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## The elephant in the other room

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# The Elephant in the Other Room

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# **The Elephant in the Other Room**

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## **Abstract**

Fabio Petri's *Microeconomics for the Critical Mind* (2021) is an impressive tour de force in the field of microeconomic theory. It manifests the author's command of cutting edge analytical tools, concepts, and theoretical approaches both in the mainstream and in the heterodox literature. The book aims to show that the neo-Ricardian approach, as augmented by the Keynesian/Kaleckian account of demand-constrained equilibrium, is a viable -- indeed, superior - - alternative to mainstream theory. While the book is effective in identifying current shortcomings of mainstream equilibrium and welfare analysis (many of which were first identified in the mainstream literature), it does not provide a rigorous demonstration that these or related difficulties are clearly avoided by the surplus approach, or that the latter is completely consistent with phenomena such as persistent unemployment. This is primarily a consequence of Petri's central distinction between "core" and "out-of-core" analysis, which offers no unified or clearly articulated basis for deriving or characterizing general equilibrium outcomes. In lieu of such foundations, Petri discusses a portfolio of analytically unconnected formal and informal narratives, some of which rely on the very theoretical constructs that he criticizes the mainstream for employing.

**Keywords:** economic theory, general equilibrium, stability, normative economics.

**JEL codes:** D5 General Equilibrium and Disequilibrium; D6 Welfare Economics; B5 Current

Heterodox Approaches

## 1. Introduction

As an advanced textbook on the current state of economic theory, Fabio Petri's *Microeconomics for the Critical Mind* (2021) constitutes an impressive achievement.<sup>1</sup> It covers a wide range of salient topics investigated in the mainstream and heterodox economics literature, often in considerable analytical depth, and manifests the author's evident mastery of both the attendant technical details of the material covered as well as its theoretical import.

Per Petri's expressed intent, the text offers something other than just a representation of current microeconomic theory. It also presents a sustained brief for what he terms the "classical" or "surplus" approach to the theory of value and income distribution.<sup>2</sup> As political economists whose own research has addressed concerns and concepts associated with the classical and Marxian schools of economic thought, we are sympathetic to Petri's goal of promoting a heterodox perspective on economic phenomena. As demonstrated in his text, the surplus approach has provided grounds for powerful critiques of certain analytical practices and theoretical inferences in the mainstream literature, and we have no doubt that it will continue to play this role.

Petri, however, pursues a much stronger case. He posits the surplus approach, as augmented by the Keynesian/Kaleckian account of demand-constrained equilibrium, as a viable *alternative* to mainstream theory (vii) – by which he primarily means mainstream general equilibrium and social

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<sup>1</sup> We shall henceforth cite Petri's text by simply specifying page numbers within parentheses.

<sup>2</sup> Although Petri cites Adam Smith and Karl Marx on par with David Ricardo as "main representatives" of this approach (3), the latter, as developed in this text, omits key elements of the former two authors' theories, such as Marx's distinction between absolute and relative surplus value and Smith's explanation of relative wages in terms of differential skill requirements or job characteristics and his doctrine of diminishing profitability of capital investment. Furthermore, the core of the approach presented in the text eschews all three authors' reliance on labor-based value theories, and thus excludes Marx's labor-based theory of exploitation, while building directly on the analytical foundation established in Piero Sraffa's classic *Production of Commodities by Means of Commodities* (1960). The core approach discussed in the text is thus perhaps best understood as *Sraffian* or *neo-Ricardian*.

welfare analysis – that avoids “insurmountable” theoretical difficulties encountered in the mainstream approach while being “compatible” with the empirical reality of persistent Keynesian unemployment and the promotion of a progressive policy agenda. This aspect of his argument proves to be considerably less convincing. While his text is effective in identifying current shortcomings of mainstream equilibrium and welfare analysis (many of which were first identified in the mainstream literature), it does not provide any rigorous demonstration that these or related difficulties are clearly *avoided* by the surplus approach, or that the latter is consistent with phenomena such as persistent unemployment.

This is primarily a consequence of Petri’s central distinction between “*core*” and “*out-of-core*” analysis, which offers no unified or clearly articulated basis for deriving or characterizing *general* equilibrium outcomes. In lieu of such foundations, Petri discusses a portfolio of analytically unconnected formal and informal narratives, some of which rely on the very theoretical constructs that he criticizes the mainstream for employing.

We note three important caveats before proceeding. First, there is an enormous literature investigating various elements of the surplus approach discussed by Petri, and we do not pretend to engage all of it. Our comments focus on the specific arguments presented in Petri’s text. Second, none of our comments should be read as dismissing the possibility that our concerns might be satisfactorily addressed by future theoretical developments consistent with the overall framework. However, any such developments would necessarily involve significant expansion of the deductive “core” of the surplus approach. Finally, we do not defend any specific alternative approach as superior to neo-Ricardian theory. Rather, our aim is to present an immanent critique of Petri’s approach by highlighting its limitations and inconsistencies.

## 2. “Core” vs. “out-of-core” analysis in the surplus approach

The primary subject of Petri’s text is the theory of value and distribution, which concerns the determination of relative commodity prices along with rates of wages, profit or interest, and land rents (3-4). In his representation, the surplus approach to the study of value and distribution presumes much less scope than its mainstream counterpart for the application of “purely deductive” reasoning, by which theoretical claims about given economic phenomena are demonstrated to follow necessarily from a clearly specified set of premises. According to this account, formal deductive reasoning holds “full sway” only in the analytical *core* of the framework, which is restricted to the derivation of a set of commodity prices and an economy-wide profit rate, based on a formal equation system in which wages, quantities of commodities produced, and technical conditions of production are taken as *given* (71).

Distinctively, the formal system studied in the analytical core makes no reference to individual endowments or preferences (and by extension, to commodity demand or input supply functions). Furthermore, the prices derived within this system (variously referred to as *natural prices*, *prices of production*, or *long-period normal prices* (30-31)) are claimed, without explicit demonstration, to reflect stable “long-period” *equilibrium* in the sense of representing “the prices around which market prices gravitate, continually tending to come back to them after every deviation” (30).

In Petri’s account, *all other* theoretical considerations associated with the surplus approach, including but not limited to determination of the magnitudes taken as data in the core framework, are relegated to *out of core* analysis. According to Petri, this body of analysis is distinguished from the core in that it admits the influence of specific historical, social, and political factors, and is thus “much more inductive, attentive to historical specificities, and *generally incapable* of arriving on a purely deductive basis at univocal predictions...” (72, emphasis added).

However, an examination of the theoretical considerations Petri treats outside of the core framework fails to corroborate his basis for distinguishing the two analytical spheres of the surplus approach. While some elements, such as the notion of “subsistence” wages, are expressed solely in narrative terms and supported primarily by casual empiricism or passages from classic texts, other significant elements, including the Keynesian aggregate demand model (76-79) and certain versions of the efficiency wage model (1146-1156), involve the use of formal deductive models, and their relevance is not predicated on specific social or political conditions.

Moreover, Petri’s claim that in the classical approach the general wage level is determined by some combination of *subsistence* and *bargaining* considerations is categorical rather than historically contingent (12-13), and formal deductive models of both of these phenomena exist (for example, strategic bargaining models such as in Rubinstein (1982)). While the specific conditions informing the determination of the subsistence wage or relative bargaining power may be historically contingent, Petri identifies no evident obstacle to providing a sufficiently general formal deductive model that integrates both elements of wage determination while allowing due scope for the influence of historical or social contingencies.

Thus, the distinguishing characteristic of the theoretical considerations treated outside of the core is neither the use of inductive reasoning nor the presence of historical or institutional contingencies. It is, rather, the lack of any effort to integrate the various narratives examined into the formal analytical system representing the core of the surplus approach. This lack of theoretical integration has several fundamental implications for Petri’s claims regarding the coherence and analytical superiority of this approach.

First, the Sraffian core offers at best a *partial* account of value and distribution in an economy, and as such cannot readily be compared to models of *general* equilibrium. The limited scope of



the Sraffian core is arguably undesirable if one wants to build a general approach to value and distribution, or even more ambitiously, to microeconomic theory. But it also rests on shaky theoretical foundations inasmuch as the justification given for treating certain variables as exogenous (and therefore explained outside of the core framework) is unpersuasive. If, however, the core were expanded to endogenize, for example, wages or output, then it is unclear that all of the defining characteristics of the Sraffian core can be maintained – most notably, the possibility of abstracting from demand and, a fortiori, preferences and endowments.

Second, all theoretical claims concerning the *economic significance* of the equation system constituting the core of the surplus approach—including, in particular, that it uniquely represents a “long-period” *equilibrium* for an economy, that this equilibrium exists and is characterized by *equalized average sectoral rates of profit* (hereafter abbreviated as EARP), and that the equilibrium is *stable*—are addressed solely *outside* of the core. As a consequence, no rigorous demonstration is provided for any of these claims *on the basis of* the decentralized process by which the economy is assumed to achieve equilibration, undermining Petri’s assertions concerning the greater “logical consistency” of the surplus approach (6).

Third, no rigorous demonstration is provided for the alleged “compatibility” of various phenomena treated in “out of core” analysis (in particular, wage bargaining, efficiency wages, and Keynesian demand-constrained equilibrium) with the core system. In the absence of such demonstrations, there is no basis for Petri’s apparent presumption that the core framework is *analytically robust* with respect to whatever “out of core” considerations are combined with it, in the sense that it constitutes “a node through which most reasonings in the surplus approach must pass in order to reach a conclusion on the effects of a change in one important variable on other important variables” (73). Similarly, no analytical basis is provided for Petri’s suggestion that one

can coherently proceed in “rounds” from out-of-core to core analysis and back again. Doing so *assumes* what must be *proven* in order to make such claims, namely that the formal core system remains relevant in the presence of given auxiliary hypotheses, such as the presence of persistent involuntary unemployment, or when it is combined with normative constructs such as utilitarianism and the economics of happiness.

In the ensuing sections, we discuss these difficulties, and their implications for the theoretical coherence and scope of the surplus approach, using examples from Petri’s text.

### **3. The nature of the core**

A first point to note about Petri’s concept of the core of the surplus approach is that it is, in a relevant sense, quite narrow in scope. It *definitionally* restricts the scope of rigorous deductive reasoning to the theory of value and distribution, but even on this circumscribed ground, the Sraffian core provides sharp but very limited insights. Taking wages (i.e., both a numeraire wage rate and relative wages for different types of labor) as given implies fixing a major component of income distribution rather than deriving it from explicitly stated conditions regarding economic behavior and the structure of economic interactions. Similarly, when applied to realistic contexts in which realized productive conditions depend on relative levels of intersectoral demand (as when comparative advantage exists in competing uses of available tracts of land), taking both production conditions and quantities produced as given effectively entails selecting, from among multiple possibilities, a particular regime of relative commodity prices and/or the distribution of the surplus between profit and land rent, rather than deriving these from underlying economic specifications.

Consequently, the core system cannot be taken to represent a complete theory of value and distribution, let alone a satisfactory foundation for the whole field of relevant economic theory.

This is particularly striking given that Petri criticizes the mainstream for “forsak[ing] the general equilibrium conceptualization altogether” so that microeconomic theory has been “reduced to a collection of techniques and tricks for resolving *narrow, isolated* microeconomic problems...” [vii, citing Katzner (2006); emphasis added].

Second, the criteria adduced to justify the choice of exogenous variables in the Sraffian analytical core are not entirely convincing. For reference, we note that mainstream general equilibrium theory and the core of the surplus approach both take the set of commodities to be exchanged and production technology as given in their specifications of exogenous economic conditions.<sup>3</sup> The main *qualitative* difference in the respective representations of the “data” of economic analysis is that the mainstream theory of value and distribution specifies the agents’ endowments of economic resources, including leisure, and their preferences over bundles of produced and unproduced goods. These specifications are then used in the derivation of demand functions for consumption goods and supply functions for productive inputs. In contrast, the analytical core of the surplus approach abstracts from individual endowments and preferences, instead taking *sectoral output levels* and *wage rates* for different types of labor as given.

Questioning the mainstream treatment of preferences as exogenous, Petri argues that given economic elements must satisfy two conditions in order to be considered *data* for the purpose of equilibrium analysis: they must be *invariant* to the effects of deliberate economic behavior (such as commercial advertising) and market adjustment processes, and must be relatively *stable* during the interval typically required for the market to “gravitate” toward a long-period equilibrium

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<sup>3</sup> There are some differences in standard practice between the two approaches such as those concerning, for example, the set of admissible production techniques. However, these are irrelevant for our argument here.

position (433). He maintains that consumer preferences generally fail both aspects of this “persistence” criterion (433-434).

It is difficult to determine what weight to give to Petri’s contention, since he offers no meaningful contemporary empirical evidence for his claims.<sup>4</sup> For example, he does not show that advertising expenditures serve to alter relative preferences across different types of commodities, as opposed to simply altering brand selection *within* given commodity markets. Nor does he show that the effects of advertising are realized more quickly than the adjustment toward equilibrium. Finally, one might ask if the effects of advertising are a relevant consideration in comparing theories of *competitive* market behavior. If they are, then presumably Sraffian core analysis would need to incorporate the implications of this behavior, including the presence of fixed costs and product differentiation.

But to the extent that these criteria are relevant, they evidently serve at least as forcefully to challenge treating the average wage in the economy as exogenously determined for the sake of “long-period” analysis. To begin with, as an empirical matter, average wages are highly volatile, both within and across business cycles. This is illustrated, for example, by quarterly data compiled by the U.S. Bureau of Labor Statistics on real median earnings of full-time workers for the period 1979-2023, displayed in graphical form at <https://fred.stlouisfed.org/series/LES1252881600Q>. Similar variability can be seen in sectoral output levels. In light of such volatility, it is difficult at best to see how wages or quantities produced can be taken as “persistent” in Petri’s terms.<sup>5</sup> One

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<sup>4</sup> Furthermore, this contention appears to be inconsistent with Petri’s implicit endorsement of Adam Smith’s view that wage differentials for different types of labor are “very persistent,” given Smith’s assessment that wages depend in part on the comparative “agreeableness” of different employments (Smith 1937 [1776]).

<sup>5</sup> One could in principle argue that wage volatility is primarily due to considerations deliberately excluded in the analysis of *competitive* economies. But this claim requires empirical verification, and as will be discussed shortly, is inconsistent with some of Petri’s own claims about the basis of wage determination.

might reasonably ask if there is evidence to suggest that the sectoral pattern of consumer preferences changes with comparable swiftness.

Furthermore, it is at best unclear how the surplus approach avoids the lash of Petri's "persistence" critique once one considers what considerations might be understood to influence the determination of wages and sectoral output levels (and thus, by implication, the distribution of economic surplus between profits and land rents). For when this is done, it is difficult to avoid the conclusion that individual preferences must play some role, and thus that Petri's critique must also apply to the surplus approach writ large.

On one hand, sectoral outputs would seem presumptively to depend on levels of consumer demand, and thus in turn on consumption preferences. Indeed, this is borne out by Petri's discussion of the Keynesian/Kaleckian aggregate demand model, in which he suggests that consumption demand is determined in part by "consumption habits" (75). But in questioning the persistence of consumer preferences, he cites Alfred Marshall to the effect that market price changes can induce "irreversible" changes in consumption habits, and also argues that these are affected by advertising (434). As for the other major component of aggregate demand in the model Petri presents, the volatility of business investment spending is well-known (see, for example, the data series presented at <https://fred.stlouisfed.org/series/W790RC1Q027SBEA>). Thus, Petri's persistence critique evidently also applies to the determination of sectoral outputs.

On the other hand, there are multiple theoretical grounds, some of which are adduced by Petri himself, for the inference that real wage levels are affected by individual preferences. For example, he observes that changes in consumption habits can affect subsistence wage norms (13). But then, per the passage from Marshall he cites, it follows that price adjustments may induce "irreversible" changes in the subsistence wage (434). In addition, with respect to the classical contention that

general wage levels are influenced by bargaining, strategic bargaining theory *a la* Rubinstein predicts that relative bargaining power depends in part on preference considerations such as relative rates of time discount (1175).

In other words, Petri's outline of a tightly defined but narrow core seems both severely limiting – as it significantly restricts the scope of deductive analysis – and theoretically unjustified – as the criteria to identify the exogenous variables to be explained out of core are not entirely persuasive. However, once one moves beyond the *partial* account of value and distribution provided by its analytical core, and explicitly considers relevant determinants of wages and sectoral quantities, it is unclear that the defining characteristics of the surplus core, including in particular the determination of value and distribution independent of individual preferences, can be maintained.

For while the above arguments suggest that demand, and thus preferences, play an important role in the determination of wages and sectoral outputs, Petri offers no analytical or empirical grounds for the contrary presumption that individual preferences categorically play *no* significant role in a *general* theory of value and distribution in which the “data” of the Sraffian core system are determined endogenously. And if there were such grounds, the general theory would need to identify what alternative factors take the place of preferences in the specification of an economy.

#### **4. The economic significance of the core**

The older definitions of economics described it as the science which is concerned with the production, the distribution, the exchange, and the consumption of wealth. Later experience has shown that the problems of distribution and exchange are so closely connected that it is doubtful whether anything is to be gained by the attempt to keep them separate. – Alfred Marshall (1890 [1952])

Petri advances a number of explicit and implicit claims concerning the economic significance of the formal equation system constituting the analytical core of the surplus approach, in particular that it represents a “long-period” competitive equilibrium for a capitalist economy, that such an equilibrium exists and entails both EARP and the intersectoral equalization of wage rates for given types of labor, and that the equilibrium thus characterized is stable. None of these claims is demonstrated within the core framework itself.

Such demonstrations, insofar as they are offered, are consequently pursued outside of the core. Since, as we’ve seen, theoretical investigations in this sphere are distinguished by a multiplicity of analytical narratives lacking any formal integration with the core equation system, the specific grounds for establishing rigorous *theoretical* justification of these claims are never clearly delineated in Petri’s text. (Moreover, the *empirical* justifications given for these claims are not compelling.) In particular, in light of our argument in the previous section, it is not even clear what elements of the general theory are to be taken as exogenous.

To get a sense of the potential issues involved in establishing the uniqueness and stability of “long-period” competitive equilibrium exhibiting certain properties (in particular, EARP and equalized sectoral wage rates), we first review Petri’s critical assessment of the mainstream literature investigating these properties. Then we’ll consider whether this critique logically implies an endorsement of the surplus approach.

The analytical core of mainstream economic theory is self-contained in the sense that it provides sufficient grounds for defining a conception of general competitive equilibrium and investigating the properties of the equilibrium thus defined, including *existence*, *uniqueness*, and *stability*. An important part of Petri’s critique of general equilibrium theory is drawn from the mainstream literature on these investigations. As he notes, establishing the *existence* of equilibrium is not the

primary issue raised in this literature, inasmuch as the conditions required to ensure this are non-trivial, yet plausible (493). Most of his critique focuses instead on theoretical results concerning the *determinacy* (non-uniqueness) and *stability* of competitive equilibria in light of potentially “perverse” properties of the *excess demand function* for the economy.

On the question of uniqueness, Petri cites the Sonnenschein-Mantel-Debreu (SMD) theorems demonstrating that the combination of “well-behaved” consumption preferences with the postulates of price-taking and optimizing behavior is insufficient to preclude the existence of “perverse” excess demand functions yielding a large number of barely distinguishable equilibria, virtually equivalent in indeterminacy to the case of a continuum of equilibrium price vectors (474-475). He subsequently discusses alternative conditions adduced in the mainstream literature to ensure uniqueness of equilibrium, including conditions on individual excess demand functions and on the overall distribution of preferences in the economy, and argues that none of these conditions is likely to obtain in practice (481-483).

Petri notes furthermore that even if there were a unique equilibrium, the hypothesized market adjustment process need not ensure a *stable* path toward equilibrium (492). The presence of multiple equilibria introduces the additional problem that perturbations of a particular equilibrium path may bump any economy into the “basin of attraction” of another equilibrium (493). Furthermore, as an empirical matter, if the underlying data of the economy were not sufficiently stable, the market equilibration process may be continually disrupted (494).

These are important cautionary results, and we endorse Petri’s insistence that students of microeconomic theory should be made aware of the significant difficulties encountered in establishing “nice” properties of neoclassical general competitive equilibrium. But by the same token, such students should expect an *equivalently rigorous* demonstration that these difficulties



are avoided in the neo-Ricardian framework in order to accept it as a superior alternative. Our main point in this section is that, inasmuch as Petri has not provided this demonstration, his critique of the mainstream literature cannot plausibly be taken as an argument in favor of the neo-Ricardian approach as a *complete* theory of value and distribution.

We next illustrate why such a rigorous demonstration is needed by discussing some of Petri's piecemeal efforts to justify the various equilibrium claims made for the core equation system.

#### **4.1. Determination of long-period equilibrium**

First, consider two issues relating to the derivation of equilibria in which EARP and the equalization of wage rates for given types of labor is presumed to obtain: the role of demand and the definition and implications of *competition* in the equilibration process.

In Petri's account, the surplus approach understands "long-period" equilibration to be the result of a *decentralized* and *incremental* process of intersectoral capital reallocation in response to differential average sectoral rates of return (31, 834). Similarly, equalization of sectoral wage rates for given types of labor is understood to be ensured by free labor mobility (834). We first consider what information about consumer demand would be needed in order to establish a given set of prices as an *equilibrium* with respect to this process.

In order to theoretically justify the claim that the core model represents a (stable) long-period equilibrium for an economy characterized by the intersectoral mobility story described above, it is presumably necessary to provide *some* specification of sectoral consumption demand conditions, both at the price regime putatively corresponding to long-period equilibrium *and* at other price vectors understood to be inconsistent with this equilibrium.

On this point, Petri, following Garegnani (1984, 1991), argues that investigation of potential long-period equilibrium positions does not require the specification of demand *functions*, because

all one needs is the more flexible thesis that the market price will be *in all likelihood* above the long-period price if supply is less than **effectual demand**—that is, the demand at the normal price—and will be below the long period price if supply is greater than effectual demand, but with no need to assume a precise functional connection between price and demand at prices different from the normal price (436; boldface in original; italics added).

This suggestion acknowledges the point that *some* information about the structure of demand is required in order to assess claims about prospective equilibrium conditions.

Beyond that, the argument is puzzling. First, no formal demonstration is provided for the assertion that the two claims above are “all one needs” in order to establish a stable equilibrium featuring prices of production, or to rule out equilibria which do not equilibrate sectoral rates of profit, and no theoretical grounds are provided to justify the asserted “likelihood” of the suggested conditions. Second, it is difficult at best to see how Garegnani’s conditions could “in all likelihood” be met *for any initial combinations of supply and effectual demand* without assuming the existence of a demand correspondence, if not a demand function, albeit one whose properties are only loosely specified.

Third, the relevant question is not what suitably flexible hypothesis about demand is “needed” in order to validate the neo-Ricardian story, but rather what properties of demand *cannot be ruled out on a priori* grounds. Here, the absence of a coherent, clearly stated theory of consumption demand is telling, as this framework can thus offer no categorical basis for *dismissing* the possibility that demand is determined by the optimizing behavior of effectively price-taking consumers, as posited in the mainstream account that Petri criticizes. As discussed further below,

wealth effects on demand could still be generated by the process of price adjustment even if real wages were fixed (due to changes in employment, profit, and the split between profits and land rents) potentially yielding the “perverse” demand characteristics identified by the SMD results. These consequences are reinforced in the entirely plausible case that sectoral real wages vary during the equilibration process. Moreover, the possibility suggested by Petri that preferences are endogenous would make this adjustment process even more idiosyncratic.

To illustrate the logical consequences of these points, consider Garegnani’s suggestion in light of the decentralized and incremental equilibration process hypothesized in the classical approach, starting with an initial price and quantity regime reflecting unequal sectoral rates of profit (and perhaps wages). If in a particular relatively high-profit sector there were no information about consumer demand for quantities slightly different from the initial values, there would be no way for prospective entrants to determine whether entry would be profitable. Suppose, alternatively, that the demand curve were kinked at that point, such that the *marginal* return to entry were strictly negative. In that case, there could be no *marginal* incentive for entry despite the absence of EARP, contrary to Garegnani’s claim.

Conversely, suppose that at a particular regime of quantities and prices of production, in which average sectoral rates of return are equalized, the excess demand function is such that demand curves are *upward*-sloping in some sectors. In that case, there would be positive marginal returns to additional entry in those sectors, and the position thus could not constitute an equilibrium.

Next, consider the equilibrium implications of Petri’s conception of *competitive markets*. He suggests markets can be considered “competitive” just to the extent that products are not differentiated within sectors and there is free entry and exit across sectors (840). Notably, no

assumptions are made with respect to individual firms about price-taking behavior or the ratio between the minimum efficient scale of production and total market demand in given sectors.

An immediate implication of the decentralized market adjustment process posited in the surplus approach is that profit-maximizing capital suppliers would choose sectoral allocations to equate *marginal* rather than *average* rates of return. If this marginal condition were not met, capitalists could increase the profits earned on given capital outlays through intersectoral reallocation, contradicting the assumption of profit-maximizing behavior. (Conversely, if capital suppliers were not assumed to be profit-maximizing, then one could not presume that capital mobility would yield equalization of marginal *or* average rates of return.) One must then ask what market conditions suffice to ensure that marginal and average rates of return coincide, so that profit-maximizing capital mobility ensures EARP.

A key result established by Novshek and Sonnenschein (1987) (who study a similarly decentralized equilibration process within the neoclassical framework) is that free capital mobility may not ensure EARP *unless* the minimum efficient scale of firm production *relative* to total sectoral demand were sufficiently close to *infinitesimal*, resulting in *de facto* price-taking behavior. Consequently, Petri's representation of "competitive" market conditions is generally *insufficient* to ensure the properties assumed in the core equation system such as EARP.<sup>6</sup>

A related argument can be made with respect to Petri's implicit assumption that intersectoral labor mobility would serve to equalize sectoral wage rates for given types of labor. This claim is not generally consistent with his assertion that wage rates are determined, at least in part, by

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<sup>6</sup> Moreover, Petri's suggestion that empirical trends support the presumption of sectoral profit rate equalization (837-838) is unconvincing because of the absence of a relevant counterfactual (or relevant standard of statistical significance for rejecting the hypothesis of equalized profit rates) as well as the evident absence of competitive conditions—as indicated, for example, by the presence of persistent and widespread inter-industry profit rate differentials that cannot evidently be explained by "competitive" considerations.

*bargaining*. Petri's account of the role of bargaining implicitly assumes that wage bargaining is *centralized*, and thus yields *economy-wide* wage rates for given types of labor (13-14). This assumption is challenged both by institutional realities and the presence of persistent wage differentials across industries (Rycx and Tojerow 2007).

The sectoral wage equalization hypothesis could presumably be reconciled with the assumption of free labor mobility, despite the presence of bargaining, but this would require an explicit, deductive demonstration based on clearly specified underlying assumptions, which Petri does not supply. In any case, there is no evident basis for presumption that sectoral real wages would be fixed during the process of adjustment to long-period positions.

#### **4.2. Stability**

Consider the conditions needed to demonstrate the *stability* of the neo-Ricardian "long-period" equilibrium. Such conditions are not explicitly and rigorously investigated in Petri's magnum opus, possibly because convergence to natural prices is deemed an obvious property that need not be proved formally, but merely "re-examined":

"Among classical and old neoclassical economists this stability was never doubted; but the recent loss of familiarity with the long-period method has made the claim that market prices gravitate towards long-period prices appear a novel claim, in need of reexamination" (834).

Petri does offer a proof of convergence of relative prices to natural prices *contingent* on the assumptions of a constant real wage rate and a uniform sectoral markup on production costs (841). However, this is hardly a general proof of stability: the rather mechanical adjustment process encapsulated in a set of simple difference equations does not really capture the dynamic competitive mechanism of the classical authors, and there is no reason to think that such restrictive

conditions as the constancy of the real wage and the mark-up would obtain throughout the decentralized and incremental adjustment process assumed in the surplus approach.

As the difficulty of proving the stability of the Walrasian equilibrium shows, it is important to explicitly investigate the conditions under which convergence to the Sraffian long period position obtains. Indeed, it is all the more important to do so because, as we have already noted, stability is one of the key arguments underpinning the economic significance of the formal equation system constituting the analytical core of the surplus approach. Therefore stability analysis is important to assess Petri's claims about *both* the superiority of the Sraffian framework *and* the secondary role of demand, and preferences, in relation to the core of the surplus approach.

Petri's own simple proof of convergence raises doubts regarding both claims. To see this, note that even if the restrictive conditions concerning the constancy of the real wage and the uniform mark up were to obtain, the convergence of the price equations is not, and cannot be, the end of the story. It is well known, in light of the 1960s literature on dual instability, that in input/output models similar to the Sraffian framework, there is a link between the dynamics of prices and that of quantities such that

[i]f the output system is globally relatively stable, then the price system is unstable in this sense, and vice versa. If excess capacity is not admitted and the dual interpretation of the dynamic input-output system is retained, then Hawkins's macro-economic stability of the dynamic input-output system implies instability of the dual; causal determinacy of the prices requires causal indeterminacy of the outputs (Jorgenson 1960, 893).

In other words, even taking the simple dynamic mechanism discussed by Petri at face value, the output side and, a fortiori, demand cannot be ignored. Indeed, Petri admits as much, and openly encourages heterodox economists to incorporate demand in the analysis of stability:

Some reluctance has been occasionally manifested by non-neoclassical economists towards admitting that changes in consumer choice induced by price changes may be one reason why a temporary adjustment between demand and supply can be reached in the market of a product, a reluctance deriving from a fear of falling into neoclassical modes of reasoning. This reluctance does not appear warranted. To admit that, when the price of a product changes, there may be changes in the consumption choices of consumers, or in the technical choices of firms if the good is a capital good, does not mean adopting neoclassical assumptions; it only means admitting the facts... A classical approach need not—indeed, should not—deny that sufficient variations in the price of a consumption good will relevantly alter the demand for it (850).

Granting Petri's point, it seems evident that demand, and thus preferences, play a central role in stability analysis, which is in turn needed to justify the economic significance of the core of the surplus approach. Further, it is at best unclear how the surplus approach avoids the difficulties encountered in mainstream theory when attempting to establish sufficient conditions for stability of given equilibria.

These considerations suggest that differences between the neoclassical and neo-Ricardian approaches to the problem of equilibrium stability are a matter of degree rather than kind, and of specific assumptions concerning preferences. Moreover, granting Petri's observation that allowing demand to have a role in equilibrium analysis "does not mean adopting neoclassical assumptions," he offers no grounds for categorically *dismissing* neoclassical assumptions about preferences or price-taking behavior. Thus, there is no basis for concluding that the stability of the classical competitive mechanism is guaranteed.

This point has been forcefully made in the literature on cross-dual dynamics, which is cursorily examined in section 10.4 of Petri's text (for a more comprehensive formal treatment, see Flaschel (2008)). This literature arises from a series of contributions questioning the presumed stability of the classical competitive mechanism (Flaschel 2008, 365). In cross-dual models, "the rate of

change of relative quantities is made to depend on the difference between the sectoral rates of profit and the average or normal rate of profit, while the rate of change of relative prices is made to depend on *excess demands*” (845, italics added). The conditions for the stability of the long period equilibrium are then identified based on the specific adjustment mechanism postulated in a general framework which allows, among other things, for joint production, and process and product extinction. The main finding is that the general conditions for stability of the competitive process are the same for Walrasian and classical models. As Flaschel notes,

[T]here exists a close relationship between Walras’ price-quantity tatonnement process for production economies and the stability analysis for so-called classical long-term positions ... This (formal) similarity in the type of price-quantity adjustment considered by Walras’ and the Classics allows that results which have been obtained with respect to one approach may be applicable to the other approach if the differences in their concepts of ‘equilibrium’ are taken into account in an appropriate way (Flaschel 2008, 336).

## **5. The compatibility of core and out of core analysis**

The asserted consistency of out-of-core analysis with the core framework is not formally treated in Petri’s book. To be sure, the book is sprinkled with many informal, suggestive remarks hinting at the consistency of various phenomena treated in “out-of-core” analysis (for example, wage bargaining, efficiency wages, or Keynesian demand-constrained equilibrium), but there is no rigorous attempt at integrating those with the core of the surplus approach, and the issue of consistency is not subjected to the same sharp, rigorous intellectual scrutiny as, say, the limitations of general equilibrium theory. But then there is no solid basis for Petri’s apparent presumption that the formal system and theoretical inferences of core analysis are analytically robust to whatever “out-of-core” considerations are combined with it.



## 5.1. Compatibility of the classical core with Keynesian equilibrium

It is...surprising that a wave identified as Ricardian or at least, “neo-Ricardian,” emerged in the shadow of Keynes after his death. Joan Robinson sought to remain true to both traditions in some way, by dropping Ricardo’s assumption of full employment. Others, like Sraffa himself, seemed to be indifferent to the full employment hypothesis, though one would have thought a position on this question to be basic to the formation of a coherent model. If prices do not have the property that all markets clear, then there must be a hypothesis that the price on a non-clearing market may, for some one reason, remain unaffected. – Kenneth Arrow (1988, 2)

Petri criticizes mainstream theory for its prediction that all markets (including those for labor) clear in general equilibrium, in view of empirical observations that unemployment is a typical and persistent feature of capitalist economies (6, 1118). In contrast, he contends that the core of the classical approach, featuring long-period prices derived on the premise that intersectoral capital mobility promotes EARP, is entirely consistent with the existence of Keynesian or demand-constrained unemployment (*vi*, 75).

It is far from self-evident why Keynesian equilibrium would be theoretically consistent with the manifestation of long-period prices of production premised on EARP. As Petri makes clear, the process of arriving at long-period prices in the classical account is *supply-driven*, such that incremental capital flows in response to profit rate differentials eventually cause output to increase and prices to decrease in high-profit sectors, and *vice-versa* in low-return markets (31, 436). This process could not occur if sectoral outputs were demand-constrained, however: if excess productive capacity existed in most sectors, then expanding capacity could not result in increased output.

There are many possible ways of formalizing the latter claim. To fix ideas, consider a simple model of multi-sector capital allocation in which a given number of profit-maximizing suppliers allocate circulating capital across multiple sectors producing undifferentiated commodities and

characterized by excess fixed productive capacity.<sup>7</sup> Since relative prices and thus sectoral quantities demanded are fixed, capital reallocations serve only to alter the distribution of demand-constrained output across multiple producers. Furthermore, given the presence of sunk fixed costs, equalization of returns on marginal capital commitments imply that *average* rates of return will vary idiosyncratically depending on pre-established sectoral productive capacities and demand limitations. Thus, EARP will generally not be achieved in symmetric Nash equilibrium, even as the number of capital suppliers becomes very large. Furthermore, asymmetries due to unequal capital endowments would introduce additional departures from EARP. In other words, Keynesian equilibrium is in general *incompatible* with a natural price regime, contrary to Petri's claim.

However, if excess sectoral productive capacity were generally eliminated, implying that any residual unemployment is classical/Marxian rather than Keynesian/Kaleckian in nature, EARP would be realized. In this connection it is perhaps telling that Petri, in introducing the Keynesian theory as a *complement* to classical core analysis, suggests that “[g]iven sufficient time,” the price in each industry “is the natural price or price of production, imposed by entry” (75). This is tantamount to saying that all product markets clear in the long period, which would presumably eliminate Keynesian unemployment. But that is precisely the basis on which Petri criticizes mainstream general equilibrium theory.

There are two additional scenario-specific cases in which the presence of persistent involuntary unemployment is demonstrably inconsistent with the core neo-Ricardian system. First, this system is based on the implicit assumption that the input coefficients of production are determined independently of the wage level. This assumption can be seen in the key comparative static result

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<sup>7</sup> Details are available from the authors upon request.

that an increase in the wage rate reduces the profit rate, assuming that production conditions are given. However, the assumption is clearly contradicted by the efficiency wage model, discussed by Petri in Chapter 13 of his text. In several versions of this model, a reduction in the wage below its “efficiency” level would also generally reduce output per labor hour and thus shrink the entire wage-profit frontier.

Second, and alternatively, in the context of “insider-outsider” bargaining relationships (1143-1146), the presence of significant unemployment reduces the expected gains to workers from exiting incumbent employment relationships, and thus increases the scope for bargaining outcomes that depend on firm- or sector-specific variables such as the total value added to be distributed (see Binmore *et al.* (1986) for a discussion of the qualitatively distinct role of exit options in strategic bargaining models). As a result, the prospect of intersectoral mobility does not suffice to ensure equalization of sectoral wage rates for given types of labor.

In sum, Petri does not establish coherent grounds for the claimed “compatibility” of involuntary unemployment with the Sraffian system, and there are multiple analytical grounds, some of which he discusses, for the assessment that the two phenomena are *not* mutually consistent.

## **5.2. Compatibility of the Sraffian core with utilitarianism**

The core of the surplus approach, as presented by Petri, offers no basis whatsoever for *evaluating* economic outcomes. It’s true that a certain aspect of distribution is at the heart of the surplus approach: aside from the determination of relative prices for given specifications of wages, production conditions, and quantities produced, along with the EARP hypothesis, the key analytical result yielded by the core model of the surplus approach is an inverse relationship

between the general wage rate and the economy-wide rate of profit.<sup>8</sup> Given that the core framework omits any reference to individual endowments and preferences, however, even the *potential* normative implications of this inverse relationship are necessarily amorphous.

Specifically, first, the core framework offers no intrinsic basis for associating points on the wage-profit frontier with the distribution of aggregate net income among distinct economic groups. Petri suggests that the surplus approach “realistically admits the presence in the economy of capitalist societies of sometimes violent conflicts of interests between different social groups” (85), but this is an *interpretation* of the frontier that has no grounding whatever in the formal core system. This system is entirely consistent, for example, with an economy of worker-owned firms in which every worker receives both profit and wage income. A movement along the frontier in this economy might simply represent a change in the balance of income streams to each worker. Thus, the core framework offers no basis for identifying the “different social groups” supposedly in conflict, if any. Moreover, second, even if there were such intergroup conflict, it offers no intrinsic basis for *evaluating* the result of this conflict: on what grounds is any one point on the frontier deemed better than another point?

Petri suggests that the surplus approach clears the way for a new approach to welfare economics due to “the compatibility of classical free competition and *permanent* labor unemployment” (1278, citing an anonymous editorial note in Foley et al., 2004; emphasis added). As we have just seen, the alleged “compatibility” of persistent involuntary unemployment with the core of the surplus approach is far from evident. But even if the presence of Keynesian demand-constrained

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<sup>8</sup> For an economy with different types of labor, distinguished by the payment of unequal wage rates (for any reason consistent with the operation of free labor mobility), this result takes the somewhat more involved form of an inverse relationship between the wage paid to a particular type of labor (e.g., the least skilled) serving as a numeraire, taking the wages of all other types of labor relative to the numeraire wage as given.

equilibrium could somehow be theoretically reconciled with the Sraffian equation system, the core of the surplus approach per se has nothing to say about the *desirability* of reducing unemployment, or, for that matter, financing a welfare state. It is certainly true that “Broadly shared ethical feelings can have deeply different practical implications depending on the theory of how the economy works” (1306). But the converse is equally true: a broadly shared view of how the economy works can have deeply different normative implications depending on one’s ethical principles. One can acknowledge that the reserve army of the unemployed is an integral part of capitalist economies without thereby concluding that unemployment programs should be created and/or expanded.

Having little to say in such important matters is obviously problematic for any economic theory, and so Petri does try to show how the surplus approach might yield relevant normative implications.<sup>9</sup> Yet, all of the arguments that Petri musters in support of unemployment policies or the welfare state derive from normative commitments that, however commendable, have no apparent foundation in the formal core of the surplus approach.<sup>10</sup>

Similarly, consider Petri’s discussion of the Pareto principle and the First Fundamental Theorem of Welfare Economics (henceforth, FFTWE). He argues here that a cornerstone of the surplus approach is the recognition of the pervasiveness of unemployment, so that “a different welfare analysis [can be constructed] if market economies do not spontaneously tend to the full utilization of resources” (1277). On this point, he cites Garegnani to the effect that the presence of persistent unemployment “breaks the magic circle within which policy analysis tends to be

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<sup>9</sup> On this point, Petri seems to suggest that rejecting the neoclassical framework is both necessary and sufficient to provide a normative justification of the welfare state. Remarkably, he argues that “...if the basic neoclassical framework itself is rejected, the legitimacy of the welfare state is *unassailable*” (1280, emphasis added). Contemporary Austrian economists, for one, would likely beg to differ with this assessment.

<sup>10</sup> Some of Petri’s arguments are based on an integrated Sraffian-Keynesian approach. However, we note that the heavy lifting is done entirely by the Keynesian extension whose consistency with the surplus core is unclear at best, as argued above.

confined by the neoclassical preoccupation with distorting the Pareto-optimal allocation of resources allegedly effected by competitive prices” (Garegnani 2004, pp. 37–38).

The Pareto principle is certainly not uncontroversial, and there is indeed a massive literature highlighting its limitations, starting from Amartya Sen’s seminal work (Sen 1977), none of which is discussed by Petri. Yet the presence of unemployed resources *per se* has, quite simply, no theoretical implications for the Pareto principle, or the FFTWE. Charitably read, Garegnani’s argument at best shows why declaring actual economies to be Pareto efficient in the presence of massive unemployment is purely ideological, not that the Pareto principle is *per se* invalid.

The only argument against the Pareto principle (and, a fortiori against the FFTWE) that would seem to follow from the surplus approach *might* be that it relies on individual preferences, whose theoretical relevance is questioned throughout the book. Petri does note a number of problems arising from the Pareto principle’s reliance on individual preferences (1274-1277). However, this critique does not evidently point to a coherent alternative normative framework.

First, not one of the criticisms advanced is based on analytical insights from the surplus approach. Indeed, they have been widely discussed in the mainstream literature on social choice (again, see Sen 1977 and the vast literature it sparked). Second, and more important, if the reliance on individual preferences is a major conceptual shortcoming of the Pareto principle, it is difficult to understand Petri’s arguments in favor of a *utilitarian* approach to distributive justice. According to him, “utilitarianism intelligently interpreted supplies a social welfare function that does not comply with [Arrow’s axiom of Independence of Irrelevant Alternatives, IIA] but appears neither irrational nor incompatible with a democratic society; it is not evident why its contradicting IIA should be seen as an obstacle to its acceptability” (p.1318).

Further, Petri rejects the criticisms of utilitarianism levied by egalitarian and socialist authors, arguing that utilitarianism actually promotes equality of individual economic outcomes. In his reading, “people in the same objective condition must be treated as having the same level of utility” (1318). On this basis, he concludes that “The literature on happiness, combined with a more correct picture of the functioning of market economies that discards the full-employment assumption and the idea that income distribution reflects what people deserve, appears to be at present the most promising starting point for a reformulation of welfare economics” (1322). He lists a number of policies that would allegedly follow from this utilitarian approach, such as efforts to reduce average working hours (1327) and unemployment (1328-9).

Petri’s arguments here do not seem compelling for a number of reasons. First, Arrow’s theorem has usually been read in the literature sparked by Sen (1970), as showing the difficulty of making social choices with an impoverished informational structure, which assumes only ordinally noncomparable individual preferences. Utilitarianism escapes Arrow’s theorem not, as Petri suggests, because it violates IIA (in fact, it does not: see d’Aspremont and Gevers 1977), but rather because it allows for cardinally measurable and interpersonally comparable utility units.

Second, and again contrary to Petri’s claim, the egalitarian critique of utilitarianism is not based on a “misinterpretation” (1317), and has nothing to do with Robbins’ emphasis on ordinal preferences: rather, it points to the fact that the utilitarian social welfare function is *definitionally* indifferent to inequalities in utilities. For a given level of aggregate utility, it is immaterial whether one agent gets everything and everyone else gets nothing, or everyone obtains the same utility. The “egalitarian” implications of utilitarianism highlighted by authors such as Bentham and Sidgwick briefly mentioned by Petri are premised on the restrictive condition that all agents have

*identical, concave* utility functions.<sup>11</sup> But these are assumptions about actual preferences of economic actors, which are unlikely to be verified in practice (more on this in the next paragraph). Indeed, if one assumes preferences to be endogenous, as Petri prompts us to do repeatedly throughout the book, it can be shown that utilitarianism does not necessarily imply equality *even if agents have identical and concave utility functions* (Layard, 1980; Galanis and Veneziani, 2022).

Furthermore, in order to defend the alleged “egalitarian” nature of utilitarianism, Petri implicitly adopts an objective view of human welfare (which allows him to conclude that people facing the same objective conditions will have the same level of satisfaction). But this is inconsistent with the theoretical and philosophical foundations of the economics of happiness, which takes people’s preferences as they are, and focuses on self-reported satisfaction.

Finally, Petri’s policy conclusions quite simply do not follow from his preferred approach. He claims that “Evidently the primary concern of governments should be to ensure as high a level of employment as possible” (1328-9). But there is nothing “evident” about this conclusion: if there are several factors affecting happiness and if maximizing (the sum of?) self-reported happiness is the utilitarian objective, then the state should invest resources in whatever yields the best results (the biggest increase in the sum of utilities) and on whomever is most likely to have an increase in self-reported happiness. As Layard and Ward (2020) show for the UK, employment status is by no means the main determinant of people’s happiness: it emerges as the sixth main concern in their survey, behind mental health, quality of work, having a domestic partner, and enjoying physical

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<sup>11</sup> Petri appears to misinterpret Sidgwick (1907) here. It is “practically important to ask whether any mode of distributing a given quantum of happiness is better than any other. Now the utilitarian formula seems to supply no answer to this question: at least we have to supplement the principle of seeking the greatest happiness of the whole by some principle of Just or Right distribution of this happiness.” (Sidgwick, 1907, p. 417). It is true that Sidgwick goes on to argue that “The principle which most utilitarians have either tacitly or expressly adopted is that of pure equality”, but this does not follow from utilitarianism as a doctrine: it is an additional, empirically unverifiable principle *appended* to it.



health. Thus, pushing Petri's utilitarian reasoning to its natural conclusion, one would have to recommend that, given the need to make tradeoffs, the government dismantle employment programs and invest in psychological therapy, dating apps, and gym memberships instead.

But, as noted above, the most surprising implication of Petri's discussion in chapter 14 is the glaring inconsistency it reveals. If the Pareto principle ought to be rejected, among other things, because of its reliance on individual preferences (as argued in section 14.7), then it is very much unclear how one can advocate a utilitarian approach based on the economics of happiness in order to derive theoretically robust conclusions on welfare policies. Either preferences provide solid foundations for economic analysis, and policy prescriptions, or they don't. If they do, then presumptively they should be integrated in the core framework of the surplus approach. Or they do not, in which case the utilitarian approach Petri discusses here must be discarded.

## **6. Conclusion: Connecting the rooms**

[Ricardo's] interest was in the clear-cut result of direct, practical significance. In order to get this he cut the general [economic] system to pieces, bundled up as large parts of it as possible, and put them in cold storage—so that as many things as possible should be frozen and “given.” He then piled one simplifying assumption upon another until he was left with only a few aggregative variables between which, given these assumptions, he set up simple one-way relations....The habit of applying results of this character to the solution of practical problems we shall call the Ricardian Vice. – Joseph Schumpeter (1954, 473).

Taken on its own terms, the analytical core of the surplus approach is simply a formal equation system from which a number of deductive inferences is drawn. All of Petri's claims about the economic significance of this formal analysis—in particular, that it represents a stable “long-period” position for a competitive capitalist economy that “admits the presence of sometimes violent conflicts of interests between different social groups” and is “compatible” with the premise

of persistent involuntary unemployment while somehow providing a “much more positive assessment” of the welfare state and policies to simultaneously reduce unemployment and the average length of the work week—are discussed, if at all, in “the other room,” the sphere of out of core analysis. But as we’ve seen, the key distinguishing feature of all such analysis is the absence of any effort to integrate it with the core framework, and in many cases the relevant arguments are in addition neither logically nor empirically compelling on their own terms. Consequently, none of these claims can be regarded as theoretically established, and moreover there are substantial grounds, some of them noted in Petri’s text, for doubting their general validity.

We continue to believe, however, that the general analytical approach discussed by Petri has the potential to provide a robust alternative to the mainstream economic paradigm that is progressive in both the political and intellectual senses. But any such progress will entail bringing the elephant in from the other room, and expanding the core.

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# School of Economics and Finance



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