

Measuring economic transformation – what to make of constant price sectoral GDP – evidence from Vietnam

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Abstract

The paper discusses the analysis of economic growth and transformation and the concept of constant price sectoral GDP, usually understood to measure real factor rewards, linked to actual factor inputs. It reviews criticisms of such statistics and statistical conventions underlying GDP data, their focus upon current price factor incomes and implications of the practice of constructing constant price sectoral GDP from revalued net output (gross output less non-factor inputs). Innovatively, it shows how recalculations at constant prices of actual sectoral factor inputs at a year away from the base-year will **not** necessarily equal revalued gross output less non-factor inputs, the usual basis for such data. The accounting identity that requires their equality only holds for current prices. Therefore, constant price sectoral GDP data does not measure actual factor inputs. Despite this, the analytical frameworks of economists analysing structural transformation often assumes that they have, in constant price sectoral GDP, a measure of actual factor inputs (when they do not). This inhibits analyses from engaging properly with incentives, often disregarding the possibility of disequilibria by adopting a production function approach that, encouraged by the belief that constant price sectoral data measures changes in actual factor inputs, expects technical conditions to determine incentives (factor rewards). The paper shows this risk of confirmation bias by examining work on Vietnam.¹

Key words

Structural change, national income accounting, economic growth, economic development, confirmation bias.

1. Introduction

1.1. GDP

In this paper I discuss constant price sectoral GDP. By this I mean statistics reporting GDP generated in sectors (such as services), or sub-sectors (such as, within services, retail trade) that are revalued to create measures in some way independent of price changes. This can be done (as for example by the Vietnamese General Statistical Office (GSO)) by revaluing to the prices of a base year (currently 2010 [GSO 2020]), or through a 'chain' procedure that gives

¹ I thank David Dapice for collegial informal discussions, and comments from an anonymous commentator introduced to me by Frank Stilwell, and other anonymous reviewers. This paper draws upon '*Services and development – structural change in the Vietnamese economy during the 1992-2016 'economic miracle': some questions, a few answers and several suggestions*' presented to the National Center for Economic Forecast and Information of the Ministry of Planning and Investment Hanoi August 2018. I thank Tran Toan Thang, Nguyen Ngoc Anh, Tran Kim Chung and others for their comments.

estimates of real changes year to year based upon prices for each year. My central point is that these statistics are conceptually confusing, and that this has unfortunate consequences for analysis: they appear to create data on actual – or ‘real’² - factor rewards, and so inputs (given the removal of price changes), for these are thought equal to the difference between gross output and non-factor inputs, as indeed they are at current prices. But, as I show, this equality, based on an accounting identity, only holds at current – observed – value, but does not hold at constant prices. Reported constant price sectoral GDP almost always is calculated as real gross output less real non-factor inputs (as these are in practice calculable, but real factor inputs, especially of capital, are not). Therefore, they do not create data on real factor rewards, and so inputs (given the removal of price changes). The common assumption, though, is that they do.

One common consequence of this is that some economists, and I show this, therefore tend to think that these constant price statistics offer them an empirical door into a physical world where actual factor inputs and changes in them (rewards to factors with price changes taken out) are known. In fact, they do not, which removes the empirical foundation of analyses and views of the knowable economy that assume this. This I argue facilitates confirmation bias, helping to explain why important trends, such as the shift from industrialisation to servicisation in economic development in poor countries, are ignored for surprisingly long periods (see below) [Fforde 2016b].

Further, this bias then encourages a de-emphasis of research into actual factor incentives and development of suitable models to use that data, and an over-emphasis on the use of production function methodologies. These methods appear to embody actual factor inputs, linking production functions to incentives, such as through marginal product pricing³ (either actually or as a reference point to which markets will seek to move), and assumptions that relative factor prices are determined by technical conditions embodied in the production function. This bias assumes what must be shown, and, for example, tends to dismiss possible alternatives, which may or may not pertain in different sub-sectors, such as the possibility of various forms of rents (for example, with fast structural change, labour and / or capital receiving rewards largely independent of the costs workers or employers face in supplying work or capital).

What we find in the literature, too often, is inadequate attention to experienced incentives that drive shifts in labour and capital as core elements of structural transformation. Part of this bias, but of course not all, is explained by my argument here, pointing to the false belief that statistics on constant price sectoral output, whether chained or at base year prices, and derived from revalued net output, should equal constant price factor inputs **because at current prices they must**. Away from the base year, at imposed ‘constant’ prices, whether using an index or a chain basis, there is no reason for this equality to hold, so revalued changes in net output (which is what the data almost always is) do not record changes in actual factor inputs. Further, this tends to shift attention away from the valuable GDP data we do have, which is the current price factor

² By ‘real’ some mean that changes in these statistics might be interpreted as changes in isolation from price changes, and so mappable to physical quantities. This can itself be confusing in a NIA context, given the NIA framework’s internal definitions, which I discuss below. Essentially, there is a major conceptual gap between a ‘deflated’ current price measure and notions of physical quantities. See on this for example Rymes 1971 as an extensive discussion. This is not the meaning of ‘real’ used by Kuznets, a founder of NIA methods – see below – for whom ‘real’ meant current price data.

³ See McLeod 2019 for a thought-through discussion of links between this and GDP data.

income data for sectors and sub-sectors: focussing on this implies a refocussing of what we mean by economic growth upon the changing pattern and value of factor incomes generation, which, as a measure of economic activity, is the conceptual heart of National Income Accounting. In this framing, the central issue to understanding economic growth is the capacity of an economy to generate increases in factor rewards without excessive inflation or external instability, so that workers' incomes and profits have increasing purchasing power. This shifts the analytical focus away from real GDP and towards current price incomes and final demand. Revaluation of the latter to manage price changes is conceptually straightforward.

1.2. Motivations

So, in this paper I examine the construction and definition of constant price sectoral and sub-sectoral GDP data or changes in it, if a chain basis is used - that is, the associated ontological issues - and evidence for how this has influenced research on economic growth, and I illustrate the associated issues in applied research by using Vietnam as a case study. The motivation for this is, first, my own attempts at analysing contemporary Vietnamese economic history, specifically the 'Economic Miracle' that started in 1992, and the need to produce a plausible and coherent analysis of structural change: movements of economic activity and payments to factors of production (rewards to labour and capital) between sectors.⁴ If 'water flows downhill', in the Vietnamese expression ('Nước chảy vào chỗ trũng'),⁵ or heeding Bloomberg's advice to 'follow the money', we clearly need to know the analogous issues of gravity, the height of the hill, etc. This research quickly ran up against the question of what is meant by constant price sectoral GDP, and my issues with much of the extant literature. Thus, my second motivation is methodological - how economists may avoid pitfalls through a clearer understanding of the data they are using.

1.3. Vietnam

The question of the actual incentives operating upon factors of production in Vietnam, and how they are reflected in data, is given added importance by important aspects of the Vietnamese political economy. Recent research by Vietnamese scholars has reported that payments of bribes by businesses are about the same as their retained profits [Nguyen & van Dijk 2012 and Nguyen et al 2016]. Based on these and other data I think that bribes probably "amount to at least ¼ of GDP and are likely far higher" [Fforde 2021a:5]. Further, research also shows that the value of relations with officials, whilst high in the early stages of the Vietnamese 'Economic Miracle', have evolved significantly. By the late 2010s, bribe payments whilst clearly high were not seen as influencing the commercial success or failure of individual businesses [Nguyen et al 2016]. Further, qualitative research shows how the ruling Vietnam Communist Party is involved in procedures that prevent state bodies investigating Party members' possibly corrupt

⁴ It is the case that structural transformation was mainly not industrialisation, but an expansion of services. I claim credit for first publishing on this in Fforde 2016. Vietnamese economists are starting to publish on this [Nguyen 2018; Nguyen & Ta 2019]. See also Helbe & Shepherd Eds 2019 from the ADB that is, so far as I know, the first major work from a major donor to look seriously at the issue.

⁵ The saying derives I think from rice farming, for the phrase literally means 'water flows to low-lying land', which, in the Red River delta, being somewhat waterlogged, tended to require quick-growing rice varieties to take a crop. Such areas were called 'Chiêm trũng', as the strains came originally (it is said) from Champa (Chiêm) in central Vietnam.

activities without the formal approval of the requisite Party body [Vu Anh Dao 2017].⁶ This means that we need to be careful in how we explain incentives and especially careful in how we treat GDP data reporting value-added. There is evidence that ‘rents’ created by relationships nourished by bribes have fallen sharply over time, and no longer seem greatly to influence business success or failure [Nguyen et al 2016 and Nguyen thi Xuan Huong 2018].⁷ Whilst this is clearly a topic that requires deep research, not least into case studies that explore business’, bribe-receiving officials’ and workers’ perceived incentives, such research is made harder by uncritical deployment of analyses based upon production functions that assumes that constant price sectoral GDP data measures actual factor rewards and that this buttresses assumptions that factor rewards are either determined by technical conditions (such as their marginal products obtained from the production function) or strongly influenced by them.

For example, in the Vietnamese GDP data four sectors stand out as having sub-sectoral Gross Value Added (GVA) well above the average: power, mining, real estate and financial services.⁸ Personally, I am not hostile to assuming that this reflects, for power and mining, the low levels of labour costs compared to capital in generating electricity and extracting crude oil, but I am not happy assuming that there are high levels of actual inputs of highly skilled and so costly labour that explain adequately the situation in real estate and financial services. One reason for my judgement here is that the year-year variation in this current price data is large for the latter, but not the former.

The evidence from Vietnam is that GVA/worker in manufacturing, although relatively high when fast growth started, likely due to favourable resourcing by the state as part of the central-planning system, fell back relative to national averages rather quickly, so that employment generation there created rather low additions to current price GDP compared with services sectors – so the economy servicised [Fforde 2021b].⁹ This basic arithmetic can be obscured by deploying research methods that rely on misinterpretations of data to generate confirmation

⁶ This refers to Directive # 15 (2007) of the VCP Politburo ordering that state organs could not investigate Party members for possibly corrupt activities without Party permission [Vu Anh Dao 2017], in effect making corruption legal, if judgements of legality are determined by how local sovereign power determines what the law actually means in practice.

⁷ This implies that officials may often treat their ‘portfolio’ of bribe-generating businesses as best managed by a ‘hands-off’ approach that minimises transactions costs. The widely cited McMillan & Woodruff 1999 reports on the vigour and economic power of Vietnam’s informal business institutions. De Vylder & Fforde 1996 analyses the transition ‘from plan to market’ of the 1980s largely in terms of informal ‘bottom-up’, not policy-driven, change processes, linking them to processes in the north before 1975 and stressing the importance of macroeconomic shocks in the late 1970s. Fforde 2018c examines the subsequent literature, arguing that despite peer review and the availability (‘down the corridor’) of country expertise, many major scholars, in accepting arguments that change was driven by the Party, have made serious empirical mistakes.

⁸ These sub-sectors often contain sub-sub-sectors (e.g., power usually includes water supply) but I ignore these for convenience. I use GVA rather than GDP for clarity – they are statistically the same.

⁹ Data in Fforde 2012b reports that the ratio between manufacturing GVA/worker and the national average - *fell*, according to official data, from a 1999 peak of 206.1% of average GVA/worker to 125.4% in 2013. According to the latest data, in 2010 this was 95.5%, *lower* than the national average (in 2018 the ratio was 89.3%). Thus, just after 1992 in the first years of the Miracle, despite relatively high GVA/worker, because of weak job creation the share of manufacturing in total current price GDP, 15.4% in 1995, peaked at only 21.2% in 2007 before *falling* to 16.0% in 2018. Manufacturing was not acting arithmetically as a leading sector driving rapid GDP growth.

bias, such as supporting the view that industrialisation is both necessary and the actual average structural transformation of contemporary developing countries.

The focus on production conditions and use of production functions as the core metaphor of economic activity is influential. For example, the standard division of GDP in NIA is 'physicalist' - to do with production conditions - under three broad headings: primary (agriculture, forestry and fishing), secondary – industry (power, mining, manufacturing and construction) and then a group of activities grouped as services. The latter is in many ways a residual; in the Vietnamese data, which now follows international practice, there are 13 sub-sectors - Trade +, Science +, Arts +, Transport and Information, Administration +, Other services, Accommodation +, Party +, Household Employment, Financial Services +, Education, Real Estate + and Health.¹⁰ Whilst the basic argument made is that each of the three broad headings includes activities that share similar production methods, there is clearly much to discuss about this view. Clearly, this way of categorising economic activity itself encourages thinking of activities in a 'physicalist' way, by focussing upon the importance of similar production conditions. This then seems to encourage production function analysis, with the associated tendency to assume that in constant price sectoral and sub-sectoral GDP data analysts possess measures of actual factor inputs, when they do not.

Personally, treating tourism as sharing similar production conditions and technologies to financial services seems to me a big ask. For example, tourism, with its substantial investments in fixed capital such as hotels, is likely to enjoy economies of scale as occupancy rates rise, with no obvious equivalent in financial services.¹¹ This issue is becoming of greater importance as data suggests (see Table 1) that structural transformation is no longer centrally industrialisation. Rather, transformation appears as servicisation, often in situations with fast-growing GDP and implying relatively high GVA/worker in services sectors. Table 1 suggests the faster the growth the greater the servicisation. But whilst Table 1 covers a period since the end of the Cold War, this view is not widely accepted [Fforde 2018a], I think in part due to the belief 'in production', so that it is shared production conditions that are central to the sectoral categorisation of economic activity in GDP data. Services indeed can also be seen as simply a residual – not primary, nor industry. The content of servicisation is therefore obscured: just what do services sub-sectors have in common other than being neither primary nor industrial? And also confirmation bias is encouraged.

1.4. Servicisation vs. industrialisation, and 'confirmation bias'

There is widespread assertion of the necessity of industrialisation for economic development, and so deviation from this is seen as a mistake and research into servicisation strikingly limited [Fforde 2018a]. Given the statistical position of 'services', deviation from industrialisation is by definition, if primary sectors are shrinking, 'servicisation'. This evidence also suggests that faster-growing countries (excepting China) tended to increase the share of services in their

¹⁰ As already mentioned, these sub-sectors often contain sub-sub-sectors, marked here by the '+' sign.

¹¹ Sheehan 2008 channels the analytical framework of Murphy et al 1989 to point to the possibility that their 'drivers' of industrialisation – economies of scale, pecuniary externalities (industrial workers' tendency to spend on industrial goods) and structural issues helping to preserve profit levels ('dual economy') – could apply to servicisation. Domestic tourism would seem to be a good example in the case of Vietnam. Sheehan unfortunately did not test his conjecture empirically.

GDP more than slower-growing countries, on average (see Table 1). Fforde 2018a offers empirical evidence that shows the general ignorance of this at global level in terms of both academic work (by examining article abstracts) and that of donors, taking the World Bank as a main indicator. These facts notwithstanding, and consistent with established belief rather than what the data shows, industrialisation retains considerable normative power. As one example we find that Rodrik, a globally influential scholar, has recently published work fearing ‘premature servicisation’ [Rodrik 2015], which he tellingly calls ‘premature de-industrialisation’. Again, whilst the Vietnamese data shows rapid growth with servicisation [Fforde 2016, Nguyen 2018 and Nguyen & Ta 2019], study of what happened during the Economic Miracle that started in 1992 must cope with studies that support Rodrik’s position and deploy analytical techniques based upon production functions that assume, for empirical work, that constant price sectoral GDP data measures actual factor rewards.

There are two issues here: first, the one I confront in trying to understand structural change in Vietnam, which is - what happened? Second, how does the assessments that we have depend upon a specific interpretation of our available data, specifically constant price sectoral and sub-sectoral GDP (or changes in it if a chained series is used)? It seems that reliance upon constant price sectoral GDP (or constant price changes in it) is common but, as I argue, built upon a basic misunderstanding of the data. It is possibly that this misunderstanding is in some way linked to the confident assertions that industrialisation is necessary and sufficient for fast growth, when the data clearly shows that it is not. This may be because the ‘economic homunculus’ – the ‘physicalist’ model many economists use to think about and debate economic growth – relies upon a production function view of the economy, whose links to reality are thought strong (because of the mistaken believe that the data they have - constant price GDP - measures actual factor inputs) with implicit associated parameters derived from belief in industrialisation, leading to confirmation bias in applied research.¹²

Table 1: Structural change in developing countries’ economies, 1991-2013

| | Percentages of countries | Change in the measured share of GDP in the whole economy | |
|---------------------------------|--------------------------|--|-------------|
| | | A. Services | B. Industry |
| Group 1 (less than 100% growth) | 25% | +2.1% | +0.6% |
| Group 2 (100%-200% growth) | 48% | +6.5% | +1.4% |
| Group 3 (200%-300% growth) | 15% | +7.5% | -0.7% |
| Group 4 (more than 300% growth) | 10% | +10.8% | +0.1% |
| All countries | | +6.2% | +0.5% |

¹² Statisticians and econometricians are aware of the extent to which extant statistical techniques face, at root because ‘so much is in the null’, difficulties in managing situations where, for example, the empirical analysis is founded upon a production function approach that cannot itself easily be denied by the statistical results. And, of course, choice of functional form and proxies, usually not well-guided by theory, can lead to good statistical results (which may be used to attack opponents) that are in fact spurious in technical terms (that is, meaningless). In such ways confirmation bias can occur.

Note: Averages are unweighted: data is for individual countries. Growth defined as change in current PPP US dollars. <http://data.worldbank.org/indicator/NV.IND.TOTL.ZS/countries> (24 November 2015). Reproduced from Fforde 2018a.

Both issues can be seen in Rodrik 2015. In a ‘physicalist’ view, productivity for him conceptually means constant price GDP/worker which is assumed to be data measuring actual factor inputs.

Typically, manufacturing experiences more rapid productivity growth than the rest of the economy. [3]

Premature deindustrialization is not good news for developing nations. It blocks off the main avenue of rapid economic convergence in low-income settings, the shift of workers from the countryside to urban factories where their productivity tends to be much higher. [23]

The argument focusses upon the assertion that manufacturing – a sub-sector of industry in the NIA – “experiences more rapid productivity growth”. My questions are therefore, first, what happened to manufacturing, and second, what does the available data on constant price output – manufacturing GDP – really mean? To repeat: the accounting identity that means that net output equals value-added **only holds at current prices**: away from the base period and revalued at base year prices using a chain method or fixed base year prices there is no reason conceptually that price-adjusted sectoral or sub-sectoral GVA viewed as actual factor inputs equals the difference between the constant price values of gross output and non-factor inputs. I argue that we are on far firmer ground when we ask whether factor incomes in manufacturing are growing relatively fast or slowly **in current price terms**. Table 1 suggests that similar arithmetic to that we see in Vietnam must also be common given the global averages: GVA/worker at current prices in manufacturing has been relatively low compared with national average GVA/worker.¹³

1.5. The GDP arithmetic of structural transformation

It needs I think to be stressed that simple arithmetic means that if there is structural change (understood as movements of factors of production from low to high GVA/worker sectors) rapid growth in current price GDP can only take place *if* current price GVA per worker in leading sectors is well above the average. Servicingisation therefore, if GDP is growing fast, means movements to sectors – services - where GVA/worker there must be relatively high.

Since this arithmetic is fundamental, for NIA in the first instance measures current price factor incomes which are in accounting terms identical to final demand (net of indirect taxes and subsidies – the so-called ‘factor cost adjustment’), then we must see constant price statistics (whether chain based or not) as derivative. On the expenditure side, such measures are derived from estimates of price changes; but derived from what on the output side? Sub-sectoral and sectoral statistics derived by deflating non-factor inputs and subtracting them from deflated gross output exist, but though they are called sectoral and sub-sectoral constant price GDP,

¹³ This echoes research by Wood 1997 arguing that technology has often evolved to prevent factor rewards shifting from rich countries as off-shoring takes place – reducing GVA/worker in offshore manufacturing below what it might have been.

what do they mean, and, crucially, what do the textbooks on NIA method say they are, and are not?

1.6. The paper

These arguments are developed and supported in the rest of the paper. In the next section (2) I explore how, and with what assumptions, constant price measures labelled sectoral and sub-sectoral GDP are derived and used, and what meanings are given to them. In the section after that (3) I look at what the relevant manuals on NIA methodology say. I then (section 4) discuss how these general issues appear to have impacted upon the Vietnam literature and the country's economic strategy. I then (5) conclude.

2. Use of volume measures of sectoral and sub-sectoral GDP – literature

In the next section (3) I will review and clarify the statistical assumptions behind National Income Accounting (NIA) to support my argument, which so far has not been in sufficient depth. Prior to that, in this section, I look at the uses made of volume measures of sectoral and sub-sectoral GDP, to show the major meanings attributed to it.

2.1. Global patterns of research

A search for the most widely-cited relevant studies of structural change gives us the following most-cited papers (with Google Scholar Citations, as of August 27th, 2018, in brackets) – Arrow 1962 (14232), Levine 1999 (8547), Miller & Blair 2009 (6778) and Woolcock 1998 (6489).¹⁴ These are very high citations levels.

The common metric of structural change in these papers is, as expected, constant price sectoral and sub-sectoral GDP. This, as I discuss in the next section, constructs statistics by revaluing gross output and non-factor inputs at base year prices.

Arrow models and conceptualises in a 'physicalist' world where there are, conceptually, clear relationships between observed factor rewards and an underlying production function and where "both capital and labor are paid their marginal products" [159]. For Arrow productivity is conceptually a real 'physical' measure, and he is assuming that sectoral and sub-sectoral actual output per worker has coherent meaning as an observable, through the relationship between the production function's form and factor rewards – their marginal products.

Levine 1999 works within a similar conceptual framework, within which it is assumed that it makes sense to use "existing theory to organize an analytical framework of the finance-growth nexus and then assesses the quantitative importance of the financial system in economic growth." [1]. This world view sees economic growth as inextricably linkable to production function analysis, and his empirical work takes this 'physical' metaphor as its core:

¹⁴ I used Harzing's *Publish or Perish* which platforms on Google Scholar and searched under 'structural change, economic, productivity'. Some findings were excluded as not suitable or relevant.

The three growth indicators are as follows: (1) the average rate of real per capita GDP growth, (2) the average rate of growth in the capital stock per person, and (3) total productivity growth, which is a "Solow residual" defined as real per capita GDP growth minus (0.3) times the growth rate of the capital stock per person. [33]

Miller & Blair 2009 reveal a similar approach:

A key source of growth and health in many economies is the rate of growth in its economic productivity, broadly defined as the level of output of an industry or of the economy as a whole per unit of input. Exploring different methods of measuring this economic productivity has been an active area of analysis for the last two decades (Jorgenson and Griliches, 1967). [670]

Again, this clearly requires and deploys a physical concept of real sectoral or sub-sectoral output (GDP).

Jorgenson & Griliches 1967 share this conceptual framing:¹⁵

... the theory consists of a production function with constant returns to scale together with the necessary conditions for producer equilibrium. Quantities of output and input entering the production function are identified with real product and real factor input as measured for social accounting purposes. Marginal rates of substitution are identified with the corresponding price ratios. [249]

For Woolcock 1998 productivity is, also, ontologically, 'real' and a necessary part of a valid explanation of economic growth.

This rapid survey shows that the most cited works in this field assert 'physicalist' views of the nature of economic growth, structural change, and the underlying reality upon which observables, such as constant price sectoral GDP, sit.

2.2. Core aspects of the dominant global literature

From this discussion it is clearly the case that these (the most cited and generally highly cited) authors treat constant price (volume) sectoral or sub-sectoral GDP uncritically as a suitable tool for the analysis of structural change and assume it to refer to something 'real' in ways that make sense. But in fact, this data as provided by NIA statisticians is conceptually (and usually in practice) the difference between output and non-factor inputs revalued at constant prices. Sectoral and sub-sectoral volume GDP is in these and other texts assumed to mean 'a measure of actual output', and this is linked to the deployment of production function analyses.

In passing, I think that, apart from these core issues, a strong factor supporting these practices is the availability of proxies for labour input, such as employment (and perhaps hours worked). If it is thought that the available sectoral or sub-sectoral constant price GDP data measures actual factor inputs (or, if using a chain-based method, changes in the sum of actual factor

¹⁵ I discuss below their understanding of what they mean by 'real', which contrasts with that of Kuznets.

inputs), then the availability of labour input proxies surely suggests that, in some way, (changes in) actual capital inputs can be obtained. These can be augmented by devices such as creating estimates for changes in the sectoral or sub-sectoral capital stock by constructing lagged functions of investments (which can be deflated without too much worry as they are part of final demand). This then reinforces beliefs that the production function approach is empirically supported by the available price adjusted sectoral GDP data, which is why the point I make here, that the accounting identity that equates net output to GVA only holds at current prices, is important. I illustrate this below with a simple arithmetic exercise, and, once realised, I think this is obvious.

3. Economic growth and its analysis: some core conceptual issues

3.1. NIA – a review

Economic growth viewed in terms of commonplace measurement, economic analysis and public discussion is no more than changes in constant price GDP over time. Economists know that GDP is not in the first instance a measure of physical output. It starts from the desire to measure economic activity and the thought-through view that total economic activity is best viewed conceptually, and measured, as the rewards paid to factors of production – labour and capital. How these might be related to actual inputs of factors of production and physical productivity is a secondary question.¹⁶ This is why it is called National Income.

The conceptual ‘soul’ of this way of measuring levels of economic activity is, then, *factor incomes*. In its essence, the primary insight of the conceptualisation is not about physical inputs and outputs, but about flows of income to factors of production – labour and capital. Only secondarily, and only if these factor inputs can be measured and priced, to get at what they actually are, can factor rewards be linked to actual factor inputs. The discipline of double-entry accounting means that at the level of the production unit, as well as sectorally, sub-sectorally and the national economy, value-added, which equals factor rewards, also equals the value of gross sales (gross output) less non-factor inputs. This discipline of course does not apply for any set of prices other than those in the base period. Some expositions argue that GDP, as a statistic, is mainly aimed at giving a correct measure of output ‘by netting out double-counting’.

But what does it net out, and why? Thus:

The main output from the national accounts is a measure of the overall value of economic production in Australia in a given period, but without any double counting of the goods and services being produced. Many goods and services are bought by businesses for use in their own productive activities (e.g., steel is bought by car manufacturers). If the value of all goods and services produced were simply added together, there would be serious duplication because some goods and services would be added in several times at various stages of production. The overall measure of production, excluding double counting, is

¹⁶ I base my exposition on three official texts covering nearly 50 years: Maurice Ed, 1968; United Nations 2009; and Statistics Canada 2002; also, ABS 2012. There has been a trend to shift towards use of chain-based methods, using period-period price changes, but many still use the base year prices method (e.g., the Vietnamese GSO) and the core issue I stress here is unaffected by this. Statistics Canada have invested heavily in attempting to get at actual capital and labour inputs – see below.

called 'gross domestic product', which is commonly referred to as GDP. [ABS 2012: n/p]

This definition moves to what happens at the level of the whole economy from what happens at the level of the economic unit. This I think hides the important issue that whilst accounting identities hold at current prices at the level of the economic unit, and so sectorally and sub-sectorally, at fixed prices, whether chained or using a single year as the base, there is no reason for them to hold.

Activity in an economic unit, such as a business, can be measured as its gross value-added (GVA), being payments by it to factors of production (labour and capital) which as an accounting identity is also the value of the unit's other purchases (called in the quote above intermediate inputs) subtracted from its total sales. What is meant here by an economic unit's production is clearly just the GVA generated. It has always seemed to me personally that this is an odd use of the term productivity. It means that if actual levels of work and capital use do not change, but factor rewards rise, then so does productivity (on the surface a physical concept), which seems absurd. Anybody who has had to explain how a value-added tax works will have had to go through this.

For the purposes of argument, think of a one-man business that uses two inputs and labour to make a single output, using a tool, and pays something to the owner of the tool. We can look at the accounts and say that what he pays himself and the tool owner equals the gross value of sales less what he pays for his two inputs. We can do that again for another period and see what the change is in GVA – the business's contribution to current price GDP. But to say anything about his actual physical productivity is highly problematic, and simply saying that this equals the changes in his gross output less his non-factor inputs with all revalued at fixed prices is incoherent.

This incoherence is clarified if we think through whether the accounting identity which holds definitionally in the base period will hold at any other set of values revalued at constant prices: clearly, there is no reason why it should. If we revalue actual inputs and outputs, factor and non-factor, away from the base period at the prices of the base period there is no reason why constant price GVA should equal the difference between constant price gross output and constant price non-factor input costs (or changes in them if we use a chain method). The accounting identity that makes the NIA system work only applies at the base period, and to the aggregate data, where it works because final demand is definitionally equal to GVA adjusted for indirect taxes and subsidies (the 'factor cost adjustment').

The components of final demand (consumption both private and public, investment, export and imports ...) clearly are flows of actual goods and services, and so with some choice of price index can be adjusted in a conceptually consistent manner to give constant price measures (or changes in them if we use a chain method).

So, whilst sectoral or sub-sectoral factor incomes are the difference between the value of gross outputs and non-factor inputs for a given sector or sub-sector, it is not clear what we are looking at if we deflate these two collections of physical quantities – that is, measure them at a different set of prices. We may also assert, to complicate the issue further, that the 'actual' value of factor incomes rather reflects to those who receive them the costs of what they may spend them on, and **variations in such costs are not measured by changes in either non-factor sectoral input or output prices**. To quote a UK government manual [Maurice et al 1968]:

*Direct estimates of gross domestic product at constant prices cannot be made from income data. Although wages and salaries may be deflated by an index of wage and salary rates, this provides a measure of only part of net output which does not take full account of changes in labour productivity ... The various types of factor income might be deflated by changes in the prices of the goods and services on which the income is spent; but not all income is immediately spent, and until income is spent it cannot be identified with actual goods and services. However, since by definition total factor incomes equals total expenditure on the gross domestic product at current prices, the price index derived by dividing the expenditure-based estimate at current prices by the corresponding estimate at constant prices can be treated as a currently-weighted price index applicable to total factor income [The GDP deflator – AF]. The estimate of gross domestic product at constant prices obtained in this way ... provides no information on changes in the deflated values of **separate components of factor incomes** [Maurice et al 1968:45, stress added].*

Another manual [United Nations 2009] reaches similar conclusions:

Para 15.178. The limit to a set of integrated price and volume measures within the accounting framework of the SNA is effectively reached with net operating surplus. It is conceptually impossible to factor all the flows in the income accounts of the SNA, including current transfers, into their own price and volume components into unequivocal price and volume components. However, any income flow can be deflated by a price index for a numeraire set of goods and services to measure the increase or decrease of the purchasing power of the income over the numeraire but this is quite different from decomposing a flow into its own price and volume components... [314]

What Maurice et al and United Nations 2009 are saying is that one can calculate data and call it constant price sectoral or sub-sectoral GDP, but though it is clear how the data is constructed it is not at all clear conceptually just what it measures. What is clear from my analysis is that this data does not measure actual factor inputs or changes in them.

These sceptical views contrast with those we find in Statistics Canada 2002, which echo those assumptions in the texts reviewed in Section 2 and the suggestion from ABS 2012 that GDP, a net measure, is usefully thought of as an output measure *from which double-counting has been netted out*. Statistics Canada have sought to develop measures of actual capital and labour inputs. This is interesting but must confront severe measurement difficulties. Durand 1994 and 1995 grapples with the issue of ‘double deflation’ for measuring “real industry value-added” [1994: 303] in the Canadian NIA data. In this he is following up on criticism of ‘double deflation’ measures by Bruno 1978 and Denny & May 1978. The former reports that the relevant literature is “remarkably small” [4] and concludes that the requirements that such measures correctly measure marginal factor productivities are unlikely to be met. This literature tends to show that, when the situation is explored with reference to possible formulations of production functions, it becomes clear that Kuznets was likely correct – see below - to consider that the ‘real’ data is the current price data.

An analytical problem that arises when constant price sectoral or sub-sectoral GDP is used is, I think, often a feeling that the implied underlying distributional assumptions are not risky, and

so the physicalist metaphor with its implications for what determines factor rewards that we see in the quotations above will robustly generate and explain actual observables. This is conceptually linked to thinking in terms of production functions that, as we have seen, are conventionally linked by the economists I cite through the standard partial differential analysis to marginally priced inputs (including factors of production). Further, it may be the case (I have not checked) that the specific algebra of the chosen production functions *imposes* the requirement that constant price GVA equals the difference between constant price gross output and non-factor inputs, further clouding judgement (for this is not necessary ‘in reality’, as I have already discussed – see below for a simple arithmetic example). There is, rather, no strong analytical reason for applied research to make such assumptions: rewards to capital and work, and other prices, may reflect disequilibria, rent creation or other factors and the point of research is to establish what. The approach of Jorgenson & Griliches 2016 encourages belief that variations in GVA/worker are, *in any empirical context*, caused by technological and demand conditions (such as risk, human capital etc), and *not* by anything else (or that disequilibria reflect an orderly departure from equilibria so understood). This assumes away, though, what should be researched empirically.

3.2. *Current and constant price sectoral GDP*

What do different scholars mean by ‘real’? Whilst the view of those cited above is that it is actual factor inputs and their relationships that are real, this is not the view of the founder of NIA methods, Kuznets. He argued that “real investment” was made up, in the NIAs, of “the part of the current national product that is diverted from immediate consumption into additions to the capital of business and public enterprises” [Kuznets 1942: 3]. Here for him it is **current** price statistics that are real, and this implies that for him the central conceptual essence of NIAs, what was for him real, are the current price statistics, not those revalued in some way to give constant price information.¹⁷ His subsequent discussion treats constant price investment on the demand side – that is, like consumption, a deflated element of final demand. Kuznets 1941 Chapter 1 discusses the “Concept of National Income” and focusses upon current price aggregates: the duality that means that it “may be defined as the net value of all economic goods produced by the nation” [3] and the “total of all net receipts of individuals and business agencies” [4].¹⁸

¹⁷ There is of course a considerable literature in many cultures about such issues that I do not refer to here - apart from flagging Gillespie 2008 (and in summary 1999): “[T]he process of secularisation or disenchantment that has come to be seen as identical with modernity was in fact something different than it seemed . . . the gradual transference of divine attributes to human beings (an infinite human will), the natural world (universal mechanical causality), social forces (the general will, the hidden hand), and history (the idea of progress) [272–273]. And Nisbet 1969: “... what we have brought into conceptual existence, we are prone to believe has actual existence.” [241]. Nisbet’s comment seems applicable to the ontological positioning of the widely-cited scholars in Section 2.1 above.

¹⁸ Note also “For those not intimately acquainted with this type of work it is difficult to realise the degree to which estimates of national income have been and must be affected by implicit or explicit value judgements” [5]. See also pp.17-18 showing the author’s awareness of the variety of possible definitions of productivity – suggesting the value of focusing upon current price data, for all its dependency upon value judgements, such as the definition of activities deemed productive of factor incomes. See also pp. 29-31 discussing inherent issues with deciding upon how to measure prices. It is striking how the discussion of this Chapter largely excludes reference to constant price measures: for Kuznets, as the quote in the text shows, ‘real’ national income is a current price measure.

But the ability to generate constant price statistics called sectoral or sub-sectoral real GDP poses the issue of what actual economic activity this data measures. Rymes 1971, in a thorough discussion, surveys the debates about value and meaning in this area.

That, in contrast with Kuznets, Jorgenson & Griliches 1967 use the word 'real' in a physicalist sense is clear from:

Quantities of output and input entering the production function are identified with real product and real factor input as measured for social accounting purposes. Marginal rates of substitution are identified with the corresponding price ratios ... if quantities of output and input are measured accurately, growth in total output is largely explained by growth in total input. Associated with the theory of production is a system of social accounts for real product and real factor input. [249 – stress added]

Clearly, they disagree with Kuznets in their understanding of what the 'social accounting' (NIA) framework is, and what it measures.¹⁹

What this contrast between the views of Kuznets and others I think shows is that current price measures pose fewer problems when facing critiques that come down to the question (in a more popular register) of 'well are these measures measuring something real'. Physical conceptualisations, whether of actual labour inputs (proxied by employment or hours work), or of capital, perhaps proxied by capital stock estimates, or through a production function with associated links to remuneration, are far less robust in the face of annoying questions. Workers may turn up, they may be paid, but 'how hard they work' is far less easy to measure; a factory may exist and be used to produce goods that can be sold, but 'what it contributes to production' is a far harder question to answer. Answers to neither of these questions in terms that rely upon constant price sectoral GDP measures are robust if criticised.

3.3. Viewing the situation 'epistemologically'

The previous section (2) argued that a common view in the most-cited parts of the literature, based upon a production function conceptualisation of the economy, is usefully seen as deploying physical metaphors. We saw this in the common use of language that refers to GDP in physical terms, as 'output', close conceptually to the RHS of a production function: physical inputs are transformed into physical outputs. That is, the notion is that constant price sectoral or sub-sectoral GDP 'measures something real' in these, rather than in Kuznets', terms. This perhaps seems apparent because it is the difference between two constant price measures – intermediate inputs and gross outputs. Yet this metric 'just happens' because the current price measures are constructed by statisticians and used to generate the data. Subtracting revalued constant price intermediate inputs from gross output does not create a measure of output, in any coherent sense of the word output, not least as there is no reason to suppose that a revalued set of inputs and outputs will be one where GVA equals gross output less non-factor inputs.

¹⁹ From another perspective, which stresses the view that labour inputs are 'real' in the sense that they are measurable, see De Juan & Febrero n/d drawing upon Sraffian and Ricardian traditions. Here, by contrast, the focus is not upon concepts of physical capital inputs, but labour, as the 'real' source of all outputs, and so capital. Again, see Rymes 1971.

Further, as Maurice et al pointed out, there are two quite different senses to what is meant conceptually by constant price factor incomes. Do they measure, in a physical conceptualisation, real inputs? Or the actual value of them to their recipients? There is no reason, outside of some formal model that assumes it, that these are identical. In the latter sense, sectoral 'constant price wages', for example, if we are interested in them because of any effects of changes in them upon workers' incentives, are clearly not derivable from current incomes by deflating with a price index that is sector specific. The actual value to workers of their incomes in the tourist sector are not determined by price shifts within the tourist sector. They might be in a formal model, but that is another matter. Rewards to capital suffer from similar arguments – for example, perceptions by capitalists in the tourist sector of the effects of price changes on the inflation-adjusted value of their profits are not likely to be determined by what is going on in the tourist sector – for example, if construction costs fall then this arguably may influence whether they want to build more hotels. And so on.

3.4. How constant price GDP is measured – double deflation is not real factor rewards – a simple arithmetic illustration

As I have stated, away from the base year (whether using a chain basis or a fixed set of prices), the accounting identity that equates net output with factor rewards does not apply. I now illustrate this with a simple arithmetic example.

Consider a sub-sector of services, perhaps finance or real estate, that is measured through NIA to produce GVA/worker. Conceptually, we can think of the actual inputs in terms of factors and non-factors, and the real gross outputs. Perhaps to 'fix the mind' we can think of the factor inputs as workers and owners' expertise and actual assets such as the office infrastructure, non-factor inputs as purchases of services from outside the sector as well as goods (electricity), and gross outputs as services to capital market participants, management of IPOs etc. In the base year, these various actual flows are priced in some way and GVA definitionally and practically has to equal factor rewards, which equal gross outputs less non-factor inputs. This follows from the accounting identity faced by all producers.

Now let us do a 'thought experiment' away from the base year. Conceptually, the actual flows shift, and are revalued at base year prices. This gives us two estimates of constant price GDP – one based on revalued factor inputs, the other based on revalued gross outputs less revalued non-factor inputs. By comparing the base year with another year, we include both the chained and non-chained methods we find in the data.

Say there is a sharp fall in services provided, and we think of this (to concretise our conceptualisation a little) as largely caused by a sharp change in the work done on IPOs – in the base year, this was mainly done by highly paid senior executives structuring the deals; in the new year, the work shifted to administrative preparation, and much of this was outsourced, away from the financial services sub-sector towards professional and technical.

In the base year, factor inputs were, say, 100 units x 1 (price), with gross outputs (sales to IPO companies) of 200 units x 1, and non-factor inputs 100 units x 1. Factor incomes equal gross sales less non-factor inputs, as they must at current prices.

In the new year, say, factor inputs fall to 80, now priced at 1.1, so 88 at current prices (GVA on one measure) and 80 at constant prices; gross output, now priced at 1.1 (for whatever reason

– disequilibrium, increased demand ...) at constant prices rise to 120, so 132 at current prices; non-factor inputs rise to 110, say, which, however, for the accounting identity to hold at current prices must be valued (at say 'p') so that the two measures of GVA are equal. Gross inputs less non-factor inputs = $132 - 110.p$, which must equal 88. Therefore 'p' (non-factor input average prices) must equal $(132 - 88)/110 = 0.40$. At that price non-factor current price inputs are 44, so that GVA equals $132 - 44 = 88$. So, at constant prices GVA equals 80 under the first measure and 20 under the second measure. What many economists want is to know one, but the statisticians report on the other, as they in practice cannot get at estimates of actual capital or labour inputs, nor the prices of the former, but they can revalue gross outputs and non-factor inputs, and they calculate the difference between the two and publish it.

This means that whilst there is no reason to assume that the accounting identity between GVA as factor rewards and GVA as gross output less non-factor inputs will hold away from the base year, the results of assuming that it does may be large, and we have no way of knowing in practice whether the error is large or not. One might be estimated, but such estimates are not to be found in the standard data collections.

This conclusion is not altered by the fact that sometimes measures of constant price sectoral GDP are not derived by statisticians from 'double deflated' non-factor inputs and gross outputs, but estimates based upon non-factor inputs. This is common when, as with much services output, outputs may not be standardised and/or marketed so it is hard and/or expensive to reliably estimate gross output. Both services and agriculture sectoral constant price GDP are thus often derived from deflated inputs, with an adjustment to estimate constant price GDP based upon a 'double deflation' conception (such as the ratio between current inputs and current GVA) [United Nations 2009: 294, 310-1].

4. The Vietnam literature

The discussion so far has two implications: first, that Kuznets is likely right in suggesting to us that the 'real' data is current price GDP, but that there is a powerful strand, expressed by Griliches & Jorgenson and others, that asserts that reality is rather captured through constant price data; second, that this view confronts problems in interpreting constant price sectoral GDP measured through 'double deflation' as measuring real factor inputs (or changes in them). This then readily opens doors to confirmation bias, which in the case of Vietnam is pushed by the tensions between VCP and donor advocacy of industrialisation and the experienced reality of servicisation. Examination of the Vietnam literature may therefore show this. It is worth here remarking that the ruling Vietnamese Communist Party, whilst taking propaganda and its own ideology seriously, has shown itself quite capable of managing processes leading to major shifts in strategic direction [Fforde 2018c].

I focus upon the most cited work, and the two studies already mentioned [Nguyen 2018 and Nguyen & Ta 2019]. I have already mentioned the aspects of the Vietnamese political economy that, I think, make it important to have an empirically well-founded basis for assessing incentives operating on capital and labour. I have also pointed out that the year-year changes in some current price sub-sectoral GVA/worker have often been high.

Examination of literature on Vietnamese growth tends to lead to two conclusions. The first is related to the relative unimportance of policy change and the second shows the influence of 'physicalist' views of what 'real' changes are that are implied by conceptualisations that rest

upon production functions are important and lead to confirmation bias, in part as they rely upon constant price sectoral GDP data.

4.1. *Endogenous forces vs policy*

As would be expected from the reality of servicisation, in contrast to VCP and donor beliefs, some analysts point to powerful endogenous forces in play independent of policy. For example: Pham et al. 2008 conclude:

The result from three national IO tables {give} strong support for the evolutionary movement of Vietnamese economy, or in our terminology, a bottom-up process ... [33]

Giesecke and Tran 2008 study the period 1996-2003 and conclude:

*In our story, we find rapid growth in GDP to be due to productivity and labour force growth. ... **Our results downplay policy reforms** ... [26-27 – emphasis added].*

4.2. *'Physicalist' views, production function-based analysis, and reliance upon constant price GDT data*

Older studies other than those already mentioned that specifically focus on structural change (Bui et al 2012, Agola et al 2015, Abbott et al 2017, Tisdell 2011, McCaig & Pavcnik 2013) tend to avoid current price data in favour of constant price data and show problems with confirmation bias. More recent studies, likely aware of the servicisation issue [Fforde 2016a], avoid this [Nguyen 2018 and Nguyen & Ta 2019].

The earlier studies tend to conclude that manufacturing has been a central growth driver, **without placing this in an overall analysis of structural transformation that would reveal the greater importance of services**. They are strongly influenced by the production function approach, but do not succumb always to confirmation bias and support for industrialisation.

Bui et al 2012 report that “When analyzing long - term economic growth, most countries around the world follow the Solow growth model which was developed based on production functions.” [7]. But they conclude by asking the “reasonable question {as} to if the economic structure with the following priority order of industry, service and agriculture is an appropriate structure?” [9].

Agola et al 2015 explicitly contrast Vietnamese and Japanese experiences.²⁰ Their analysis, like that of Sheehan 2008 and Murphy, Sheifler & Vishny, 1989, is interested in dual economy issues, more generally the balance of welfare gains between the rural and urban sectors. As they put it:

²⁰ Current price sectoral GDP data shows that in Japan, for the years 1953, 1960 and 1970 respectively, GVA/worker in manufacturing was 116.5%, 138.6% and 120.0% of average GVA/worker [Fforde 2021b]. This contrasts sharply with the Vietnamese relative sectoral GVA/worker – see above Section 3.1.

The main finding is that raising productivity uniformly across sectors and regions was central to Japanese structural economic transformation, and that such productivity rise can be facilitated by uniform infrastructure development and judicious governmental policies directly impacting the right combinations of factors of production, namely increase in capital and technology in all productive sectors. [168]

Their analysis relies upon positing the existence of a production function and distributional relations that determine factor rewards [169] and so thinks in terms of the ‘real products’ of workers. Agola et al 2015 focus also upon sectoral real GVA/worker, and its average growth rate, and, by focussing upon real sectoral GDP, they can conclude that the manufacturing sector has ‘grown rapidly’ with high increases in gross exports [173].²¹ They therefore ‘miss’ what the arithmetic shows - the GVA/worker story of the sector’s rather unimportant contribution to economic growth (see above Section 1.3).

Abbott et al 2017 place upfront the concern on the part of Vietnamese policy makers that “ongoing structural transformation is creating too few jobs” [54]. They use production functions of various types [61] and assume (without empirical justification) that observed prices and factor rewards reflect technical conditions.

The data on factor rewards is fudged, with an observed interest rate less inflation treated as the same as the reward to capital manifest in non-labour GVA. Their analysis of “the extent to which higher wages would induce factor substitution towards more capital-intensive techniques {leads to} estimates of elasticities of substitution {that} yielded quite low ... values” [65]. This suggests, of course, that we are not in an equilibrium world at all, so their empirical results are technically spurious (that is, based upon assumptions that do not hold, and so technically meaningless). Be that as it may, they conclude that variations in labour productivity are caused by “biased technical progress” [66].

McCaig & Pavcnik 2013 (a later version is in Ed McMillan et al 2016) was used by Rodrik (see Ed. McMillan et al 2016) to support his thesis of ‘premature deindustrialisation’ [Rodrik 2015]. They are ignorant of the global reality of servicisation (above Table 1; Fforde 2018a). They stress the role of manufacturing in structural change and note the data that shows the rising share of the services sector [2013:2]. In contrast to the results cited above that de-emphasise the role of policy, they stress policy’s causative power. They rely upon the constant price sectoral GDP data to give them accurate measures of real factor inputs, following the Griliches & Jorgenson rather than the Kuznets view of what is ‘real’. Recall that the current price sectoral data shows that manufacturing GVA/worker was by 2010 below the national GVA/worker – at 95.5%. In 2018 the ratio was 89.3% [see above Section 1.3 and Fforde 2021b].

One of their core conclusions is that:

²¹ This is misleading as the domestic value added in manufacturing exports is likely below 15% of the value of exports. Total GVA in manufacturing for 2018 (using 25,000 VN Dong to the US\$ as an exchange rate) was around US\$35 bn. This compares with total manufacturing exports in that year of US\$ 208 bn on an SITC basis [GSO 2019 - NGTK 2018: 612], or US\$ 227 bn using the GSO’s definition [611]. Clearly, these export values included rather little Vietnamese value-added (below 15%, as some of the sector’s output was domestically consumed).

Manufacturing stands out as a sector that experienced a large increase in productivity during this period, averaging an annual growth rate in labor productivity of 5.1 percent, and a large expansion of its employment base at an annual growth rate of 7 percent. ... In general, relative employment tended to expand in manufacturing industries ... [27 – stressed added]

The logic here is flawed, equivalent to 'X won the race because they ran fast'. Given Vietnamese rates of GDP growth, and the facts that manufacturing's current price GVA/worker fell sharply, it is misleading to argue that fast growth meant that the sector 'stands out', given the **declining** share of that sector in GDP and economic activity as measured by the NIA. A race is won, not by running fast, but by running the fastest. Further, value added in manufacturing exports is now very low, confirming the point made far earlier by Wood and mentioned above. This is a stark example of confirmation bias, facilitated by the combination of the particular use of data – constant price sectoral GDP – and theory – production functions [2016: 107 et seq].

By contrast, Nguyen 2018 and Nguyen & Ta 2019 take positions closer to the observed current price GVA data. These show - like Bui et al 2012 - that confirmation bias is a flexible tool. Nguyen 2018 uses constant price sectoral GDP but avoids production functions. However, by avoiding current price data the author can remark that "the contribution of service industries to productivity improvement was solely driven by structural change effect, i.e., absorbing more labour" [246]. This helps perpetuate the view of McCaig & Pavcnik 2013 and 2016 that services are 'low productivity' sectors with low GVA/worker, which is not the case, as the data – and the simple arithmetic of growth - shows. However, note their view that "One of the most prominent observations over the 2000–13 period is the diminished role of the manufacturing sector in driving productivity growth." [247]. By contrast, Nguyen & Ta 2019 sub-title their article "The Shift to Services". Their analysis is based upon input-output data and constant price sectoral data. Most importantly, they look at the whole economy and avoid the logical flaws we saw in McCaig & Pavcnik 2013. Their use of input-output data and a case study of eCommerce sees them end by deploying standard arguments for policy – "To enhance the competitiveness of the services sector, it is important to focus on privatization, eliminating restrictions on supply, and creating a favourable business environment." [272]. But they have little analysis of just why structural change took the path that it has done, so far.

I conclude from the literature that it is relatively clear that the confirmation bias encouraged by the issues I have discussed is present, but that it is not determinant. The shifting position of Vietnamese scholars suggests that we may be seeing a strategic realignment in the Party's strategic policy, likely away from a particular pattern of structural transformation, not least as the reasons for the servicisation remain somewhat unclear, part because one effect of the dominance of industrialisation as a policy prescription has been extensive confirmation bias and a severe lack of research into alternatives, such as servicisation [Fforde 2018a]. This implies that Kuznets' view of the real meaning of current price GDP is sufficiently powerful to lead rather quickly to local analysts like Nguyen & Ta (the former is Director of a senior Institute at the Vietnamese Academy of Social Sciences) to generate research that contradicts Rodrik's position as well as those long-established by donors.

4.3. Policy implications

VCP and donor policy stressed, from the early 1990s, continuity with the structural transformation of the Soviet development strategy of industrialisation. Table 1 above shows that this was not the global pattern, and Vietnamese data shows that Vietnam serviced, with manufacturing's share of GDP failing to rise as agriculture's share fell [Fforde 2016a; Nguyen & Ta 2019].

There are therefore two policy implications of the literature just discussed. First, related to the analytical frameworks widely adopted that focus upon production functions as models of economic 'reality' viewed essentially in physicalist terms, and rely unreliably on misunderstandings of the meaning of sectoral and sub-sectoral constant price GDP data, policy makers should be cautious of the results of such analyses, and their high degree of confirmation bias. Second, causality that explains the observed pattern of servicisation and rapid GDP growth both deserves further research and should pay particular attention to the pattern of incentives and the clear acceptance and power of Vietnam's factor markets as they emerged and developed.

5. Conclusions

My argument against use analytically of constant price sectoral GDP leads to my conclusion that analysis of structural change should assert that the main and conceptually clear effect of economic change is upon **current** price factor incomes. Constant price measures are conceptually troubled. This permits confirmation bias. However, the Vietnam case study suggests that the story told by current price measures has a certain power.

What is needed is a serious re-examination of the pattern of economic growth and structural transformations in growth experiences, for me personally the post-1992 Vietnamese 'economic miracle'. We need to know far more about the roles played by structural change - the shift in factors of production – labour and capital - from areas where GVA paid to factors were relatively low to areas where they were higher. That this approach poses analytical questions that we need to solve does not imply that we should assume that they are already solved, as I hope I have shown. Fforde 2018b showed that servicisation was not mentioned once in the World Bank's flagship *World Development Reports* and had been largely ignored in an academic literature producing a host of studies of industrialisation.

The paper has argued that constant price sectoral GDP, whilst it exists as a clearly defined statistical measure, widely published and used analytically, has in fact no coherent analytical meaning. Within the NAI framework, to repeat, there is no reason to suppose that if all actual inputs and outputs were known, away from the base period, and were revalued at base year prices, constant price GVA (revalued factor inputs) would equal the difference between constant price gross output and non-factor inputs. The formal algebra used for convenience by modellers may assume this, but that is no reason to assume it true.

We can use current price sectoral GVA as a conceptually coherent measure of structural change, and this approach then focusses us analytically on the correct question, which is what explains, in real historical time, variations in sectoral GVA between sectors and over time. Case studies are a powerful research tool to explain this behaviour.

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