Trying to Make Sense of the Principle of Effective Demand

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Abstract
Most of the scholarly reinterpretations of the Principle of Effective Demand are not in line with Keynes’s original presentation of it in Chapter 3 of the *General Theory*. To substantiate this claim, Keynes’s definition is here first reproduced and then compared with different reinterpretations of the principle by textbook authors, and Neo-Ricardian, Kaleckian, and Post Keynesian economists. A new interpretation of the Principle of Effective Demand is suggested which links the Post Keynesian D/Z-model to a reproduction scheme that – broadly in the tradition of Marx – distinguishes between the consumption- and investment-goods “departments”.

*Key words*: Effective demand, D/Z-model, reproduction schemes

*JEL classifications*: B22, E12, E20, E31

1. The Principle of Effective Demand in the literature
1.1 Keynes’s original presentation of the Principle of Effective Demand
In the first section of this paper it is argued that most of the scholarly interpretations of the Principle of Effective Demand are not in line with Keynes’s own description thereof. Since this is a strong claim a full quote from the *General Theory* is called for:

“Let \( Z \) be the aggregate supply price of the output from employing \( N \) men, the relationship between \( Z \) and \( N \) being written \( Z = \phi ( N ) \), 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 \( D = f ( N ) \), which can be called the aggregate demand function. Now if for a given value of \( N \) the expected proceeds are greater than the supply price, i.e. if \( D \) is greater than \( Z \), there will be an incentive to entrepreneurs to increase employment

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In the next sentence Keynes declares Effective Demand “the substance of the General Theory of Employment”. In view of his statement: “The ultimate object of our analysis is to discover what determines the volume of employment” (KEYNES 1973A, p. 89), it is beyond doubt that the Principle of Effective Demand is the centerpiece of the economics of Keynes1.

Keynes defines Effective Demand as a point of intersection of two curves. Are those curves identical with the aggregate demand curve and the 45°-line in the famous “Keynesian Cross”? They are not. Even if we were prepared to ignore the facts that the two functions $D$ and $Z$ as defined by Keynes are specified in nominal terms while those of the Income-Expenditure-model are in real terms, and that Keynes’s functions depend on expectations while the Keynesian Cross-functions do not, it would still be impossible to mix up Keynes’s aggregate supply function $Z$ with the 45°-line. $Z$ depends on employment, the 45°-line does not; $Z$ incorporates profit maximization (see below), the 45°-line does not; $Z$ has a distinguishable price- and quantity-component (see below), the 45°-line has not. In short: unlike $Z$, the 45°-line is no autonomous supply function, it is a “helping line” (SAMUELSON 1948, p. 257) – it is just there to find out which level of income is consistent with the aggregate demand it supports, given the assumptions made about the aggregate demand schedule.

1.2 The Principle of Effective Demand in textbook-economics

What do students of economics learn about Effective Demand from their textbooks? The answer to this question is important because “(s)tandard textbooks are deliberate attempts to represent the consensus concerning accepted facts (and theories) in a given area of study. ... Any would-be textbook whose contents deviates (sic!) from this will fail as a textbook since it will not be generally used” (BOLAND 1991, p. 14). We should be on the safe side in

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1 Keynes uses the expression “Principle of Effective Demand” in the title of Chapter 3 of the General Theory, but not in the given quotation and hardly ever again. A recent discussion has focussed the question whether the given quotation expresses a principle (cf. PASINETTI 1996, DAVIDSON 2001). Here, the Principle of Effective Demand is taken to state that the quantity of employment is fixed at the Point of Effective Demand.
assuming that what has fought its way into those textbooks is regarded as “conventional wisdom” by the discipline’s mainstream.

Perhaps the most influential textbook ever written is Paul A. Samuelson’s *Economics*. But although the macroeconomic framework of *Economics* evolves from a simple Income-Expenditure model (SAMUELSON 1948, Chapter 12) via the same model supplemented by an IS/LM-analysis (SAMUELSON 1973, Chapter 12 plus appendix to Chapter 18) into a combination of the Keynesian Cross with AS/AD-analysis (SAMUELSON/NORDHAUS 1995, Chapter 24), neither in the first nor in later editions of the book is the term “Effective Demand” ever mentioned. And this holds for many other best-selling textbooks too².

Textbooks tend to neglect Effective Demand. But there is a revealing exception in a textbook most prominent in the German-speaking countries: FELDERER/HOMBURG 1999. The 32nd section of this book is called “Effective demand”. There the authors write: “The crux of the argumentation lies in the fact that Keynes points attention to *effective demand*, defined as aggregate demand backed by purchasing power in an economy” (FELDERER/HOMBURG 1999, p. 102, my translation). Felderer/Homburg treat Effective Demand as equivalent to aggregate demand. Their additional remark that *effective* demand is backed by purchasing power while aggregate demand could be just notional (cf. p. 102) seems odd: in all Anglo-Saxon textbooks mentioned above it is presupposed that aggregate demand is not just notional. So it is no surprise that on page 112f. of their book Felderer/Homburg define Effective Demand as the sum of consumption- and investment demand (what the others call aggregate demand), equate that with output and end up with the familiar Keynesian Cross.

To sum up, mainstream textbooks either neglect Effective Demand or confuse it with aggregate demand³. The implications of this practice are severe, since the substitution of aggregate demand for Effective Demand seems to be mainly responsible for some influen-

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² Of course, I cannot provide a complete overview. I examined the following textbooks – which had been indicated to me by colleagues as most often assigned in undergraduate intermediate macro courses and / or used in first-year graduate courses since the Sixties – without finding any reference to the Principle of Effective Demand: ACKLEY 1969, HALL/TAYLOR 1991, GORDON 1993, FROYEN 1996, BARRO 1997, DORNBUSCH/FISCHER/STARTZ 1998, and MANKIW 2000. I also checked earlier editions of these books (in most cases back to the first edition) to see if a reference to the Principle of Effective Demand might have disappeared in the course of time, but this is not the case. The same holds for advanced-level textbooks such as BLANCHARD/FISCHER 1989, and ROMER 1996.

³ Another example for this confusion by a renowned economist would be: “The *General Theory* emphasised *effective demand* – what we now call *aggregate demand*”, BLANCHARD 2000, p. 538.
tial misinterpretations of Keynes’s theory still defending their place in those textbooks: the conclusion drawn from the income-expenditure (450-) model that Keynes simply shifted the equilibrating role (between supply and demand) from prices to quantities – the notion of “fast quantities” but “slow prices” in Keynes’s theory (originating Leijonhufvud⁴); or the notion that Keynes has simply turned Say’s Law upside down – not every supply creates its own demand but every demand creates its own supply (cf. Felderer/Homburg 1999, p. 102f.). As will be argued below these ideas are not compatible with Keynes’s Principle of Effective Demand.

1.3 The Principle of Effective Demand in Neo-Ricardian economics

The core of Neo-Ricardian economics is the determination of relative prices of production in a hypothetical long-period equilibrium that is characterized by a uniform rate of profit. The explanation of the level of output (and employment) is out-of-core. That is, the vector of prices of production is calculated for a given output level (cf. Dutt/Amadeo 1990, p. 56-58).

Neo-Ricardians draw on Keynes when questioned about the output level they presuppose. They refute the marginalist position that the interest rate equilibrates saving and investment, that is, they refute the mechanism by which Say’s Law is supported in neoclassical economics. Instead, they adopt the position that saving and investment are equated by quantity reactions of real income. (That implies that Say’s law need not hold and that unemployment of labor might occur even in the long period equilibrium.) Neo-Ricardians claim that this result is called the Principle of Effective Demand: “The formal proposition is that saving and investment are brought into equality by variations in the level of income (output). This is the Principle of Effective Demand” (Milgate 1982, p. 78). The position thus reached is seen to be the long-period equilibrium for which the prices of production can be calculated.

Apart from its stress on the alleged long-period characteristics of the Principle of Effective Demand (cf. Milgate 1982, Chapter 6), the Neo-Ricardian interpretation of it is strik-

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⁴ “In the Keynesian macrosystem the Marshallian ranking of price- and quantity-adjustment speeds is reversed: In the shortest period flow quantities are freely variable, but one or more prices are given, and the admissible range of variation for the rest of the prices is thereby limited. The ‘revolutionary’ element of the General Theory can perhaps not be stated in simpler terms” (Leijonhufvud 1968, p. 52). Leijonhufvud later stepped back from this interpretation (cf. Leijonhufvud 1974), but it is still alive in the Neo-Keynesian school.
ingly similar to the mainstream variant. Compare for example Milgate’s 6th Chapter to Felderer/Homburg’s 32nd and 35th sections. In both cases the Principle of Effective Demand is connected with quantity reactions of real income which bring about “equilibrium”\(^5\).

1.4 The Principle of Effective Demand in Kaleckian economics

This section is concerned with the interpretation of the Principle of Effective Demand within a group of economists who are united by their conviction that it is important to distinguish different sectors of an economy as well as different income groups (in other words: paying attention to distributive aspects). Some of them are sometimes referred to as Post-Keynesians. I prefer to call their approach Kaleckian – on the one hand because they themselves declare their indebtedness to Kalecki and on the other hand to distinguish them from the authors to be dealt with in the next section.

Chapter three of the second book of ROBINSON/EATWELL 1973 is called “Effective Demand”. After having stated that they intend to follow Kalecki rather than Keynes the authors present a reproduction scheme with two departments (sectors), one of which produces wheat, the other machines. If a certain rate of profit and propensity to save (or different propensities to save for different income groups) are assumed, a specific proportion of the two departments in value terms (what BHADURI 1986, p. 40, calls “macro-economic balance equation”) can be calculated. If the two departments are in proportion (given by the “balance equation”), their whole output can be sold for its value (or price of production). Since profit is incorporated in the value product, “macroeconomic balance” is equivalent to maximization of the realized profit or to realization of the maximum profit respectively. (Since all of this plays an important role in my own reinterpretation of the Principle of Effective Demand I relegate an in-depth discussion of these topics to the third section of this paper.) If, on the other hand, the two departments are out of balance, demand does not equal supply. The authors of the Kaleckian school assume that in such a situation a quantity reaction of real income closes the gap. To recapitulate: There is only one proportion of departments in which demand equals supply, and this equilibrium proportion is brought about by quantity reactions. This is seen to be the Principle of Effective Demand (cf., e.g., ROBINSON/EATWELL 1973, book 2, Chapter 3; BHADURI 1986, Chapter 2; NELL 1998, Chapter 11).

\(^5\) To state it clearly: I do not deny that quantity reactions could be gathered from Keynes’s writings. The issue of this paper is to settle the question whether they are the essence of the Principle of Effective Demand.
As will be argued in more detail below the “macroeconomic balance equation” is identical to Keynes’s “logical” multiplier relation while the alleged quantity reaction which brings about the correct proportion of departments is his dynamic multiplier process (cf. KEYNES 1973A, p. 122f.). If we consider this, the Kaleckian interpretation of the Principle of Effective Demand bears a striking resemblance to the Neo-Ricardian and (if at all) the textbook-view of the Principle of Effective Demand: Its essence is claimed to be a quantity reaction of real income which brings about “equilibrium”, and which could be labeled “multiplier process”. None of these camps mention the two functions $D$ and $Z$ that Keynes uses to illustrate the Principle of Effective Demand.

1.5 The Principle of Effective Demand in Post Keynesian economics

In this paper, I reserve the term “Post Keynesian” for authors who follow Keynes in his presentation of the Principle of Effective Demand in terms of the two functions $D$ and $Z$.

Probably the first scholar who ever drew $D$- and $Z$-curves was Sidney Weintraub. His diagram looks like this (cf. WEINTRAUB 1958, p. 39):

![Figure 1: The D/Z-Diagram](image)

Weintraub called the point of intersection of these two curves “the income-employment equilibrium”. It was Paul Davidson who got back to Keynes’s coining “point of effective demand” (cf. DAVIDSON/SMOLENSKY 1964, p. 4-6; DAVIDSON 1978, pp. 22, 44-49) and who has been the perhaps most audible advocate of the D/Z-model ever since (cf. also DAVIDSON 1994, Chapter 2).

How do these two authors define the $D$- and $Z$-curves? DAVIDSON 1994, p. 19, writes about $Z$:

“Keynes's aggregate supply function represents the relationship between entrepreneurs' expected sales revenues tomorrow and the amount of today's labour hiring that the entrepreneurs require to produce sufficient output to meet tomorrow's expected demand.”
Herein he follows WEINTRAUB 1958, p. 25. If we compare this with the quotation given above in section 1.1 we recognize that Weintraub and Davidson call “Z” what Keynes called “D”. What, then, do Davidson and Weintraub call “D”?


Whereas for Keynes D represents “the proceeds which entrepreneurs expect to receive from the employment of N men”, that is, a magnitude the suppliers are concerned about, for Weintraub and Davidson D represents something which is contemplated by the other side of the market – the buyers. Their interpretation of the Principle of Effective Demand cannot claim to be in line with Keynes’s expositions in Chapter 3 of the General Theory.

Other (mostly Post Keynesian) authors follow Keynes’s model more closely in that they recognize that D refers to aggregate demand as expected by the suppliers. (Let me postpone a discussion of Z until the next section.) The question then arising is what shape the

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6 Weintraub contemplated a D-curve in expectations terms in an early AER-paper (WEINTRAUB 1942), but he later expressed strong doubts concerning the usefulness of expectational curves, cf. KREGEL 1985, p. 547f.

Davidson considers the possibility of interpreting D as expected sales proceeds in the postscript to the 2nd edition of Money and the Real World (cf. DAVIDSON 1978, p. 381-388). There, he also makes clear why he discards this interpretation. Davidson refers to Keynes’s famous letter to Ohlin (KEYNES 1937D), in which Keynes expresses his discomfort with the “Swedish” approach of comparing ex ante plans with ex post results. This approach is nevertheless essential for the Principle of Effective Demand as exposed in Chapter 3 of the General Theory. AMADEO 1989, pp. 67ff., 90f., notes that Keynes’s growing discomfort with the “Swedish” approach seems to pervade the General Theory itself: Keynes starts along “Swedish” lines (GT, Chapter 3, 5), but he then gradually substitutes (ex post) realized magnitudes for (ex ante) expected ones and ends up with a presentation that evokes the impression that the Principle of Effective Demand indeed means nothing more than quantity reactions of real income to equate saving and investment (GT, Chapter 18).

Although Amadeo sees that this implies a theoretical impoverishment because the whole supply side falls out of the picture, he is ready to follow Keynes on this road because he believes – and this seems to be Davidson’s position, too – that the stress on ex ante expectations inhibits an equilibrium analysis of output, employment, and the price level (cf. AMADEO 1989, p. 106f.). To this I would object that there is only one Chapter in the General Theory which is called “The Principle of Effective Demand”, and that is Chapter 3. Chapter 18 presents perhaps a different theory of employment than Chapter 3, but definitely not another version of the Principle of Effective Demand. Furthermore, I think that Amadeo’s vision of Keynes’s intellectual development away from ex ante expectations is questionable. Keynes restated a “Chapter 3”-view of the Principle of Effective Demand – based on the notions of fundamental uncertainty and expectations – forcefully in his 1937 article The General Theory of Employment (KEYNES 1973C).

D-curve has. In Weintraub’s and Davidson’s presentation the D-curve is strictly concave. But while it is uncontroversial that the aggregate demand curve as realized ex post must be strictly concave as long as the marginal propensity to consume is smaller than one (Keynes’s “fundamental psychological law”) and as long as there are decreasing returns to labor, it is less clear why the same should hold for the D-curve in expectations terms. As Parinello 1980, p. 68-70, notes, the individual producer’s expected demand curve is a horizontal line in a diagram with her own offers of employment as abscissa and her own expected proceeds as ordinate (cf. also Wells 1987, p. 512). No single producer expects her own proceeds to be negatively influenced if she cuts back employment, but if all of them did so, aggregate proceeds would certainly be smaller. But how does this aggregate result come about? Certainly there should be some kind of connection between the individual behavior of the producers and the aggregate result. I offer an explanation in the next section in the context of my own reinterpretation of the Principle of Effective Demand.

2. Proposal for a thoroughgoing interpretation of the Principle of Effective Demand

To understand the Principle of Effective Demand, it is highly important to visualize the economic process as a sequence of production periods (cf. Chick 1983, p. 16-21). The production period is mainly an analytical concept. But in order not to be a false abstraction, it has to have some grounding in reality. I think it has. Entrepreneurs do plan for certain periods of the (uncertain) future. The production period is characterized by the length of time that an entrepreneur is bound by her employment decisions taken at the beginning of that period. The term of the wage contract and the period of notice for work contracts seem to be important elements that influence the length of the production period for an individual firm. Keynes turned to comparative statics because, as he wrote in the above-mentioned letter to Ohlin, the production periods of individual firms “are all of different length and

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8 Cf. Amadeo 1989, p. 105, fn. 1. Keynes’s acceptance of the “first classical postulate” (cf. Keynes 1973A, p. 17f.) implies the assumptions (a) of perfect or at least “free” competition (in a Marshallian sense) – that means firms that are unable to dictate the market price for the commodities they produce –, (b) of profit maximization, and (c) of decreasing marginal returns, cf. also Amadeo 1989, p. 13.

9 Referees have complained that the subsections 1.2-1.5 are to short to give a full account of what the different schools had to say about Effective Demand. The referees were right. The only justification I have to offer is that this paper is not meant to be an exercise in the History of Economic Thought. Its main purpose is to introduce some new ideas about the nature of the Principle of Effective Demand. Subsections 1.2-1.5 should set the stage for what follows by reminding the reader of some core statements on Effective Demand from different camps.
overlap one another”, a property that seemed to be inconsistent with the idea of a macro-economic production period. But I think Keynes overstated the difficulties inherent in the concept of production periods. The rules of collective bargaining and legal regulations concerning the beginning and the end of the accounting year tend to bring the production periods of individual firms into line\(^\text{10}\). Another solution to the problem of establishing a macroeconomic production period is to make it very short so that the individual firms’ periods won’t overlap any more. Keynes considered this possibility in the *General Theory*\(^\text{11}\).

Entrepreneurs decide at the beginning of the production period how much to produce during that period, and they deduce from this decision how much employment to offer. From the definition of the production period follows that they are not able to revise these decisions during the production period. It is the Principle of Effective Demand that guides their decision how much to produce. Their cost conditions together with the aim to maximize profits are reflected in their supply function. The price component inherent in the Z-function is a “pretension level”. It is not the market price level an entrepreneur expects (as in the bulk of the Post Keynesian literature on Z), but the proceeds she must have for the last unit of output at each level of employment to satisfy the profit maximizing condition. This unit offer price will grow with employment under conditions of decreasing marginal returns to labor\(^\text{12}\).

The supply functions of individual firms can be aggregated straightforwardly (cf. WEINTRAUB 1958, p. 25f., CHICK 1983, p. 88-92), which yields the aggregate supply function of the economy: \(Z = \phi(N)\). The Z-function will be strictly convex (in the aggregate

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\(^{10}\) Nell presents the same argument somewhat differently: “‘Continuous output’ should not be overstressed. Even under Mass Production the seasons, traditional holidays and social customs provide a framework that sets definitive marketing dates toward which manufactures aim. ... So, while under continuous production there need be no common starting and finishing points, these will often exist, nevertheless” (NELL 1998, p. 205).

\(^{11}\) “Daily” here stands for the shortest interval after which the firm is free to revise its decision as to how much employment to offer. It is, so to speak, the minimum effective unit of economic time” (KEYNES 1973A, p. 47, fn. 1).

\(^{12}\) Mathematically, the supply price is given by: \(P^s = w \cdot \frac{dN}{dY}\), with \(w\) = nominal wage rate, \(N\) = employment, and \(Y\) = output, cf. CHICK 1983, p. 66. I repeat that this results from profit maximizing of a firm that cannot dictate the market price, cf. fn. 8 above.
employment / aggregate proceeds quadrant) if, with rising employment, the profit share in aggregate proceeds grows relatively to the wage share\textsuperscript{13}.

Because of fundamental uncertainty in a monetary production economy, Say’s Law does not hold (KEYNES 1973C). Therefore, each entrepreneur is forced to form expectations about how much she might be able to sell. This leads to (to quote VICKERS 1987) “the producer’s expected demand curve”. Contrary to VICKERS 1987, p. 98, the price level implicit in the expected demand curve need not be equal to the price level implicit in the supply curve at the same level of employment. The price level implicit in the supply curve is a “pretension level”, and it shifts with employment. The price level implicit in the expected demand curve, however – the proceeds each individual entrepreneur thinks she will be able to receive for a unit of output –, is independent of the level of employment she offers. Each entrepreneur has to form an expectation with respect to the price that can be enforced for her product on the (at least to some degree) competitive markets that characterize contemporary capitalism. (As noted before, Keynes took for granted a high degree of competition.) The expectations about the enforceable price will be largely influenced by last period’s experiences. But it is possible to offer more of an explanation than that (see below).

Contrary to the supply curves, the individual demand curves cannot be aggregated straightforwardly. To repeat: since no single producer expects her own proceeds to be negatively influenced if she cuts back employment, the producer’s expected demand curve should be a horizontal line in a graph with her own offers of employment as abscissa and her own expected proceeds as ordinate. But although it is true that no entrepreneur will expect to sell more just because she employs more people, each entrepreneur will expect to sell more if she expects aggregate employment to be higher in the next production period, because each entrepreneur knows that in this case aggregate demand will be higher. If we interpret the employment quantity with regard to the individual entrepreneur’s D-curve as the share of expected aggregate employment for an individual firm, then the D-curve of every single firm (as well as the aggregate D-curve) will be strictly concave. There is a range of conceivable total employment levels along with the specific share of an individual firm. The expected proceeds of each firm grow with this share, but due to decreasing marginal returns to labor, (real) income and also sales proceeds are expected to grow with a

\textsuperscript{13} If the profit share does not grow, the Z-curve is a straight line. In this case the ratio: average product of labor / marginal product of labor remains constant, too, with growing employment (as in, e.g., $Y = \alpha N^\beta$), cf. DAVIDSON 1994, p. 173f., fn. 9. For a formal derivation, see VICKERS 1987, p. 93.
decreasing slope\textsuperscript{14}. So we have two cases: if the entrepreneurs have some macroeconomic insights, the aggregate demand curve $D = f(N)$ (which is expectation-dependent\textsuperscript{15}) will be strictly concave. If they have no such insights, it will be a horizontal line\textsuperscript{16}.

Each entrepreneur fixes her labor demand at the point where her D- and Z-curve intersect, “for it is at this point that the entrepreneurs’ expectation of profits will be maximised” (KEYNES 1973A, p. 25). Note that, although the concepts of price and employment are different for both curves (supply price as a “pretension level” dependent on costs versus demand price as an estimated enforceable price for the firm’s output; employment level of the firm versus employment level as the firm’s share of expected total employment), they are all mutually consistent at this point of intersection. The supply price equals the demand price, and the firm’s \textit{de facto} employment equals the entrepreneur’s expectation as to how much of total employment is attributable to that firm.

If the above-mentioned qualifications are taken into consideration, the individual D- and Z-curves can be aggregated, which yields the Point of Effective Demand for the economy as a whole\textsuperscript{17}. This point contains all information about price-, output-, and employment

\textsuperscript{14}To the best of my knowledge the only scholar who has considered this solution so far is CASAROSA 1981, p. 192. But he believes it to be “completely incompatible with the theory of the firm operating in an atomistic (let alone perfectly competitive) market”, and claims that “the notion that the expected demand function is the producers’ estimate of the expenditure function is clearly a theoretical aberration which has strangely survived” (ibid). Casarosa is right that the notion of firms forming \textit{ex ante} expectations about their market share is incompatible with the microeconomic theory of the small firm operating under perfect competition. But I do not think that Keynes – who was concerned with the real world – had such firms in mind. In his theory firms are not \textit{atomistic} but also not powerful enough to dictate the price. They have to form expectations about the price for their products they can enforce and about the market share that might be attributable to them.

\textsuperscript{15}Sometimes Keynes uses the term “aggregate demand” to describe the aggregate demand that has been realized \textit{(ex post)}. There is a certain confusion here, to which I return below.

\textsuperscript{16}As to the shapes of $D$ and $Z$ the following should be noted: $Z$ \textit{may} be a linear function of $N$ even under decreasing marginal returns (cf. above, fn. 13). It \textit{will} be a straight line under constant returns, with the slope given by the wage rate. In this case, the D-curve, too, will be a linear function of $N$, with the slope given by the marginal propensity to consume multiplied by the demand price level and by the (constant) marginal product of labor. The slopes of $D$ and $Z$ depend crucially on the assumptions made about the “production function” – in other words: about the marginal product of labor. Note also, that the case of increasing returns cannot be handled with the D/Z-diagram, because then the Z-curve becomes concave, the D-curve becomes convex, the two curves don’t intersect, and there is no Point of Effective Demand

\textsuperscript{17}I return to Keynes’s confusion in the choice of terms. On p. 259 of the \textit{General Theory}, he mentions “aggregate effective demand”. Here he means aggregate demand which has been realized \textit{ex post}. Contrary to
levels for the next production period. One might conceive of this point as an equilibrium, but it is not some kind of “market equilibrium”. It is a point where the entrepreneurs’ expectations and pretensions concerning different things, e.g. prices, costs, profits, demand etc. are mutually consistent. I have chosen to call this interpretation of the Principle of Effective Demand “thoroughgoing” because it uses the same analytical devices as did Keynes (the D- and Z-curves), and it overcomes some interpretative problems as to the meaning and shape of the two curves, so far unsolved in Post Keynesian Economics.

Understood this way, the Principle of Effective Demand has fatal consequences for certain interpretations of Keynes’s theory. Consider the familiar “quantity reactions”. They are simply impossible. The entrepreneurs decide at the beginning of the production period how much to produce and how many people to employ. They use the D- and Z-curves to find out which level of employment will be profit-maximizing, given what they know and what they expect. If their expectations turn out to be wrong, e.g., if they have underestimated demand, they are not able to correct their decisions ad hoc. They are bound by them until the end of the production period. Victoria Chick was right to point out that “(e)ffective demand is an unfortunate term, for it really refers to the output that will be supplied; in general there is no assurance that it will also be demanded” (CHICK 1983, p. 65). It is not the de facto demand, but the ex ante expected demand, that is decisive (together with the Z-function) for output and employment during each production period. If the entrepreneurs have (ex ante) over- or underestimated the period’s de facto demand they cannot produce more or less ad hoc – as in the 45°-model. The definition of the production period given above (the length of time that an entrepreneur is bound by her employment decisions) implies that corrections could only affect next period’s supply.

Before I continue I should pause for a moment to discuss if all of this it is not just a piece of sophism. One might object to the exposition chosen here that it doesn’t really make a difference. If the entrepreneurs have (ex ante) underestimated aggregate demand they will react by selling off their inventories. This is a form of quantity reaction. At the beginning of the next production period they will most probably expand their output. This is a quantity reaction, too. Moreover, they could try to influence the productivity of the labor force (hired at the beginning of the period) by, e.g., talking them into working overtime or short time respectively. That would trigger off a quantity reaction, too. So why should we feel

this practice, one has to distinguish carefully between “Effective Demand” (the point of intersection of the D- and Z-curve), “aggregate demand curve” (the D-curve in expectations terms), and “aggregate demand” as realized ex post.
obligated to cut the continuous-time analysis underlying the conventional wisdom about Effective Demand into piecemeal production periods?

My first answer to this question is that the production period – as an analytical concept – is superior to the traditional analysis because it (a) enables the researcher to deal with expectations and their possible disappointment, (b) helps settling the disturbing question of price- versus quantity-reactions, and (c) sheds new light on the multiplier by enabling us to see it as a structural relationship between the two sectors (or “departments”) of the economy.

These issues are confronted in the next section. Yet there is another reason: Keynes’s main objective was to write a theory of employment (see section 1.1). Even if one permits quantity reactions of real income during the production period other than inventory adjustments, for example due to workers doing overtime or short time\(^\text{18}\) – the quantity of employment would still be fixed at the Point of Effective Demand. In the traditional continuous-time analysis, on the other hand, where real output is freely variable, no clear-cut statements are possible about what happens to employment (does it rise – or does only productivity rise?).

3. Extending the analytical framework: two departments in the D/Z-diagram, a structural view of the multiplier, and macroeconomic balance

In section 1.4 above, it was mentioned that Kaleckians have understood the Principle of Effective Demand as a statement about quantity reactions of real income that establish a balance between two departments in a reproduction scheme. Though I reject their “quantity

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\(^{18}\) I am reluctant to concede this, though. Since overtime or short time constitute rearrangements of the work contracts they mark the beginning of a new production period within the analytical framework presented here. If we abstract from inventory adjustments we could regard the production period as the short term in which disequilibria are cured by price reactions. New and unexpected prices lead to revisions in the entrepreneurs’ expectations as to the enforceable prices for their products. These revisions will, at the beginning of the next production period, lead to a different D-curve (in expectations terms), to a new Point of Effective Demand, a different labor demand, and a different level of real output. So the quantity reaction does not take place within the production period but – if at all – in the transition from one period to the next. I say “if at all”, because, for some reason, entrepreneurs might expect conditions in the next production period to be fundamentally different from those in the actual one so that an expansion of output might not look profitable. Quantity reactions are no “hydraulic” device (as the conventional wisdom about effective demand would have it). Not much can be said about them in general within the confines of the historical time-theory that KEYNES 1973A, p. 293, and KREGEL 1976 have called the theory (or model) of “shifting equilibrium”.

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reaction"-interpretation of the Principle of Effective Demand, I find it convenient – if not necessary – to reinterpret Keynes’s theory in a scheme with two departments.

Keynes normally presents his theory on a highly aggregated level. But in some instances, especially when discussing the multiplier, he keeps the sector producing consumption-goods (Department II in terms of Marx 1973, Chapters 20-21) and the sector producing investment-goods (Department I) separate. For example, in his 1937 article The General Theory of Employment he writes: “there is always a formula ... relating the output of consumption-goods which it pays to produce to the output of investment-goods; and I have given attention to it in my book under the name of the multiplier” (Keynes 1973C, p. 121). Here, Keynes is picking up a thread from the fourth paragraph of Chapter 10 of the General Theory where he writes:

“The discussion has been carried on, so far, on the basis of a change in aggregate investment which has been foreseen sufficiently in advance for the consumption industries to advance pari passu with the capital-goods industries without more disturbance to the price of consumption-goods than consequential, in conditions of decreasing returns, on an increase in the quantity which is produced” (Keynes 1973A, p. 122).

Here, Keynes adopts a scheme with two departments and formulates the multiplier in terms of ex ante expectations. As I have argued elsewhere (Hartwig forthcoming), the significance of the multiplier is that it provides the entrepreneurs of the consumption-goods sector with the “formula” (mentioned by Keynes) to estimate ex ante the total “emanation” (in value terms) of an expected (additional) investment expenditure into the consumption-goods department. “Advancing pari passu” means that the net value added of the two departments expands in the proportion Department I : Department II as $1 : \frac{c}{1-c}$. If it does, we have a situation of “macroeconomic balance”, that is a situation in which at the end of the production period the whole output of both departments has been sold for its value (or price of production) and (at the same time) all ex ante plans have been fulfilled. I propose to call such a situation “completely successful reproduction”. The economically important variable is not so much the investment multiplier ($\frac{1}{1-c}$), but the multiplier ($\frac{c}{1-c}$). It designates the proportion of Department II relative to Department I that is necessary for completely successful reproduction, and that must be sustained in an expanding...
economy to ensure the identity between saving and investment. In so far as it designates a quantitative proportion between the two departments, the multiplier is a “model of structure” (in the sense of NELL 1998, pp. 119-121). The advantage of the “structural view” of the economic process as compared to the continuous-time approach is that it allows to incorporate expectations into the analysis and to interpret the multiplier as the guideline for the entrepreneurs of Department II for how to form these expectations.

In what follows, these insights will be incorporated into the $D/Z$-paradigm of the Principle of Effective Demand.

**Figure 2:** The equilibrium proportion of departments

In Figure 2, $P_I$ is the price-of-production level of the investment-goods sector, $I_r$ is real output of this sector, $P_C$ is the price-of-production level of the consumption-goods sector, and $C_r$ is real output of consumption-goods. The line OA (with a slope of $\frac{c}{1-c}$) depicts the equilibrium proportion of departments. In Figure 3, this proportion has been translated into a demand curve.

**Figure 3:** Demand under completely successful reproduction
Note that what I call the “aggregate demand curve under completely successful reproduction” $D_{csr}$ is not to be confused with the D-curve of Figure 1. $D_{csr}$ reflects the equilibrium proportion of departments at different levels of employment. If employment grows along the X-axis, the part of aggregate demand that is dependent upon employment ($D_1$ in Keynes’s notation) will grow, but – as has been noted before – with a decreasing rate due to diminishing marginal returns. $D_{csr}$ is so drawn that it incorporates for each level of employment-dependent nominal consumption demand (which is equal to the value added in Department II, $PCC_r$, in a situation of “completely successful reproduction”) the corresponding level of investment demand (equal to the value added in Department I) given by the adapted multiplier formula.

To repeat: The curve is in nominal terms. Along the Y-axis proceeds are measured as the product of the aggregate demand price ($P^d$) and real output in both departments ($Y$).

The $D_{csr}$-curve reflects what NELL 1998, p. 350, calls a “core” relationship of capitalist economies. It changes its shape only if changes in productivity or the marginal propensity to consume should occur. As will be shown shortly, it does not reflect what actually happens because of the possibility of expectational errors. But note that, since completely successful reproduction implies maximization of realized profit (as was mentioned above in section 1.4), $D_{csr}$ is the curve that entrepreneurs would want to know *ex ante*.

The next step will be to combine $D_{csr}$ with the $D/Z$-diagram (which has been interpreted as the aggregate result of a thought experiment of each entrepreneur aiming at estimating *ex ante* which output and employment level will realize maximum profit)\(^{21}\). Let us concentrate on $D$, first. The difference between the $D_{csr}$-curve and the D-curves in Figure 4 is that, for the latter, a specific level of estimated investment expenditure ($de_n$) has to be taken for granted, whereas in $D_{csr}$ a different level of investment is implicit at each $N$.

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\(^{20}\) Questions of weighting are neglected. Note that the demand price $P^d$ has replaced the value (or price of production). If $P$ is the value (or price of production) of a unit of output in Marx’s notion, then $P^d$, the price that is effectively paid for this unit of output, can deviate from it due to peculiarities of the distribution sphere. But that means that the *effective* rate of surplus-value is different from the relation between “surplus labor” and “necessary labor”. The net value added (or income) represented by each unit of output is the sum of variable capital (wage) and the *effective* surplus-value (profit) inherent in it. Since income is the magnitude that influences demand as well as the equilibrium proportion of departments, we have to concentrate on $P^d$ instead of $P$.

\(^{21}\) To the best of my knowledge something similar has not been tried before.
Let’s assume for simplicity that Department I produces to order. Then the whole burden of expectation-formation lies with the entrepreneurs of the consumption-goods department. $I_n^{de}$ is the value of investment that the entrepreneurs of Department II expect. The two D-curves show alternative expectations as to the consequences of different investment levels for the nominal demand for consumption-goods. An arguably ideal case is depicted by $D_1$. If the entrepreneurs of Department II have correct expectations about the marginal propensity to consume as well as the volume of nominal investment demand and the demand price level (that means: $c_i^e = c$, $I_n^{de} = I_i$, $P_i^{de} = P^d$), then $D_1$ intersects $D_{csr}$ at Point A, and the economy is in macroeconomic balance at the end of the production period. The two curves have to intersect at Point A, because, given the premises mentioned, $C_1$ will be the expected total “emanation” (in value terms) of the expected investment expenditure $I_n^{de} = I_i$ into the consumption-goods department. This “emanation” includes the total consumption demand of those producing consumption-goods (and receiving profits therefrom), and it can be calculated ex ante using the modified multiplier formula. (But even this case is perhaps not so “ideal”, because there is no reason why $N_i$ should imply full employment of labor.)

If the entrepreneurs of Department II do not expect $c$ and $I_n$ and $P^d$ correctly, then the economy will only find itself in a position of balance at the end of the production period if the various deviations should by chance exactly cancel out. In Figure 4, $D_2$ depicts a situa-

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22 In Figure 4 it is assumed that $I_n^{de}$ is equal to $I_i$ of Figure 3.
tion where the expected demand-price level $P^{de}$ is higher than the *ex post* demand-price level (at the end of the production period) $P^d$. The higher the expected demand price level is, the more towards the top of the diagram will the D-curve be situated, because not only nominal investment demand is overestimated, but also the “emanation” of demand into *Department II*. But if price expectations turn out to be overly optimistic, the condition for macroeconomic balance will be violated. We have to be careful in interpreting what that means! Prices are set by firms. So, if entrepreneurs expect *ex ante* that $P^{de}_2$ will be enforceable, they will set prices at that level, and $P^{de}_2$ will rule in the market initially. But if buyers are reluctant to accept such a high price level, proceeds will fall short of $P^{de}_2 \cdot Y(N_2)$. If entrepreneurs react by cutting prices, and it is assumed here that they do so to some extent — the alternative being accumulation of inventories —, the *ex post* demand-price level $P^d$ will fall short of $P^{de}_2$, and the condition for completely successful reproduction will be violated. The same result will emerge if the entrepreneurs of *Department II* overestimate *ex ante* real investment demand or the marginal propensity to consume.

It has been said that the expectation of higher demand prices shifts the D-curve to the top. A crucial issue to note at this juncture is that this can only happen if price increases are expected in both departments. To see what this implies consider Figure 5.

**Figure 5: Marx-Keynes reproduction scheme I - Completely successful reproduction**

**Department I:**

\[
250v + 250s = 500
\]

**Department II:**

\[
1000v + 1000s = 2000
\]

In this reproduction scheme, it is assumed that the rate of surplus-value is unity in both departments. This implies that the amount of variable capital (subscript “v”) and of surplus-value (subscript “s”) are equal in each department. What the entrepreneurs (E) spend as variable capital constitutes income for the workers (W). The rest of the value added, the surplus-value, belongs to the entrepreneurs and constitutes their income. Of course, the income of the entrepreneurs has to be realized in the process of reproduction by selling their products to other entrepreneurs, and to the workers.

Keynes does not distinguish between workers and entrepreneurs as far as the disposal of their income is concerned. As “households” they dispose of their income according to the
“fundamental psychological law”. That is why the marginal propensities to consume are the same for workers and entrepreneurs in the scheme. The main rationale for me sticking to Keynes at this point is that it keeps the formula for the equilibrium proportion of departments as simple as possible\textsuperscript{23}.

The workers of Department I want to consume the equivalent of 80% of their income of 250$, which gives a value of desired consumption of 200$ (indicated by the arrow annotated by $C_{(W1)} = 200$). The entrepreneurs of Department I also want to spend 200$ on consumption whereas both the workers and the entrepreneurs of Department II want to consume the equivalent of 800$. All the consumption plans add up to 2000$, which happens to be the value added of Department II. In the same way the savings sum up to the value added of Department I \textsuperscript{24}. The whole output has been sold for its value; the reproduction has been “completely successful”. The reason is that the two departments stand in equilibrium proportion:

$$Department I : Department II \text{ as } 1 : \frac{c}{1-c} = 1 : 4.$$  

A further remark is apposite. Since constant capital is absent from the scheme, it may not be concluded that we have a situation of “simple reproduction” in Marx’s sense. It is not possible to tell if the net value added of Department I constitutes an addition to the capital stock or not, since it is unknown how much constant capital has to be replaced. Constant capital has to be absent from the scheme (in other words: it is necessary to deal with net value added instead of the total value product of the two departments) to account for Keynes’s treatment of the transfer of the value of constant capital onto the output. It seems, Keynes had some difficulties with this issue, because his statement: “(t)he reader will observe that I am deducting the user cost both from the proceeds and from the aggregate

\textsuperscript{23} In Hartwig, forthcoming, the formula for the equilibrium proportion of departments for different marginal propensities to consume between workers and entrepreneurs is derived. Then, possibly different profit shares between the two departments also have to be considered.

\textsuperscript{24} A remark about workers’ savings is apposite. In the reproduction scheme it looks as if they constituted a direct demand for investment-goods. Of course, this is not the case. The transfer of workers’ savings to the entrepreneurs is effectuated by what Keynes once has called the “financial machine” (Keynes 1973B, p. 352). It is assumed that there is no hoarding. (Indeed, zero hoarding is a precondition for “completely successful reproduction”.) If workers save part of their income they are, in effect, granting loans to the entrepreneurs. Then they can participate in the distribution of the surplus value (which is divided between profit and interest on debt). It follows that it is an over-simplification not to distinguish between functional and personal income distribution in the scheme. On the other hand, as long as the marginal propensities to consume are assumed to be identical, this simplification makes no difference.
supply price of a given volume of output, so that both these terms are to be interpreted net of user cost; whereas the aggregate sums paid by the purchasers are, of course, gross of user cost” (KEYNES 1973A, p. 24, fn. 2), leaves the reader at a loss. And his “indubitable [proposition] ... that the income derived in the aggregate by all elements in the community concerned in a productive activity has a value exactly equal to the value of the output” (KEYNES 1973A, p. 20) is imprecise. National accounts distinguish between gross and net income. Keynes’s statement is correct for gross income, but it is only (net) “national income” that households have at their disposal for consumption or saving and that is relevant for the reproduction scheme. Keynes’s theory mainly deals with net value added (cf. also BHADURI 1986, Chapters 1-2).

Now assume that, at the beginning of production period \( t+1 \), entrepreneurs of Department II expect a demand price level that is 50% higher in both departments. Assume further, that they do not expect the variable capital parts to alter so that all the increase in proceeds would constitute surplus value (or profit). (Keynes might have called such a situation “true inflation”, cf. KEYNES 1973A, p. 118f.) The result is shown in Figure 6.

Figure 6: Marx-Keynes reproduction scheme II - Completely successful reproduction

Reproduction is still “completely successful” because the two departments have conserved their equilibrium proportion. But this will not be the case if the entrepreneurs of Department II expect the demand-price increase to happen only in their own department. Then, as is shown in Figure 7, the value added in Department II would be 3000$, but the aggregate consumption demand would only add up to \( 800S_{C(W2)} + 1600S_{C(E2)} + 200S_{C(W1)} + 200S_{C(E1)} = 2800\)$. The output of Department II could only be sold for 200$ below value. On the other hand, the demand for the output of Department I would be much higher than the value added there.

25 User cost, as defined by Keynes, are not to be confounded with write-offs, though. They comprise only the part of the depreciation that is due to wear and tear plus purchases between entrepreneurs.
If the entrepreneurs of Department II are reluctant to cut prices, they could also accumulate inventories. But regardless of what the entrepreneurs do, the condition for completely successful reproduction is violated: the output cannot be sold for its value, and not all plans are being realized. Let’s assume that the net value added of Department II (of 3000$) incorporates 1000 units of the aggregate consumption-good, and that the expected demand price of each unit is 3$. If the entrepreneurs of the consumption-goods department do not expect the price level of Department I to “advance pari passu” they know ex ante that the profit rate will fall short of the projected 2/3 if they produced 1000 units at cost of 1000$. Instead, the profit rate would only be 9/14 (= 1800$/2800$). If they insist on a profit rate of 2/3 they will produce less than in the production period before the expected demand price increased. By cutting back production to 666.7 units (this implies a cut-back in employment which may be even greater than 33.3% if we assume decreasing marginal productivity of labor), and by selling each unit for the expected enforceable price of 3$ the entrepreneurs of Department II can realize a profit rate of 2/3. They can realize it, because by doing so, they will restore the equilibrium proportion of departments (see Figure 8).

The last task is to bring aggregate supply back into the picture. From what has been said so far, it follows that entrepreneurs (especially of Department II) try to estimate which level of aggregate demand will imply macroeconomic balance, so that they can sell their output “without more disturbance to the price of consumption-goods than consequential, in condi-
tions of decreasing returns, on an increase in the quantity which is produced” (Keynes 1973A, p. 122). Let that estimation have led them to Point A in Figure 9:

Figure 9: The point of effective demand and macroeconomic balance

If the aggregate supply function is given by Z, the Point of Effective Demand will be B (the point of intersection of D and Z). If the entrepreneurs supplied only Y(N₁), the aggregate demand price (A) would be higher than the aggregate supply price, and they would have (in Keynes’ words) “an incentive ... to increase employment beyond N”. But, on the other hand, if they do supply Y(N₂) at Point B, they will find out during the production period that they cannot sell the whole output because the departments are out of balance. At the price level \( P^d = P^c(N_2) \) the consumption-goods department is “too big”: as in the reproduction scheme of Figure 7 it cannot sell its entire output at the price level expected to rule in the market.

At first sight, the entrepreneurs of Department II seem to have two alternatives Supplying at Point A means that they can expect to sell the whole output at the expected demand price level but to forego additional profits. Supplying at Point B means that the expected unit demand price exactly equals the marginal cost of the last-produced unit, but it also means that part of the output cannot be sold – and entrepreneurs know that \( ex \ ante \). This gives the hint how to reconcile the two alternatives. If entrepreneurs of Department II know \( ex \ ante \) that part of the output cannot be sold if they are supplying at the Point of Effective Demand, then they must expect price cuts during the period. But that means that the demand price level inherent in D is not yet the correct one. Expectations concerning the enforceable price level will have to be revised downward; and this “profit deflation” in
Department II will move the D-curve upward. It is the opposite case to the one discussed in the context of Figures 7 and 8: a downward revision in the expected demand price level only in Department II disturbs the equilibrium proportion of departments. Department II becomes “too small” in terms of its value added in relation to Department I and has to expand its output to grow into the correct proportion. What has been lost in nominal terms (reduction in the expected unit demand price) has to be gained in real terms to achieve what entrepreneurs want: completely successful reproduction.

What is implied here is that the proportion of departments inherent in Point A is not yet the equilibrium proportion because it has been calculated for the wrong relation of demand price levels of Departments I and II. To show that, in Figure 9 aggregate nominal consumption demand, aggregate nominal investment demand, and the aggregate supply price are deflated by the demand price level of consumption-goods. (Since this price level is not dependent on employment, the deflation does not change the slopes of D and Z.) If expectations concerning the demand price level in the consumption-goods department have to be revised downward – as in our example – the horizontal line: \( \frac{P_I^d}{P_C^d} \cdot I^{de} \) will move upward. This reflects the fact that, given a certain nominal investment demand and marginal propensity to consume, in macroeconomic balance the consumption-goods department will be the bigger in real terms the lower the consumption-goods price level is, while, of course, the equilibrium proportion of departments in nominal or value terms does not change with changes in the price level of Department II. The D-curve shifts upwards to \( D^* \). A certain point on the new D-curve (let that be Point C) implies macroeconomic balance. This means that the entrepreneurs of the consumption-goods department expect a real demand of \( \frac{c}{1-c} \cdot \frac{P_I^d}{P_C^d} \cdot I^{de} \) (which is bigger than before). The Z-curve, also being deflated by \( P_C^d \), shifts to the top, too. The new Point of Effective Demand does not necessarily coincide with Point C, but if it doesn’t, a new round of revision of demand price expectations in Department II sets in, resulting in shifts of D and Z, until the Point of Effective Demand implies macroeconomic balance. Only in this case demand price expectations are consistent. In all other situations, such as Point A in Figure 9, they have to change before entrepreneurs can be satisfied with their thought experiment aiming to estimate ex ante which output and employment level will realize their maximum profit.
Conclusion

In this paper it was argued (a) that the interpretation of Keynes’s Principle of Effective Demand pervasive in the literature (across different schools of thought) maintains that quantity reactions of real income would equilibrate supply and demand, and that this interpretation contradicts Keynes’s own presentation of the principle, (b) that the Principle of Effective Demand should be interpreted as the aggregate result of a thought experiment of each entrepreneur aiming to estimate ex ante which output and employment level will realize her maximum profit, and (c) that the result of this thought experiment implies an expectation of macroeconomic balance of the two departments of the economy.

It should be kept in mind, though, that all ex ante expectations are liable to be disappointed, and in this case adaptive processes like price changes, accumulation or depletion of inventories, and revisions of expectations are likely to be observed during each production period. This leads to what Keynes has called a “theory of shifting equilibrium”.

One last point has to be emphasized. In his book Keynes’s Principle of Effective Demand, Amadeo treats the demand price level as exogenously given (cf. AMADEO 1989, p. 104). If the exposition of the present paper was to gain support, then the Principle of Effective Demand would cease to be seen as a theory of quantity reactions. Instead it would be interpreted as a theory to explain not only the level of real output and its split into consumption- and investment-goods, but also the hitherto unexplained demand price level.

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