" (Keynes 1936: 266).

Here, it is Keynes — not the Z/D model — who reaches his limits, because by endogenizing the money supply, one can establish a functional relationship between the wage and price level and the money supply[16]. Furthermore, due to the negative impact of deflation on the real burden of debtors within creditor-debtor relationships that are constitutive of capitalism, it is possible to justify at least a proportional, if not a progressive, relationship between the development of wages and prices and the development of the money supply: If anything, a reduction in nominal wages as a response to the situation of involuntary unemployment or misguided expectations is likely to produce a *negative real balance effect* and, consequently, destabilize the system — especially if it triggers a fatal downward spiral of wage reductions, deflation, rising unemployment, and, as a result, further wage and price deflation. *A certain rigidity of nominal wages, stemming from the institutionalization of the collective bargaining system, now becomes the central anchor of stability in the price system — not an obstacle to adjustment.*

Is the stable Point of effective demand consistently derived?

Finally, an aspect that appears to be more technical in nature should be discussed: the importance of the ratio between average (APL) and marginal labour productivity (MPL). As equation (7) shows, this ratio — together with the nominal wage rate — determines the slope of the Z function and, as equation (13) shows, ultimately the Point of Effective Demand.

This implies that the ratio of average to marginal labour productivity must lie within a certain range for there to be an economically meaningful — i.e. consistent — solution to the Z/D model: $\frac{APL}{MPL} > c$. The ratio of average to marginal productivity must be numerically greater than the marginal propensity to consume c, because otherwise, there would be no intersection of the Z and D curves and, consequently, no stable employment point at which firms, based on profit-maximization considerations, would determine their labour demand. The result would be an unstable system that constantly operates at the full capacity limit of its production factors, with continuously rising, accelerating inflation — certainly not a realistic description of the capitalist system under normal conditions.

It is usually assumed that *c* lies between 0 and 1. As long as the ratio of average to marginal productivity of labour can be assumed to be greater than or equal to 1, the Z/D model can be clearly solved — that is, there exists an optimal employment level from the firm's perspective. However, as soon as $\frac{APL}{MPL} < 1$, the Z/D model may encounter consistency problems, especially if $\frac{APL}{MPL} < c$ also holds.

Under the condition of diminishing marginal productivity, we have APL > MPL, and thus $\frac{APL}{MPL} > 1$. With constant marginal productivity, we get $\frac{APL}{MPL} = 1$, and with increasing marginal productivity, $\frac{APL}{MPL} < 1$. Therefore, under conditions of increasing marginal productivity, an

[16] As formally explained in Heise (2019), the argument runs from liquidity preference decisions of wealth-owners endogenously determining the quantity of money, the employment level and the price level with the nominal wage being set exogenously and a certain monetary policy being fixed by the central bank.

unstable situation can arise, which calls into question the consistency of the Z/D model (see Hartwig 2017: 266, fn 14[17]) and, therefore, its *general* applicability.

It is thus crucial to re-examine the assumption of diminishing (or at least constant) marginal productivity — an assumption Keynes accepted as "beyond reasonable question" (Keynes 1939: 44). Following the U-shaped marginal cost curve, a hump-shaped marginal productivity curve can be assumed, which actually explains increasing marginal productivity: namely, when capacity is significantly underutilized. However, as utilization increases — and thus in the range relevant for determining the Point of Effective Demand — there are no plausible reasons for expecting increasing marginal productivity.

The discussion so far has concerned the *short-term* interpretation of the Z/D model—that is, examining employment changes with a *given capital stock (and a fixed technique)*. We have suggested that it can also be interpreted in the *long run*, where both factors of production (in fixed proportion) can be varied. In this context, increasing returns to scale lead to falling average and marginal costs, and correspondingly to rising average and marginal productivity. This can explain a particular firm or production unit size ('small is not always beautiful'), and possibly the tendency toward a natural monopoly, if increasing returns to scale were to persist across all output levels.

However, there are no obvious reasons to assume that the ratio of average to marginal productivity will necessarily fall below 1 — especially not as we approach full utilization of the production factor that is, at least in the short to medium term, inelastic: labour.

Finally, a quite different challenge to the stability and uniqueness of the Point of Effective Demand is raised by Kalmbach/Kurz (1986: 23, my translation), who argue:

> *"When Keynes uses revenues rather than prices, this is primarily due to the necessity of performing an aggregation. However, the required aggregation is by no means unproblematic. ... If different levels of revenue conceal very differently composed outputs, then quite different shapes of the Z-curve may result — for example, ones in which $d^2Z/dN^2 > 0$ and $d^2Z/dN^2 < 0$ alternate. Instead of the unique equilibrium determined by the intersection of the Z-curve with the (...) curve of aggregate demand, multiple equilibria may well arise".*

As correct — and indeed as obvious — as it is that the outcome of any aggregation is determined by the individual elements being aggregated, and that therefore the particular position of the Z-function in the revenue-employment-space will vary depending on the structural characteristics of an economy, it should be equally clear that this cannot constitute a serious criticism of the use of the concept in the sense that it is incapable of determining a unique result (see Weintraub 1957: 456). Why a comparatively different structural composition of an economy should lead to Z-curves that, over the course of employment development, alternate between increasing and diminishing marginal revenues remains the secret of Kalmbach and Kurz. In any case, the following conclusion drawn by the two authors does not appear to me to be justified if applied to Keynes's Z/D analysis:

[17] Hartwig (2017: 266; fn 14) seems to belief that the condition of constant marginal productivity suffices to render the Z/D apparatus inconsistent – this is evidently mistaken.

"However, he (Keynes, A.H.) insists that the results derived from macroeconomic analysis can pass as 'first approximations'. ... It is fairly obvious that such a claim cannot be upheld. Whether a macroeconomic analysis provides useful or misleading first approximations cannot be determined in advance, but depends on the extent of structural shifts and on how strongly these lead to results that contradict those derived from macroeconomic analysis" (Kalmbach/Kurz 1986: 24; my translation).

4. Z/D analysis and the Sraffian Critique

Some proponents of post-Keynesianism in its broad tent orientation reject the use of an aggregate production function — particularly in its Cobb-Douglas version — because it is based on the assumption of homogeneous inputs. However, once it is acknowledged that capital goods in particular are heterogeneous, aggregation in value terms becomes necessary (since the aggregation of physical, heterogeneous capital goods is nonsensical), and this in turn requires knowledge of the functional income distribution — that is, either the real wage rate or the profit rate as determinant of income distribution. But this leads to a dilemma already known to the classical economists and particularly emphasized by Piero Sraffa: that distribution can only be determined once the exchange values are known. This renders standard economic distribution theory, which derives factor remuneration from the marginal productivity of the respective production factor, problematic, since in this context it is not physical magnitudes that are being related to one another, but rather value magnitudes that must first be determined. Although Sraffa himself appears to favour the profit rate as the independent variable that closes the distributional system (see Sraffa 1960: 33), most post-Keynesians — especially Kaleckians — consider the real wage rate, as shaped by social conflict, to be the independent variable.

Moreover, the so-called Cambridge Capital Controversy demonstrated that due to the phenomenon of re-switching of techniques (within a given technology), the commonly postulated clear inverse relationship between factor price and factor intensity (see Walsh/Gram 1980: 362) does not necessarily hold (see Walsh/Gram 1980: 393) — which also undermines the price adjustment mechanism that is supposed to restore equilibrium when there is an oversupply of a production factor[18].

Sraffa's criticism was directed at mainstream standard economics – however, with Keynes's acceptance of the first classical postulate, his Z/D approach also seems to be subject to Sraffian criticism and, consequently, appears unsuitable as a *universally* valid explanatory framework for overall employment levels and (involuntary) unemployment (see Mongovi 1991: 26). On the other hand, it is unclear whether a critique that addresses the fundamental allocation-theoretic premises of an *exchange-economy paradigm* can truly be transferred to a *paradigm of nominal obligations* (monetary or entrepreneur economy), which argues not from an

[18] As Heinz Kurz (2012: 42f.) points out: "If we cannot rely upon the principle of substitution in production expressing the monotonic prejudice, then there is no reason to presume that the economy, if left to itself, will bring about a tendency towards the full employment of all productive factors."

allocation-theoretic (resource allocation) but rather from an income-theoretic (resource management) perspective.

It is undisputed that Keynes accepted that factor remuneration is determined by its marginal productivity in value terms. However, this insight does not reflect an acceptance of a 'well-behaved' (standard economic) substitutional production function but instead stems from the profit-maximization calculus assumed in eq. (2)[19]. To justify a marginalist analysis methodologically, it is sufficient to assume that there are neither absolutely fixed input ratios ('limitation') in the short nor in the long run.

But what about the relationship between the quantity of employment and marginal productivity? Does Keynes not also accept the inverse relationship that the Sraffians reject as untenable? To address this, it is worth recalling Sraffa's line of argument once more: when the real wage, as a distributional variable, is reduced (or increased), a technique might be chosen whose labour intensity is lower (or higher) than before – this is a theoretical possibility, not an empirically confirmed necessity.

If Keynes does indeed assume an inverse relationship between real wages and employment, the argument is based on entirely different considerations: since in Keynes's economics the real wage is determined endogenously, and the distributional system is closed by specifying the profit rate – which, in equilibrium, is determined by the liquidity premium on money –, a falling real wage with increasing employment arises whenever we assume that, given a fixed capital stock (and, thus, a profit-maximizing technique) in the short run, marginal productivity decreases, which appears realistic within reasonable under-utilization ranges[20].

In the long run, when the capital stock (not the technique) becomes variable, the inverse relationship would indeed only hold under the condition of decreasing economies of scale – or, put differently: with constant economies of scale, marginal productivity would remain constant, and consequently, the real wage would also remain constant as employment increases. However, this modification would not have severe consequences for the Z/D model – the shape of the Z-function would simply be linear rather than exponential.

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[19] Mongovi (1991: 29) correctly states: „… Keynes is asserting simply that the marginal product associated with that level of employment sets the value of the real wage".

[20] Mongovi (1991: 30) challenges this view: „Now if an autonomous increase in investment were to trigger a movement towards a higher level of aggregate output, the argument of Chapter 2 (of the *General Theory*, A.H.) would require a reduction in the real wage. Such a reduction could come about either through a decline in the money wage rate or through an increase in the price level, or through a combination of both. But with rising aggregate demand, the money wage would be more likely to rise than to fall. Moreover, even if money wages are contractually fixed and therefore remain unchanged, the price level ought not to rise appreciably, since (on Keynes's assumptions) the presence of unemployed labour in the initial situation implies that there is some unused physical capacity". Unfortunately, he leaves the reader unclear as to why the continued use of initially unused physical capacities should not be accompanied by diminishing marginal productivity. And it becomes even more confusing when he argues: "When Keynes claims that prices vary more or less in proportion to money wages, he contradicts his own explanation of the real wage: if the price level rises and falls *pari passu* with the money wage rate, the real wage will remain fixed, unable to accommodate itself to any changes in the MP_L (marginal productivity of labour, A.H.), that might occur as a result of changes in employment" (Mongovi 1991: 30f.; italics in the original). Here, he obviously fails to distinguish between the impact of changes in nominal wages on employment, prices and, thus, real wages and the impact of rising employment on prices and real wages. Or, in terms of the notions of the Z/D model: the distinction must be made between a shift of the Z- (and D-)curve and a movement along the Z-curve.

In summary, it can, therefore, be stated that Keynes's Z/D model does not require standard economic assumptions regarding capital and production theory, and is thus not subject to the Sraffian reflex of being rejected as 'still too much entangled in the mainstream paradigm'.

5. Conclusion

In the first book of his *General Theory*, Keynes anticipates the revolutionary insights of his new theory, which are then developed and substantiated in the following five books. The Z/D model presented in the first book is, thus, a central component of Keynes's new paradigm. In early versions of the *General Theory*, Keynes described this paradigm in detail as a 'monetary economy' or 'entrepreneur economy', contrasting it with the standard economic paradigm of the 'real exchange' or 'cooperative economy'.

In later receptions of the *General Theory* — both by mainstream and many post-Keynesian economists — the Z/D model has largely been ignored or even dismissed as unhelpful. Standard-Keynesians argue that the Z/D model, or what is seen as its equivalent, the explicitly Walrasian 45° diagram, is dynamically stable and, therefore, cannot provide insights beyond the short term based on nominal rigidities. Post-Keynesians, too, still situate Keynes and the Z/D model within the core of (albeit Marshallian) standard economics, whose capital and price theoretical assumptions they reject.

It has been here argued, however, that this criticism fails to adequately recognize that the Z/D model does not originate from the standard economic paradigm. It may not be Keynes but rather his critics who are unable — or unwilling — to break free from the conventional paradigm. Even if remnants of the old paradigm can still be found in Keynes's work — an almost unavoidable trait of any pioneering theory — the Z/D model nonetheless offers a coherent *alternative* to traditional labor market theory and should not be viewed merely as a more general framework that subsumes the traditional theory as a special case and, thus, would renders both approaches commensurable[21]. When Kalmbach/Kurz (1986: 20) made their rather provocatively ironic remarks about Keynes's Z/D model and its proponents, they may not have been so far from the truth after all:

> *"Anyone who, …, makes use of the difficult-to-interpret — and precisely for that reason considered highly significant — Z- and D-functions offered by Keynes in Chapter Three of the General Theory has earned the right to be heard; indeed, they have already overcome the first hurdle toward admission into the brotherhood of the initiated".*

In any case, economists who refer to Keynes — namely, post-Keynesians — should adopt and further develop the concepts of the Z/D model in order to make it applicable to additional questions, such as the impact of minimum wages on employment (see Heise/Pusch 2020) or the effects of technological change on sectoral labor markets. This would be more fruitful than clinging to obsolete labor market models, even if they are expanded by incorporating market

[21] This means that I consider the assessment by Dutt/Amadeo (1990: 132; italic in the original) to be untenable, namely that the Keynesian Z/D conception has "no *intrinsic* advantages over other presentations".

imperfections and issues of social conflict which appear so timely in the age of growing income inequality.

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