Growth Phantoms: A Note on Classical Accounting for GDP and Decoupling from Environmental Impact

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Reconstructing gross domestic product (GDP) from national accounts in a classical political economic vein leads to a different view on its size and rate of change. This note rehashes the contributions of Duncan Foley and Anwar Shaikh to accounting for GDP with such classical national accounts that carefully distinguish production and non-production activities. It identifies two growth phantoms arising from their analysis: that growth is seen to arise from sectors that can instead be conceptualized as transfer recipients and that overall growth may appear faster than it is. The note then draws some conclusions for the debate about the future of economic growth in a world with increasingly binding environmental constraints.

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> Economic production may be defined as an activity carried out under the control and responsibility of an institutional unit that uses inputs of labour, capital, and goods and services to produce outputs of goods or services. [...] Activities that are not productive in an economic sense include basic human activities such as eating, drinking, sleeping, taking exercise, etc., that it is impossible for one person to employ another person to perform instead (System of National Accounts 2009, p.97-98).

> Productive labour, in its meaning for capitalist production, is wage-labour which, exchanged against the variable part of capital (the part of the capital that is spent on wages), reproduces not only this part of the capital (or the value of its own labour-power), but in addition produces surplus-value for the capitalist. [...] Only that wage-labour is productive which produces capital. (Marx 1969, p. 152).

Record-breaking disasters, and accelerating pollution and species extinction increasingly put the environment-changing impacts of economic activity on the agenda of national and international politics. Unsurprisingly, just how production and reproduction should go on or change has become a much scrutinized problem, and a vibrant academic debate is unfolding. Some say economic growth as a goal should be abandoned in wealthy countries and replaced by a focus on scaling down environmentally harmful activity and on meeting human needs (Hickel et al. 2022). Others argue that the way to overcome the current crisis is to grow faster thanks to rapid innovation in 'green' technologies (Perez 2019). Yet others think that the productivity of information technology will lead to boundless low-impact economic growth (Brynjolfsson and McAfee 2014). The reference for economic growth is typically the rate of growth of gross domestic product (GDP) or its components, as the world's go-to indicator for economic activity. And while most participants in the debate will be willing to criticize GDP as a far from perfect measure of production and provision of what matters, it is much less clear what a critique of the concept of production in GDP would entail for their various debate positions.

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As the first introductory quote shows, the noun product in GDP as the result of production pertains to basically any activity that can, at least in principle, be procured with money that pays for someone to do this activity[1]. As such, national accounts as currently codified tend to classify any voluntary monetary transaction as production. Of course, they duly subtract that part of the production that has already been produced in the previous step (intermediate inputs) and exclude the transfer of assets, which may involve capital gains. Yet this leaves a wide range of activities contributing product that are often pointed out to be problematic from an environmental point of view, such as the clean-up after environmental disasters. This favorite example is often employed to derive the absurdity that the more environmental disasters occur, the bigger would be GDP. However, these critiques tend to be ad hoc, mix up measures of 'welfare' with those of production and are deflected by pointing to satellite accounts that allow modification of the main GDP measure or simply calls for complementary or alternative indicators to GDP (Guterres 2021; Lange 2007; Repetto et al. 1989; Stiglitz, Sen and Fitoussi 2009).[2]

A more systematic critical perspective on the nature of production in GDP is offered by classical political economy. This theoretical school based on the writings of among others Smith, Ricardo, Malthus, Mill, Marx, Sismondi, Baudrillart and Chalmers in the 18th and 19th century (Studenski 1958 in Shaikh and Tonak 1994, p. 3) had a sophisticated understanding of production, which creates the product, the GDP. As the introductory quote by Marx shows, what activities are productive in a capitalist economy or add value, to use the national accounting term, pivots in classical political economy on whether they result in the production of surplus value – value over and above the value that is expended in the production process. As we will examine in greater detail below, a sufficient condition for the production of surplus value is that the economic activity is undertaken by labor employed by a capitalist enterprise operating in the sphere of production (Savran and Tonak 1999). This is narrower than the definition of production in the System of National Accounts (SNA), because capitalist activity is not confined to the sphere of production but also operates in the sphere of circulation and in the maintenance of society, and because not all production activity is sponsored by capitalist enterprise. As a result, the size and – importantly – rate of change of economic activity can be markedly different from the point of view of classical political economic (for short: classical) national accounts than the SNA.

This note suggests that classical national accounting leads to identifying two growth phantoms in the wider GDP debate: one phantom is to see the sources of growth where they are not, and the other is to see a higher growth rate of GDP than is warranted in the recent historical record of advanced capitalist economies like the United States. These conclusions can be drawn from the contributions of Duncan Foley and Anwar Shaikh to a critique as well as the construction of alternative operational measures of national accounting from a classical political economic perspective. The next two sections rehash the relevant arguments of the two scholars, drawn notably from (Shaikh and Tonak 1994 and Shaikh 2016), and from (Foley 2012, Foley 2013, Basu and Foley 2013), and analyze how they lead to the identification of the growth phantoms. A final section draws out the implications of these growth phantoms for changing the future nature of economic growth in a stressed environment, and in particular that some of the belief in 'weightless' growth may arise from a confusion of production and transfer of value.

I. Shaikh: Classical national accounts

By his own account in Shaikh and Tonak (1994), Anwar Shaikh's work on classical national accounts began in 1972, when he discovered the Ph.D. dissertation by Shane Mage (1963), which attempts to transform national accounts to Marxian categories in order to subject Marx's propositions to empirical scrutiny. This work by Shaikh culminates over 20 years later in the book Measuring the Wealth of Nations, co-authored with Ahmet Tonak. It "aims to provide an alternative foundation for the measure-

[1]For an introduction to national accounts and GDP, the interested reader is referred –besides the quoted System of National Accounts (SNA) – also to the handbooks by the BEA (2022) or Eurostat (2013) that implement the more abstract recommendations in the SNA in two jurisdictions. Conceptual histories can be found e.g. in Vanoli (2005), Coyle (2015) or, for the U.S., in Carson (1975), Ruggles and Ruggles (1999), and Marcuss and Kane (2007). See also Vanoli (2010) for a contrast of U.S. with other national accounts.

[2]The welfare view of GDP – associated with Pigou and Kuznets – comes into focus time and again (Syrquin 2011) and the complementing/replacing or 'beyond GDP' approach has spawned hundreds of measures (Hoekstra 2019), notably to improve the analysis of welfare (Berik 2020).

ment of the production of nations" (p. 1). By its time of publication in 1994, the text has been ten years in the making and presents a very thorough mapping of the United States' National Income and Product Accounts (NIPA) and input-output tables to classical categories. So thorough that a reviewer has no doubt it will "become the standard reference for further empirical work in this tradition" (Moseley 1995, p. 203).[3]

The analytical issue that the authors have to solve in order to present an alternative to GDP is to convert NIPA value added to classical value added.[4] This requires redrawing the NIPA production boundary. To justify the redrawing, Shaikh and Tonak develop in their chapter 2 a lucid classification of the activity that is necessary for social reproduction first in general, and then under capitalism, which is very much worth reading for any student of economics. In general, social reproduction revolves around the disposition of use values. Broadly, social reproduction consists of production and consumption of use values. Consumption is unambiguously not production and hence outside the production boundary. But while the SNA calls all other activity 'productive', Shaikh and Tonak (1994) make the analytical distinction of production and social consumption.[5] The latter involves two subcategories. Distribution is the activity of transferring ownership of a use value, for instance selling tickets, advertising, or financing a purchase (p. 26). Social maintenance encompasses all activities that keep the social order, e.g. police, firefighters, courts, guard activity etc. (p. 27). These two subcategories of activities consume use values that have already been produced while, like personal consumption, do not produce new use values. They are necessary for production and personal consumption to take place; however, they are not themselves part of production (p. 28).

Shaikh and Tonak anticipate the objection that since social consumption is indirectly necessary for production surely it must be part of production. They argue for the importance of the distinction since all activities use up use values, but only production results in new use values (p. 25). One could add another argument for the analytical utility of a restricted production boundary by way of an example. A suitably small group of people that lives mostly isolated from other communities could survive mainly on farming because this activity produces new use values such as food and implements for shelter that are necessary for survival. However, this mostly isolated group could not survive on the main activity of guard labor since it does not produce necessary use values – the guards would starve to death. Nevertheless, guard labor may be socially necessary to guard from plunderers not part of the group like in the movie Seven Samurai, where the samurai guard a peasant village in exchange for food. It might also be necessary, if the group gets larger – to keep the social order within the group and prevent stealing. This example already illustrates that in all but the socially least complex societies, substantial activities under the heading of social consumption are just as necessary as production activities. Ultimately any drawing of boundaries around production is an analytical exercise, including that in the NIPA and SNA: the problem is to use analytical categories that are useful to give answers to the questions one wants to ask. Shaikh and Tonak make a strong case based on classical political economy for the usefulness of a more restricted definition of production for various purposes. Their general classification is summarized in Fig. 1.

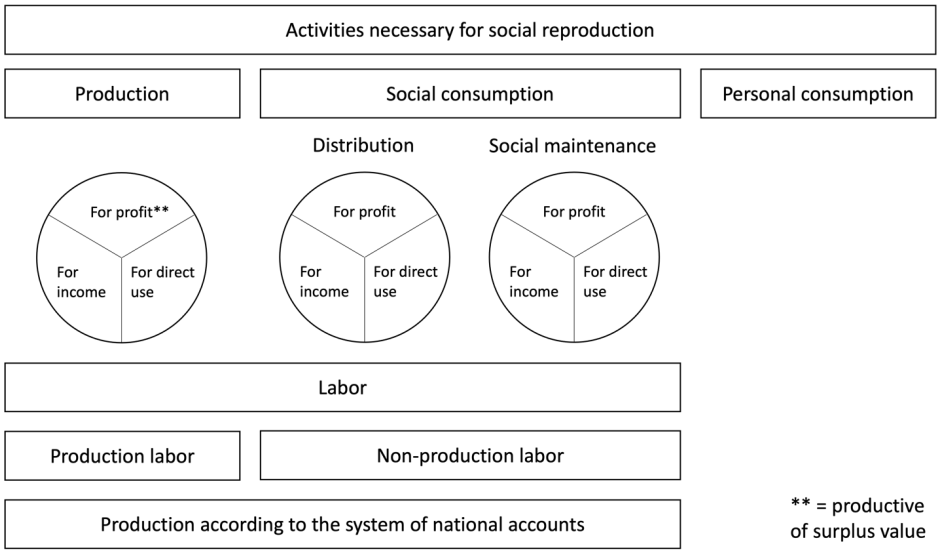
Following the classical definition further, under capitalism, adding value requires that it is a capitalist enterprise that operates in the sphere of production (as opposed to distribution such as a commercial bank or social maintenance such as a private security firm). The already mentioned farming community may simply work for direct use, they may also sell their output to buy other commodities, thereby operating in what Marx called the circuit of revenue (exchanging commodities, including labor power, for money in order to buy other commodities). None of this produces surplus value. Only when production occurs in the circuit of capital, i.e., when money capital is exchanged for labor power and constant capital and the new use values produced are exchanged for more money than was used as capital for the inputs, is surplus value created. As in the introductory quote by Marx, labor exchanges as variable capital against money

[3]For other works in this vein up to the mid 1990s see the extensive literature review in Shaikh and Tonak 1994, whose analysis has in turn been extended and critiqued (e.g. Mohun (2005) Mohun (2014); Paitaridis and Tsoulfidis (2012); Savran and Tonak (1999).

[4]That is not the only question the authors ask and answer but the only one this note focuses on.

[5]While giving this broad general definition of production, the SNA excludes "most services produced for own use by households" (SNA 2009, p. 98) from its production boundary, which is inconsistent with its otherwise inclusive approach and ignores the huge ensemble of use values produced by unpaid care activities (Folbre 2020). Shaikh and Tonak include housework and other unpaid care work in production in general (p. 28, fn14).

Figure 1. classification of activities necessary for social reproduction according to classical political economy.



Note: Adapted from Shaikh and Tonak (1994)

capital and then produces additional capital in the form of surplus value. Thus, a farming capitalist would need to hire farm labor to add value under capitalism. The circles in Figure 1 illustrate that only a subset of production adds value under capitalism according to the classical political economic lens (where value added is defined as the sum of the wages of labor, which enable the reproduction of labor power or the capacity to work, plus the surplus value). With characteristic vividness, Shaikh (2016) illustrates this distinction that is founded not on the nature of the activity (e.g. farming) or thing (e.g. a farming tool) but the process in which it is done or used that defines what it is. He explains: "A knife in the kitchen is a cooking tool. Gripped in a murderous rage, it is a deadly weapon" (p. 207). So with the circuits of revenue and capital: "to purchase fruit to eat is different from purchasing fruit to sell for profit. In the former case, both the money and the fruit are part of a circuit of revenue; in the latter, both are part of a circuit of capital" (p. 207). The upshot is that only in production, and only if production is organized along capitalist lines (hiring labor and producing for profit), should value be added in the national accounts in an economy dominated by the capitalist mode of production.

It is this definition of value added that Shaikh and Tonak (1994) then apply to the NIPA as best as the industrial categories of the input-output tables allow them to. They distinguish primary and secondary activities (the latter representing distribution and social maintenance). The primary sectors are the production sectors, that produce surplus value. The secondary sectors' revenue is called 'royalties' (p. 53) because their entire revenue is paid out of surplus value from the production sector. That is, the capitalists operating here share in the surplus value that the production capitalists obtain, then pay their non-production workers and material inputs. The amount of surplus value any capitalist manages to retain are its profits. This leads to four types of adjustment. First, value added from wages and profits is entirely removed from secondary sectors and allocated to the primary sectors' operating surplus (for this and for the recording of intermediate sector product the input-output tables are needed). One way to think about this is to consider all secondary NIPA value added as being instead uses in the primary allocation of income account, which is exactly balanced by a larger operating surplus of the primary sectors (SNA 2009, p. 150-1 and Table 7.8). It's important to see that this adjustment does not alter the mass of value added, only its sectoral location, which leads to phantom number 1, of locating the sources of growth in sectors that do not add value.[6]

The second and third adjustments are undertaken to avoid double counting. They lead to a deviation

[6]It does of course affect gross output since the mass of intermediate inputs shrinks (Shaikh and Tonak 1994, p. 54).

of classical value added from NIPA value added and possibly its rate of change if these deviations' relative importance changes over time. Thus, these adjustments foreshadow phantom number 2, of seeing too fast of a rate of economic growth. At the time Shaikh and Tonak were working, the NIPA were still netting out interest payments received by the financial sector from businesses. Therefore, to account for these royalties, as their second adjustment Shaikh and Tonak add them back into the primary sector's operating surplus (1994, p. 54), revising upward the classical value added. Since then, national accountants have decided to convert business payments to value added for the financial sector, obviating this adjustment, and making it impossible for classical value added to exceed NIPA value added (see also the next section on imputation).

The third adjustment leads to a downward adjustment of classical relative to NIPA value added. This is when secondary sectors record an income from selling product to households, government, and the rest of the world. Consider the example of a household earning a wage in the primary sector and using it to pay interest to a bank for a loan it has taken out. The NIPA accounts (even at Shaikh and Tonak's time of writing) record a value added for the banking sector, but since this is paid out of wages and hence out of variable capital, it just appropriates value from households that has already been produced, known as profit upon alienation. So, according to classical national accounts, there is no new surplus value and hence no classical value added. The interest payment does raise the mass of profits in the economy thanks to part of the value added being transferred from the household to the banking sector. Value is transferred from the circuit of revenue to the circuit of capital. So while it does increase profits, it does not add value. See also Shaikh's (2016, chapter 6.IV) classification of each type of transfer's impact on aggregate profits.

The last adjustment consists of removing imputed value added from owner-occupied housing and transferring its intermediate inputs into final demand (Shaikh and Tonak 1994, p. 254). This lowers classical value added further relative to NIPA value added.

These adjustments conclude how classical value added is different from the NIPA one. It is important to emphasize that in order to focus on the main conceptual reasons for changes to size and growth of GDP that arise from their work, this sketch has omitted several empirical challenges that Shaikh and Tonak detail in their voluminous appendices. Shaikh (2016, p. 767) furthermore shows how to alter national accounts to limit value added to finished as opposed to finished and semi-finished goods, which should not, however lead to long-term different growth rates. The key point for the sources of economic product and its growth is that – according to classical national accounts – it arises entirely in a subset of sectors: to assume otherwise is to see a phantom.

The key point for the question of the rate of growth is that, due to the second, third, and fourth adjustments, it is possible to obtain different patterns of classical and NIPA value added and hence GDP growth. For instance, if owner-occupied housing value added in the NIPA makes up 4% of GDP and grows at 2% instead of 1% like the rest of NIPA value added (which let us assume for the moment to be the same as classical value added), then NIPA GDP grows at 96%*0.01+4%*.02 = 1.04% or 0.04% faster than classical value added. That this is not just idle arithmetic can be seen in the first row of Table 1. Over a period of 41 years, inflation-adjusted classical value added grew systematically more slowly than the NIPA-reported variant, at 2.9% instead of 3.3%. Given that U.S. inflation-adjusted annual growth rates have averaged only 1.5% (BEA Table 1.1.1) since 1990, such a 0.4% reduction in growth, if it were to remain at that level, would knock more than one quarter off recent U.S. economic growth as phantom growth. Shaikh and Tonak's series ends in 1989, but as we shall see in the next section, there is good reason to believe that some such reduction in more recent growth rates, when applying their methods, may well be expected.

II. Foley: debunking imputed growth

Duncan Foley focuses on the inconsistency between national accounts and the classical conception of production and nonproduction activities almost two decades after the publication of Measuring the Wealth of Nations. That is not to say he did not address national accounts from a classical perspective before. His 1982 'new interpretation' highlights the operational nature of its aggregate magnitudes in light of national accounts and consciously postpones the treatment of production/non-production labor (Foley 1982, p. 38 and fn1). And Foley (1986, p. 122) estimates the value added by production

Table 1—Economic growth rates according to different accounting conventions.

Study	Time Period	Indicator	Growth
Shaikh & Tonak (1994)	1948-1989	Gross value added (NIPA)	3.3%
		Gross value added (Classical)	2.9%
Basu & Foley (2013)	1947-2022	GDP	3.0%
		Measurable value added	2.3%

Note: Growth reflects the average annual growth rate.

Source: Author's calculation from Table 5.4 in Shaikh and Tonak (1994) and BEA Value added by industry and GDP Deflator (Table 1.1.9).

labor using national accounts. However, as he returns to this subject in a series of papers published in 2012-2013 (Basu and Foley 2013; Foley 2012; Foley 2013), human-made global environmental change has become more important, while the U.S. economy has been deindustrializing and those industries that Shaikh and Tonak placed in the secondary sector have grown their shares in GDP. Moreover, the SNA has gone through two major revisions in 1993 and 2008 and the U.S. NIPA have been updated to internalize SNA 1993 and are in the process of internalizing the 2008 SNA revision. These revisions expand the production boundary of the national accounts and enhance the importance of imputations – that is, the ascribing of monetary values to activities not on the basis of a market price but by some other measure.[7]

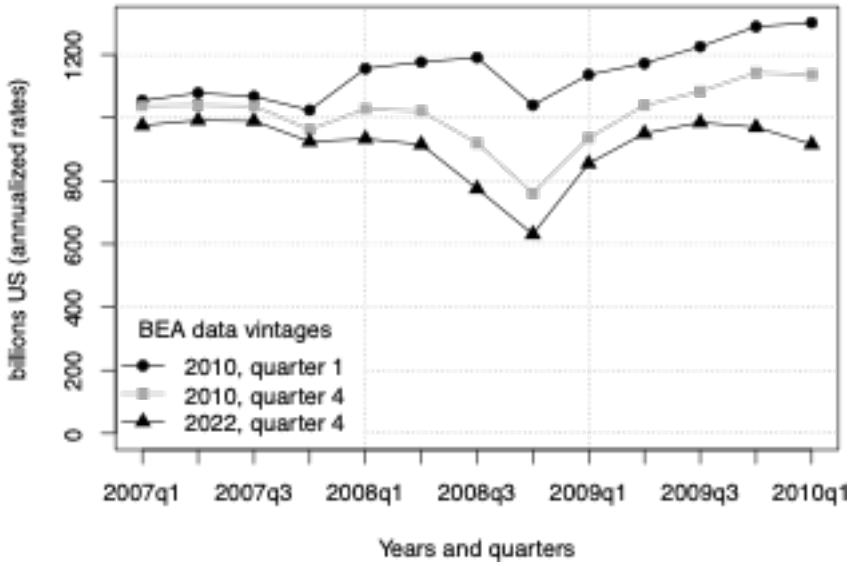
Foley uses the classical national accounting perspective to raise two critiques about how NIPA measures of GDP deal with these phenomena. The first is that to the extent that deindustrialization has contributed to a larger share of surplus value being transferred to social consumption via royalties (Foley's preferred term is rents), economic growth could eventually come to a halt. The term rent allows Foley to reason in analogy to David Ricardo's theory of land rent, where landlords are able to appropriate a larger and larger share of surplus thanks to their ability to exclude others from using land (Foley 2013, p. 264). In line with his new interpretation, Foley imagines a global pool of surplus value, for which all capitalists compete. However, "[s]ome modes of appropriation indirectly contribute to increasing the size of the pool of surplus value, but many, including a wide variety of methods of generating rents, do not" (p. 261). The distinction is between what Shaikh and Tonak call primary and secondary sectors. Usually, competition and capital mobility between sectors should act as a balancing mechanism that prevents more and more profits being appropriated by secondary sectors and starve production capitalists like Ricardo's capitalist farmers of profits. However, Foley reckons that the globalization of the financial system as well as network externalities in information technology that allow natural monopolies to appropriate an astonishingly large share of the global pool of surplus value, might defang this mechanism. Basically, pockets of the capitalist economy can successfully run this strategy, but assuming that a large part or the entire system can follow suit commits a fallacy of composition (p. 265).[8] Assuming that these rent-appropriating sectors are the engine of growth amounts again to seeing the growth phantom 1 of the illusory sources of growth.

The second critique goes a step further to suggest that imputation of value to secondary sectors may actually overstate observed economic growth. Note that until now the limitation of production to a subset of sectors did not actually fundamentally change the size of the economy (with the exception of Shaikh and Tonak's second to fourth adjustment above). The production sectors simply produce more value added that is redistributed creating the first growth phantom. But Foley (2013), Basu and Foley (2013) measure economic growth only for 'measurable value added', which includes all industries "in which a tangible output (good or service) is sold in the market for a price and hence the value-added figure is measurable without imputations" (p. 1081). They contend that imputations may not adequately reflect economic production, i.e. not even if it occurred in another sector and then surplus value was transferred.

[7]Other adjustments include e.g. the accounting for quality, and different deflation methods (Fisher chained indices instead of separate Laspeyres and Paasche indices are used).

[8]See in this context also Shaikh's (2016, p. 231) characterization of land assets as the true first financial derivative of the profits that can be made by using this land, and Semieniuk (2017) for an application of this critique to Thomas Piketty's theory of a rising capital share.

Figure 2. Gross value added of financial corporate business of the U.S. for different data vintages.



Note: Quarterly data seasonally adjusted at annual rates, current USD. Data source: different vintages of BEA Table 1.14.

This possibility can be easily demonstrated for financial services. The SNA 1993 recommended for banks to add value according to FISIM (financial intermediation services indirectly measured). FISIM has banks add value as the sum of the difference between a reference rate and the average interest rate paid on deposits and charged on credits scaled by the mass of deposits and credits the banks have on their balance sheets. The U.S. implemented this update in 2003 (Fixler and Smith 2003). The FISIM method leaves much leeway for how much value added is imputed. With the 2007-08 financial crisis, banks raised the interest rate on credits while the reference rate (measured as an average rate on U.S. Treasury and U.S. agency securities) fell. Thus, in the midst of the financial crisis caused by securitization practices in the U.S. financial sector, this sector was seen to grow its value added! Figure 2 shows that as a result of a revision shortly after the crisis that was first implemented in the fourth quarter of 2010 vintage of the BEA national accounts release, financial sector value added fell sharply from the first to the third quarter of 2008, whereas it had been seen to grow during the same period in earlier releases. By the third quarter of 2008, therefore, financial sector value added was seen to be 25% lower during the same historical time period than it had been reported to be less than a year earlier. The trick that did it was to insert a reduction of value added by an expected default loss, which rose sharply in the crisis (Hood 2013). Subsequent revisions reduced value added even more so that a national accounts user looking at this episode today sees a stagnation and decline from mid-2007, which never recovers until 2010. This may make the value added be more in line with the perception of the role of financial services during the Great Recession but reveals that Basu and Foley certainly have a point in their suspicion that the measurement of secondary sectors may not reflect underlying production expressed in surplus value transfers to secondary sectors and might best be excluded. Lest the reader thinks this was a cherry-picked example, there are more systematic critiques of the measurement of finance in national accounts in parallel to or based on the work by Foley and Shaikh that show how malleable especially the measurement of finance is in national accounting conventions (Assa 2016, 2018; Christophers 2011; Mazzucato 2018; see also Itaman 2022).

And while the above example leads to a downward revision of the growth of value added from the financial sector and hence GDP, NIPA comprehensive revisions that change the imputation and other methods have consistently revised past U.S. GDP growth rates upward (Semieniuk 2024). In fact, Basu and Foley (2013) find that their measurable value added grows more slowly than GDP and better explains fluctuations in employment (if there is no economic activity underlying imputed output and incomes, no employment is generated). Table 1, reports that measurable value added grew 0.7 percentage

points more slowly per year, on average, than GDP over the long period from 1947 to 2022, an even larger reduction than the one which Shaikh and Tonak find. While the reductions are arrived at by very different methods, the fact that Basu and Foley report such an important reduction in growth from removing precisely those sectors affected by Shaikh and Tonak's adjustments suggests that the method of the latter would also find a reduction in the rate of growth after 1990. Some of recent economic growth seen through a classical perspective is but a phantom.

III. Consequences for decoupling GDP from environmental impact

The foregoing shows that a derivation of a production boundary from classical political economy leads to shift in the sources of production, and to a decline in observed GDP growth rates. And given the continuing shift of economic activity towards sectors operating in the social consumption phase of social reproduction, there is no reason to expect this trend to reverse anytime soon. In fact, as Foley (2013) – concerned with global environmental change – points out, this trend (along with the NIPA way of interpreting it) may obscure the fact that the production sector requires additional material and energy inputs to grow. This allows in turn the argument that future economic growth measured according to NIPA value added could be increasingly 'weightless' Quah (1996). But production is the "appropriation of nature" (Marx 1973 quoted in Savran and Tonak 1999, p. 122), so that the ever-rising demand on production growth to supply both production and social consumption capitalists with surplus value raises "dilemmas of economic growth" (Foley 2012, p. 283).

One simple way to illustrate this problem is to use the classical vs NIPA growth rates to measure relative "decoupling" of economic growth from the environment. This straightforward measure of the rate of change over time of the ratio of some resource use or pollution indicator and value added or GDP (much like changes in labor or capital intensity of output) is often used as a shorthand for diagnosing trends in the resource intensity or environmental impact of economic growth (Wiedenhofer et al. 2020). Fig. 3 shows the results for three indicators for the U.S. economy: carbon dioxide (CO2) emissions, primary energy and the material footprint, the latter being a consumption-based indicator of the weight in kilograms of all material inputs into the U.S. final consumption including those embedded in the supply chain. The black timeseries are official NIPA value added estimates, those in grey are from Shaikh and Tonak (top row) and Basu and Foley (bottom row). A negative slope indicates relative decoupling, a sideways or upward movement 'recoupling'.

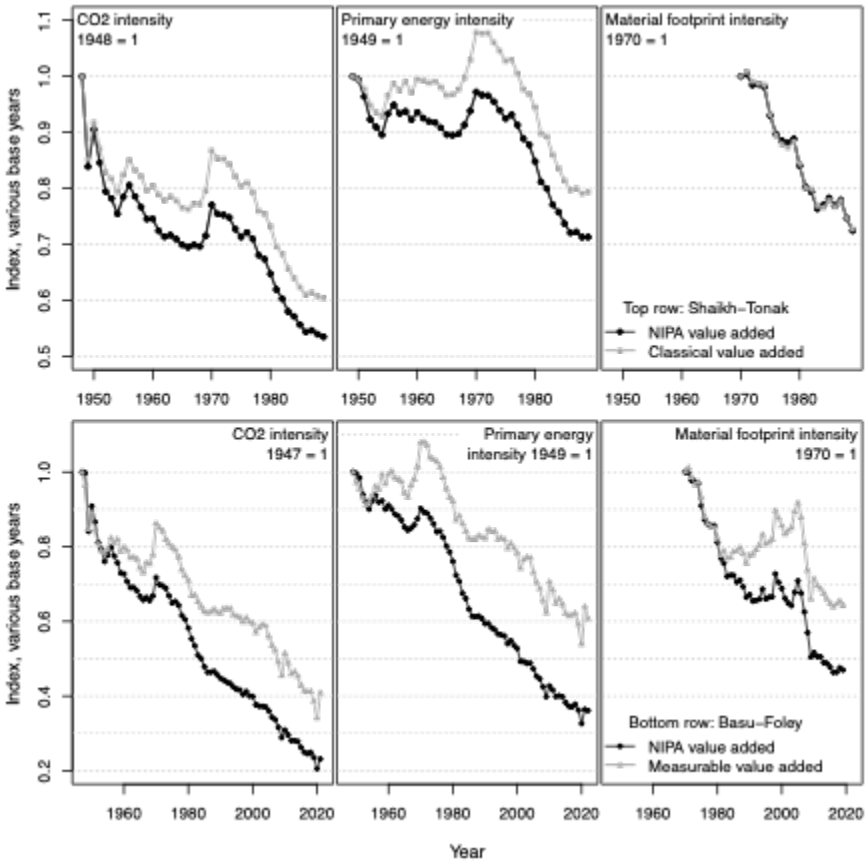
Obviously relative decoupling is more successful according to official NIPA estimates. This is a mechanistic consequence of their faster growth rate. Classical national accounts temper some of the more untrammeled optimism about the decoupling and 'green growth'. More interesting patterns result from the varying rate of change of the resource or pollution measure in the numerator. According to Shaikh and Tonak's classical value added (top left panel), there was no relative decoupling from CO2 emissions over the period early-1950s to the mid-s1970s in the U.S., and for primary energy not even from 1949 onwards. NIPA accounting instead reports a modicum of relative decoupling over the same period. That is, over these decades, the respective numerator grew faster than the classical but slower than the NIPA value added on average. In the last decade of the Shaikh and Tonak data both measures show relative decoupling and the short time period from 1970 onwards available for the material footprint indicator on the right shows that during that time, the growth rate in both value added measures was basically the same.

The Basu and Foley MVA allows extending a version of these measures for three more decades.[9] Eyeballing this longer period reveals that the NIPA measures report an almost monotone decline in the CO2 and energy intensity measures over seven decades, punctured only by the 1973 OPEC oil embargo. The MVA measure however indicates three periods without any substantial relative decoupling: the 1950s and 1960s, then the 1990s, and the period since around 2014 for CO2 and 2008 for primary energy. These are of course the periods when the MVA grew more slowly than NIPA value added, and it could be interesting to look in more detail precisely what sectors cause this difference and their energy

[9]Note the NIPA value added figures used by Shaikh and Foley are not the same due to revisions by the BEA over time; in particular, growth rates in the same historical period are faster in Foley's more recent vintage. For reasons see (Assa and Kvangraven 2021) and (Semieniuk 2024). These ambiguous measures do not only affect GDP; for an analysis centering on energy see Semieniuk and Weber (2020).

and emissions profiles. Material footprint intensity has yet another pattern, with a notable recoupling for almost three successive decades in the MVA but not NIPA value added, followed by a massive relative decoupling during the Great Recession.[10] If the current U.S. industrial policy manages to onshore mining and energy-intensive processing of the inputs into the low-carbon transition, one would expect all of these series to fall less quickly or even reverse direction.

Figure 3. U.S. CO2, primary energy and material footprint intensities according to different measures of GDP or value added in two periods.



Note: Top row: intensities according to NIPA value added and classical value added. Bottom: intensities according to NIPA value added and narrow measure of value added. Data sources: Value added as in Table 1, CO2 from the Global Carbon Project (Friedlingstein et al. 2022), primary energy from the Energy Information Agency Monthly Energy Review Table 1.1., and material footprint from the International Resource Panel, 2021 edition (West, Lieber and Wang 2021).

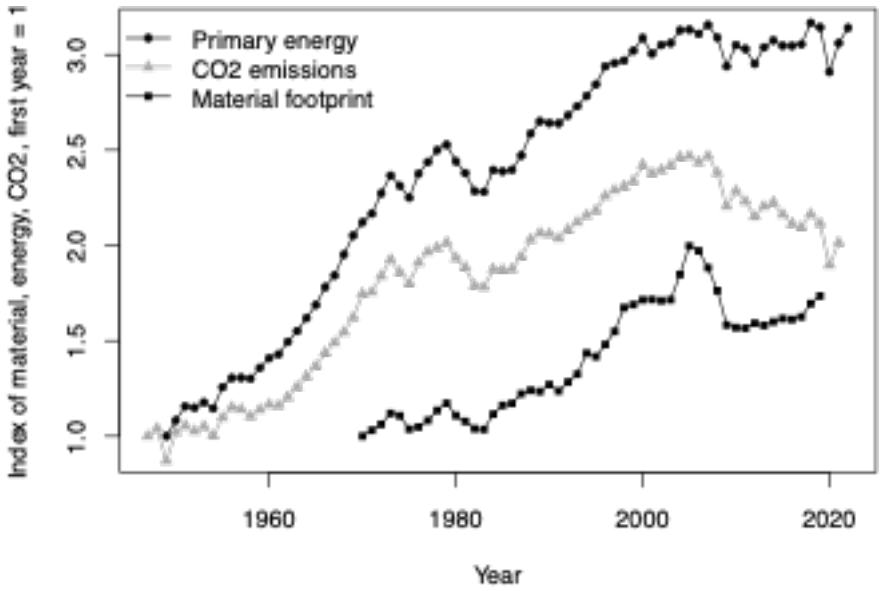
The takeaway is that for any measure of environmental impact that grows on average more slowly than the NIPA measure of value added but faster than the classical one, a qualitatively different result obtains, highlighting that economic growth has a 'real' component that impinges on the environment (Foley 2012, p. 290). The ultimate measure of sustainability of economic growth is absolute decoupling: a decline in resource use or impact and a growth in GDP that is to be contrasted with relative decoupling that only compares rates of change (Naqvi and Zwickl 2017). Here, the classical accounting also has a word of caution. There is evidence of absolute decoupling in some dimensions of environmental impact in advanced capitalist economies. Yet, as these economies are growing at anemically slow rates, the question arises whether they are not contracting from a classical viewpoint, thus moving out of the

[10]The precise year-to-year changes should perhaps to be taken with a bigger grain of salt than in the other measures as the footprint indicator requires additional assumptions about input output relationships in trade to be calculated (Lenzen et al. 2021).

desired 'absolute decoupling' space. At the time of writing this manuscript, news are that economists expect the euro area to grow at 0.1% in 2023, compared with expectations of a recession earlier on (Romei 2023); the European Central Bank predicts 0.5% economic growth in its December 2022 Macroeconomic Projection. Once adjustments are made due to secondary sector transfer accounting and the accuracy of imputations is questioned, it is rather unclear whether this positive growth would stand or is but a phantom. Or to slightly adapt Foley's words, it might be that national accounting has "convinced itself that the increasing returns in the rents to artificially created assets, such as systems software, were a remedy for thermodynamically imposed decreasing returns to resource use in material production" (Foley 2012, p. 293). To put this in the U.S. perspective, Figure 4 shows that primary energy supply has stagnated since around 2000 and growing NIPA value added suggests GDP being on the cusp of absolute decoupling from energy use. Yet, the MVA measure, which shows hardly any relative decoupling over this period in Figure 3, raises the question whether this stagnating energy use was not really obtained at the cost of a lack of growth in sectors that require energy in some proportion to production and are have no imputed value added. Since the level to which energy efficiency can be improved is finite and costly (Ayres and Warr 2005), more robust growth would most likely raise energy demand.

With the current energy mix involving fossil fuels, more energy demand would also put pressure on CO2 emissions. Of course, this is not to say that absolute decoupling specifically from CO2 is impossible (in fact, it already occurs in the U.S.) or must remain limited, since for this particular environmental impact there are technologically ready and often even commercially viable low-carbon energy substitutes. But the classical distinction between production and social consumption helps appreciate that such decoupling can be harder than current GDP growth estimates might suggest. This becomes especially salient for more encompassing views of environmental impacts, such as those summarized in the 'planetary boundaries' framework (Steffen et al. 2015).

Figure 4. Time series of an index of the absolute level of the three resource or pollution measures used in Figure 3.



Note: Data sources as in Figure 3.

IV. Conclusion

The theoretical development and operationalization of what is value added and GDP from a classical political economic perspective in the works of Duncan Foley and Anwar Shaikh helps clarify the debate about continued economic growth with environmental stresses. Growth is not weightless and some of

the more rosy projections of very successful economic growth with hardly any additional resource input (Semieniuk et al. 2021) may be projecting what has really been a growth phantom in past accounts. The analytical distinction between production and social consumption is useful for recognizing that economic growth has an important material basis but that this basis is also used for sustaining a growing structure of necessary activities that regulate overall social reproduction. This distinction cautions against hoping for an all too easy switch to 'green growth', and instead recommends looking closely at the type of economic activity that is supposed to generate this growth to make realistic projections. It similarly cautions against hoping for degrowth in certain resource- and pollution-intensive production activities while maintaining or scaling up certain social consumption activities, without first examining how these activities may be structurally dependent on each other in capitalist economies.

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