

Regional and local productivity in the public sector

Where do we stand?

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Direct consumption of economic resources by public sector agencies in producing services is a highly significant part of the GDP of OECD countries; yet, productivity in the public sector is a topic that has been long overlooked by research. This paper synthesises what we know about productivity in the public sector at the subnational level to date. It starts with a brief recap of what public sector productivity is and what is not. The next section considers how the specific functions characteristic of the regional and local public sector condition productivity, and the foundation expectations we can formulate about productivity differences across tiers of government. The paper continues with a summary of single-service studies of sub-national government productivity and the best available ideas for improving the productivity of regional, big city and local governments in ways that may generate more growth in their economies. The final parts of the paper are devoted to the renewed importance of governmental resilience and innovation at regional and local levels and on how more inclusive, balanced or compensating forms of economic development may help in lagging regions, especially in the context of adverse climate change. The conclusions argue that boosting public services productivity can also strengthen sub-national governments’ contribution to regional and local growth, and to alleviating these major new risks and challenges.

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The outcome of the workshops supports the work of the OECD Regional Development Policy Committee and its mandate to promote the design and implementation of policies that are adapted to the relevant territorial scales or geographies, and that focus on the main factors that sustain the competitive advantages of regions and cities. The seminars also support the Directorate-General for Regional and Urban Policy (DG REGIO) of the European Commission. The financial contributions and support from DG REGIO are gratefully acknowledged.

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1 Introduction

Direct consumption of economic resources by public sector agencies in producing services is a highly significant part of the GDP of OECD countries. In 2015 it accounted for an average of 20.8% of GDP in OECD countries, with a range from 18% to 30%, and a mid-range from 19% to 25% (OECD, 2021). So, the performance of the public sector as an economic actor is vital, even before we consider the salience of its regulatory and developmental functions, the efficacy of its redistributive transfer payments, or its ability to raise a reliable stream of taxation - which underpins the state's role as 'funder of last resort', dramatized by the 2020-1 COVID-19 crisis, and the 2008-10 great financial crisis.

Most public services and issues of the greatest salience for citizens, and many for enterprises also, are shaped by sub-national governments (SNGs) and agencies – operating at the region, state or province level; in big cities, and municipal and rural local governments; and in a wide range of quasi-governmental agencies at the same spatial levels. The productivity levels of these agencies extensively condition the overall efficiency and effectiveness of state intervention, public spending and policy-making across key services like health, education, transport, social care, policing and law and order, environmental planning and management, and regional and local economic development. National government functions mainly focus on raising taxes, distributing social security and welfare funding, transfer payments, grants programs, economic regulation and defence. Apart from administrative costs incurred in these areas, it is only in defence procurement, the armed forces, national security, and science/technology R&D that national government departments normally run substantial activities directly consuming economic resources.

It follows that the great bulk of government economic consumption takes place at sub-national levels, and this is also where the vast bulk of public sector staff work. It has been a political imperative in many countries to hold down the size of national government agencies. For instance, the US civil service employed around 2 million people in 1960, and is still at this level today, of whom 1.34 million work in non-defence functions (Light, 2019, Table 2.3; Dilulio, 2017).

In addition, many countries which went through a significant 'new public management' (NPM) period have built up a substantial 'para-state' apparatus of private contractors, not-for-profits and NGOs delivering public services on behalf of government agencies, or providing 'intermediate goods' vital to their delivery. For instance, in the USA 33% of total federal government spending on non-defence functions in 2017 was in-house, 39% on contractors and 28% on sub-national government federally-funded programs, involving 1.14 million workers (Light, 2019, Table 2.3, my re-analysis). Across all tiers of government, most non-defence para-state activities focus in the 'fulfilment' phases of service delivery, and hence they are also predominantly located at the sub-national level. Their effectiveness is highly conditioned by the terms under which (and the markets within which) they are contracted, set by the procurement policies and processes of the public agencies involved.

Given this evident importance, one might expect that the study of public sector productivity would be a well-developed field in economics and public policy studies, especially at the regional and local levels. However, it has in fact been a conspicuously unfashionable or 'Cinderella' field. In the past, many economists doubted the value of studying it, and analysis was also hampered by data difficulties since outputs are (largely) unpriced. For decades, national statistics defined public sector outputs only in terms of their input costs, so that public sector productivity was tautologically stable and un-growing. Studies comparing across large N sub-national governments have been far more common than any analysis of

productivity in national agencies. But they have still faced considerable difficulties. This review paper thus has somewhat opposite problems to the ‘surfeit’ of evidence, multiple variables of potential importance, and sophisticated grip on complex interactions studied in other sections of the current OECD project. Our understanding of public sector productivity is in an earlier phase of its development, even at sub-national level.

The paper has four main parts. The first briefly recaps what public sector productivity is and what is not. The core concept of total factor productivity (TFP) has been badly neglected in public agencies, and so this is what I focus on in this paper – setting to one side several other broader (and even less well-studied) concepts of public sector efficiency. I also discuss here some additional difficulties in measuring TFP specific to sub-national services. Section 2 considers how the specific functions characteristic of the regional and local public sector condition productivity, and the foundation expectations we can formulate about productivity differences across tiers of government. I also consider some key limitations of whole-unit studies of SNGs that have dominated the micro-economics literature, and especially some problems of ‘public sector efficiency’ (PSE) studies. In the third section I focus down on a small number of more promising single-service studies of sub-national government productivity. These key analyses also seek to explicitly measure ‘managerial’ (including leadership) variables across coherent agencies, rather than leaving them as unknown parts of the unexplained residual. The fourth section considers the best available ideas for improving the productivity of regional, big city and local governments in ways that may generate more growth in their economies. Fine-tuning micro-economic space-based policies is the predominant ‘rationalist’ prescription, but political economy studies suggest that other, more macro- and political factors are often key for successful regional and big city economic strategies. And in economically lagging regions public sector agencies are often the largest economic actors. I look at whether changed policies could perhaps help them to ‘level up’ growth and economic performance there, via fostering improved management practices and providing organizational exemplars and technical knowledge useful to growing small or medium firms. Section 5 considers the renewed importance of governmental resilience and innovation at regional and local levels revealed by the spectrum of COVID-19 crises (both in public health and in economic activity). The final section briefly looks at how more inclusive, balanced or compensating forms of economic development may help in lagging regions, especially in the context of adverse climate change. The conclusions argue that boosting public services productivity can also strengthen sub-national governments’ contribution to regional and local growth, and to alleviating these major new risks and challenges.

2 Public sector productivity – What it is, and is not

Even in recent decades many economists have still had difficulties in seeing public sector organizations as productive agencies (Corso and d'Ippolita, 2013), and considered productivity advances there as either unlikely or irrelevant to overall economic growth. Without price signals of the value of public service outputs, hard data and insightful analysis have been rather scarce, constituting only a tiny fraction of the economic analysis of private sector productivity. Economic textbooks on productivity measurement commonly focus solely on private sector firms (e.g., see Field et al, 2008), and so do many government and international organization reports (Dieppe et al, 2020). Much of the available literature on public sector productivity operates at purely statistical national or whole-sector levels, and at not the operational level of single organizations where decisions about productivity management actually occur. So, our knowledge of agency-level productivity (analogous to firm-level) is especially poor (Leonardus et al, 2013). In addition, as I discuss below, many studies have chosen not to address the deliberately limited and agnostic concept of total factor productivity. Instead, they have focused in a rather premature and problematic way on far more complex or inclusive notions of 'public sector efficiency' (PSE).

However, in the last fifteen years there have been major improvements in the techniques available for studying public sector productivity (deriving from Atkinson, 2005) and a small set of studies have systematically expanded available methods (see Dunleavy, 2017). In the rest of this Chapter, I first explain a deliberately narrow concept of productivity in public agencies. Next, I briefly set out the economic basis for believing that agencies' productivity grows over time. The third sub-section moves on to examine three core problems in accurately measuring public agencies' productivity. The final part of the Chapter shows how comparing across sub-national governments tackles some of these problems.

Defining productivity and the scope of productivity analysis

In the rest of this paper whenever I use the term 'productivity' I am narrowly referring only to the notion of Total Factor Productivity (TFP), defined as a ratio number. It means simply y/x

$$\frac{y(\text{the total value of outputs produced by an organisation})}{x(\text{the total value of inputs used in producing them})}$$

Equation 1

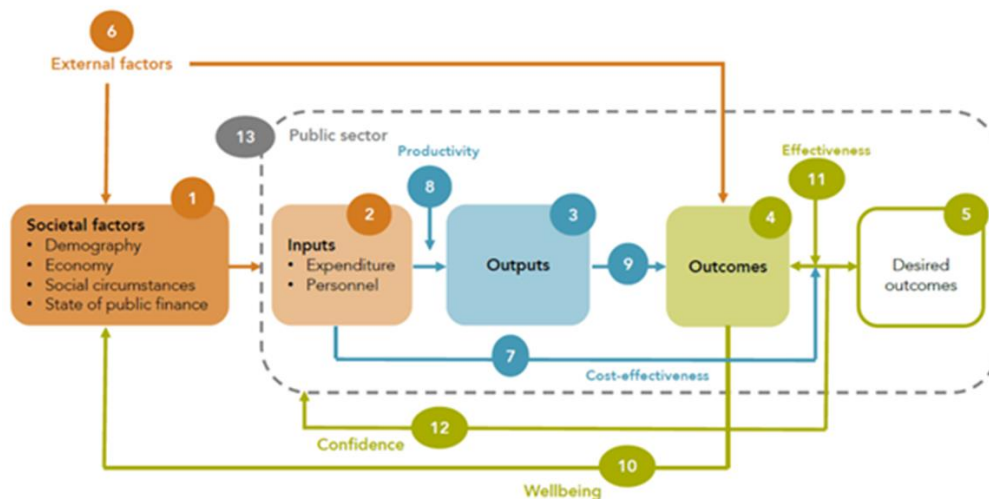
TFP is the now key indicator within the modern government sector because of extensive outsourcing of services production to contractors, not-for-profits, NGOs and other suppliers. TFP covers all such intermediate inputs in the same way as in-house salaries and wages. 'Labour productivity' looks only at the outputs/inputs ratio for in-house staff. It is no longer a useful metric within the public sector because of the importance of government contracting (see above), and because sub-national governments vary widely within and across countries in their outsourcing practices. If regional and local agencies contract differently for services comparing labour productivity across them may be highly misleading – since agency A may carry out inhouse a function that agency B assigns to a para-state body.

In some large public sector functions (like defence, see Hanson, 2016) identifying outputs y is very difficult because hopefully they are never activated in a final output form. In other precautionary spending functions (like public health) spending may also be undertaken on things that are not used (e.g., reserve stockpiles of equipment or supplies). In both cases it may be necessary to focus instead just on activities a , and not on outputs, computing TFP as a/x . This may seem undesirable, because many activity metrics are closer to inputs, and we distort TFP measurement if any component involves dividing inputs by inputs. But appropriately selected activities can incorporate measures of achievement, e.g., looking at the costs of sustaining aircraft flying hours, or the costs of fielding a fully trained army brigade.

Figure 1 shows how productivity as y/x (or a/x in special cases) fits within a wider set of performance measurements (Van de Walle and Van Dooren, 2010). What must be clearly excluded from any productivity measure are service or policy *outcomes*, which are generally problematic to track and assess in any agreed way (although see Goderis (ed), 2015). Incorporating outputs leads analysis into the wide and intractable landscape of assessing outcomes and organizational *effectiveness*, and many current disputes between statist and anti-statist analysts (Payne, 2016) demonstrate that there is no easy way to achieve consensus on that. (For example, UK Labour governments successfully urged national statisticians in the 2000s to incorporate rising school exam pass rates into measures of education sector 'productivity', only for the then Conservative opposition to denounce and promise to reverse a fall in exam standards).

Some implications of focusing narrowly on productivity as TFP, rather than seeking to also address broader 'efficiency' concerns, are spelt out briefly in Figure 2. Although most 'efficiency' drives inside government are justified as 'doing more with less', in practice they often lead to service reductions and resource 'savings' (e.g., for 'austerity programs) that simply reduce welfare for some groups of people (clients or public sector workers), or lower policy effectiveness, rather than provenly boosting the outputs/inputs ratio. This is a quite different focus from driving forward productivity advance, which focuses intensively on improving services outputs in volume or quality via sustained innovations, process improvements, and elimination of wasteful work. When genuine productivity (= TFP) gains are made they can be Pareto optimal for the agency management, workers and citizens/clients.

Figure 1. Where productivity fits as a performance metric



Note: Productivity is defined here as flow 8 alone (outputs/inputs). If we could unambiguously measure outcomes, some wider performance metrics for public agencies might encompass both flow 8 and flow 9 (outcomes/outputs), a purposefulness metric with no handy label; while a cost effectiveness measure might be outcomes/inputs. E.g., the UK Office of National Statistics has controversially attempted to incorporate school exam pass/success rates into their measure of education sector 'productivity'. Effectiveness denotes the successful targeting of outcomes by government on achieving only desired outcomes, without adverse by-product effects or unneeded outputs (flow 11).
Source: Based on Van Dooren et al. (2010).

Table 1. Why a productivity in government focus differs from an efficiency focus

Criterion	Productivity focus	Efficiency focus
Analysis happens	Happens every year (or more often, e.g. quarterly, if data allow). But you need a run of five years (or say) 15 quarters to show a consistent trend)	Only episodically in big and ad hoc efficiency reviews and incrementally via internal audit
Often focuses on	Improving substantive services outputs in volume and/or quality	Cutting costs/ceasing activities
'Production frontier' is	Constantly expandable	Fixed
Often results in	New services, new customers, increase in capital intensity, innovations, stable staff numbers	Harder/faster work for staff, cutting jobs, worsened working conditions
Key Mantra	Focus hard on finding production system, technology, organisations or service-character changes that meet <i>three goals at once</i> : <ul style="list-style-type: none"> - Better quality for customers/citizens - Simpler processes for staff - Cheaper production for the agency 	Do only what we (legally) must, at the lowest possible cost

Source: Author's elaboration.

TFP levels in public service agencies are contingent on four key factors:

- *Task definitions* for policy, include decisions about the service mix to be supplied. Since task allocations in most countries are chiefly determined by constitutional provisions, hopefully this is consistent across the sub-national organizations inside one country, so facilitating domestic comparisons of SNGs.
- *The situational features of the regional or local areas* that SNGs serve – e.g., their urban/rural character, population density, economic affluence, unemployment, dependence on different types of economic activities, and levels of digital, transport and other infrastructures. Wagner's Law predicts that demand for 'collective consumption' goods and services consistently increases strongly with greater industrialization, urbanization and modernization, both across different societies, and across different areas within the same society. Public authorities directly supply many of these services in advanced industrial societies. And they regulate in more specific or intensive ways virtually all other salient collective services that are privately supplied. Yet I note below that studies linking public service efficiency (PSE) to decentralization seem to have consistently under-estimated the Wagner's Law effect, claiming y/x gains for rural areas and smaller agencies that probably mainly reflect the more basic service mix in their areas.
- *Time*. Comparisons of SNGs need to be undertaken at the same or similar dates, an especially important factor given the recent pace of digital change in some public services. Ideally changes in the same units should be analysed over time, thereby holding constant a great many features (both of areas and of background changes across a period) – at the cost of increased data demands.
- *Exceptional conditions* may apply during crises. For example, the 2020-1 COVID-19 pandemic necessitated radical changes in hospital standard operating processes, with much more intensive safety regimes making services far more expensive to produce, and a radically changed mix of patients, compared to 'normal' times. Outside of crises, major or unplanned increases in service demands often auto-increase public services productivity because staffing, equipment and buildings take time to put in place, so facilities are 'crammed' and staff inputs are ramped up in ways that are not sustainable longer

term. A sudden fall-off in demand will also automatically lower agencies' productivity levels, until their scale of operations can be adjusted downwards.

To effectively compare productivity across regional or local public sector organizations, analysts always need to control for these four foundational features.

Sometimes, though, public sector officials over-claim, citing costly service changes as *ipso facto* evidence of productivity or efficiency gains. However, many fundamental aspects of service delivery are already incorporated into productivity measurements, and hence do *not* need to be separately controlled for. They include

- *Changes in the level or type of technology* across SNGs. At any given point in time, we assume that public services are being delivered to citizens and enterprises using currently appropriate technology. So, for instance, transitioning from a paper-based to an online system for handling welfare payments counts as a productivity (y/x) gain only if more outputs are handled with constant inputs, or the same outputs are achieved with fewer inputs. There is no additional 'quality of service' gain to claim here if the switch to digital only keeps pace with (or lags behind) a wider societal change, and the agency only delivers what citizens and enterprises expect of their interactions with other comparable organizations, such as firms.

- Similarly *changes in governance arrangements, or responses to electoral signals and political control* are important factors that always legitimately condition how public services are delivered. But these shifts cannot be claimed as productivity gains unless an improvement in outputs/inputs is demonstrated. In actual fact, reorganizing services almost always leads to short-term productivity declines, because staff and citizens/ clients take time to adjust to new ways of working or new policy objectives. Hence any y/x gains are normally posted only after three to five years, and they require consistent over-time measurement to be demonstrated. Note also that productivity analysis is simply agnostic about claims for the greater 'efficacy' of outputs often associated with 'reforms' or shifts of policy goals made by political parties. Demonstrating better outcomes lies well outside our scope, and needs separate indicators outlined in Figure 1 above.

- *Introducing NPM reforms to allegedly combat previous rent-seeking, 'political' distortions of spending, and malfeasance or corruption* again can only improve productivity if y/x improvements are clearly demonstrated. Various NPM changes, from outsourcing/ privatization through to accrual accounting, have often been claimed by economists as necessarily realizing such gains. But they may only open up different sources of rent-seeking. E.g., an in-house state prison service in a U.S state may be subject to trade union influence on legislators to pay higher wages or introduce better conditions for staff. But 'rent-seeking' may be just as intense when privatized US prison contractors donate campaign funds to those state legislators who will boost prison-cramming by passing over-sentencing laws (like the 'Three strikes and you're out' laws now operating in 28 U.S. states). Effective productivity analysis discounts all *a priori* claims for process improvements that do not show up in y/x ratios.

How productivity increases in public agencies

The history of national statistics treating public sector productivity as (tautologically) one, and thus completely unchanging over time, illustrates well how for decades many economists (and statisticians) did not view government sector organizations as productive agencies akin to firms. Government organizations were not seen as continuously seeking to improve their services delivery, but rather as primarily vehicles for political and bureaucratic rent seeking, or non-market monopoly providers devoid of any effective incentives for efficiency (Niskanen, 1994). Service provision was seen almost as a pretext for the realization of these other goals (Kraan, 1982), an approach that led almost automatically to very high economic estimates of the 'rents' acquired or 'waste' involved in public sector provision compared with (perfect) market solutions (Dunleavy, 2018; Dunleavy, 1991, Chs. 6-8).

Several intellectual foundations for economics treating public sector productivity advances more seriously have cumulated over several decades. Assuming that in the long run total spending must equal total taxes, then 'leaky bucket' techniques for delivering subsidies to subsidy seekers de-mobilize their political support, whilst double-mobilizing the more politically powerful taxpayers, to counteract both aggregate welfare losses and avoidable waste or rent-losses (Becker, 1983; Wittman, 1995). By contrast, efficient policy solutions maximize subsidy seekers' political support and de-mobilize taxpayers' resistance. Transaction costs economics has pointed up the similarities of processes leading to hierarchical provision by large firms in the private sector, and public agencies in the state sector – especially small numbers bargaining, opportunism, asset specificity, 'information impactedness' in contracting, and bounded rationality (Williamson, 1985). Budget-maximizing accounts of bureaucracies make little sense except in delivery or contracts agencies and in exceptional circumstances (like the Cold War nuclear arms race). Rational officials should bureau-shape instead (Dunleavy, 1992, Chs. 6-8; Dunleavy, 2018).

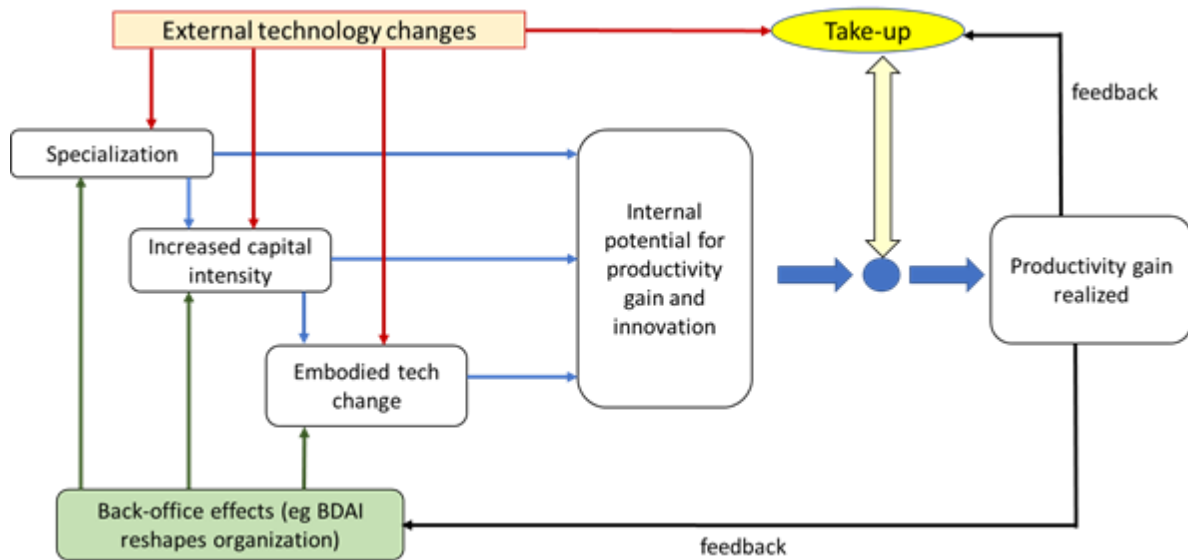
Most recently a few careful empirical studies of the evolution of organizational productivity have demonstrated that in the digital era there have been very different patterns of productivity change across apparently similar agencies. For instance, Dunleavy and Carrera (2013) showed that productivity in the UK's national customs agency increased rapidly in the decade after it introduced automated processing of containers (Ch. 3), while the productivity of the main tax agency grew consistently at a more moderate rate as it moved services online (Ch.4). By contrast, the main social security agency remained paper-bound and contact-centre based despite an expensive reorganization, so that its productivity levels wobbled around but failed to grow overall for over two decades (Ch.5).

A summary of the economic factors lying behind productivity changes in public agencies is given in Figure 2 below. Just as in firms, over-time developments in departments and agencies at any level of government will respond to:

- Increasing specialization of labour, a strong factor in most public services, which employ relatively high levels of graduates, and professional staffs. Compared to firms there will be less influence from market specialization or segmentation, but some equivalent internal labour processes will particularly apply in local governments or devolved agencies subject to central or regional state regulation of good practice.
- Over time the capital intensity of public agencies (like firms) has tended to increase with the preponderance of IT and communications changes (Bloom, Garicano et al, 2014). Yet rapidly falling IT costs means that (as elsewhere) this effect has been hard to track, with labour or intermediate supplier costs normally predominating on the inputs side. Nevertheless, heavy investment in ICT has cut public sector labour forces radically and changed expenditure patterns – e.g., some Australian federal and civil government transfer agencies had ICT budgets up to 20% of total in recent years (Dunleavy and Evans, 2019).
- The renewal of even routine investments (such as new desktop software sets) always embodies accumulated technology changes that (generally) improve agency operations and enhance linkages to external organizations.

All three factors jointly set the internal potential for productivity advances.

Figure 2. Factors shaping productivity growth in public agencies



Source: Author's elaboration, derived from Corsi and d'Ippoliti (2013).

They are strongly boosted by the pace of external technological changes in business and civil society, which in turn strongly conditions

- The take-up effect of new tech and ways of doing things, such as the transitions from contact centres, to early e-government, to mass online transactions, and then to more sophisticated digital delivery of services.
- The interaction of the internal potential for change and the take-up effect jointly determines the scale of any realized productivity gains. Genuine innovations and advances have feedback implications, boosting the take-up effect, and
- strongly shaping the 'back office' effects on overall organizational cultures and models of acting on the world that make each agency distinctive in how it realizes its core 'mission'.

A particular, classical economics version of this account is also sketched by Corsi and d'Ippoliti (2013) who label the specialization box 'the Smith effect', and the capital intensity box 'the Ricardo effect'. Their overall model of productivity change (with Greek letters changed) is:

$$d_1(y/x) = [bY + c\{w/k\} + d_2I](T, 0)$$

Equation 2

- where: y outputs and x inputs
 d_1 d_2 increases in
 Y output gain
 w change in public sector wages/ contractor costs
 k change in cost of capital goods
 I specific innovation gain
 T take up effect

O back office effect

b, c parameters

They conclude (p. 403) that: “The production of public goods is a constituent component of any well-functioning capitalist economy. Public sector output carries economic worth despite there being no adequate way to quantify it yet”.

Three core problems in measuring public sector productivity

In competitive markets the availability of price signals solves or greatly simplifies three problems that have always limited the analysis of public sector productivity. A firm’s total output can be determined by multiplying the volume of its goods or services A, B and C by their respective prices, and adding the compound numbers. The firm’s TFP then is just total output divided by total input costs. (Of course, firms with high performance on some products may lag on others, raising some issues in ranking firms’ overall productivity). The intangible aspects inherently involved in services (‘Anything sold in trade that cannot be dropped on your foot’(attributed to the *Economist*) can be captured in price differences that firms realize. And (most) differences in quality across products can be gauged by the prices that customers pay: we make the basic assumption that rational actors in competitive markets will shop around for what matters to them, either optimizing on quality in their price range, or minimizing costs where quality satisficing will do. None of these moves are feasible with public agencies. But other mitigating strategies have greatly reduced the problems for analysis caused by not having price signals.

To derive an *aggregate output number* for a public agency a first step is to focus on its core or fundamental or ‘mission critical’ activities and outputs for each main function or service carried out. The core output(s) then implies secondary or supporting outputs initially left unmeasured. For instance, the total student-hours of lessons taught might be the key outputs for a school, since it implies other outputs like holding parents evening or marking homework. Similarly, for a hospital the number of in-house operations undertaken plus the number of outpatient treatments or session completed implies many other activities, such as training hours completed or procurements of supplies.

To weight across different core output streams, the now widely accepted Atkinson (2005a and 2005b) approach is to weight by the unit costs of delivering each output (a relatively difficult thing to get data on). Where whole-service costs are not known, the approach switches to weighting outputs by their respective administrative costs (which are more widely available). Aggregate output then equals the number of outputs (such as transactions) * cost weight across each core service. For example, a tax agency collecting three main taxes would have total outputs $(y) = (\text{number of transactions A} * \text{unit cost per transaction A}) + (\text{transactions B} * \text{unit cost B}) + (\text{transactions C} * \text{unit cost C})$.

At a national level many transactional or regulatory functions (as such collecting taxes, paying welfare benefits or issuing passports) may feasibly be assumed to be of standard quality in stable environment, unless there is clear evidence of some quality decline (Dunleavy and Carrera, 2013, Ch.2). However, in sub-national governments this stable-quality expectation only holds in a (large) minority of delivery and regulatory services agencies, such as regional or local tax collection, transport services, or issuing licenses.

In most of the largest SNG public services, however, relying just on cost-weighted outputs may generate a seriously deficient or misleading view of productivity. For instance, suppose that fire department A neglects (cheap) fire-prevention programs in favour of maintaining a large and expensive emergency operation to attend its consequently frequent call-outs. Given its apparently high demand load it would be easy for A to seem more efficient compared with a neighbouring agency B that spends more on prevention and has fewer call outs to spread its emergency fixed costs across. Similarly, hospital A that discharges a patient too quickly, so that they have to be readmitted, may record two short patient stays in hospital for

the same or lower costs than hospital B, which takes the time needed to treat the case once properly by keeping the patient in long enough to heal.

So, in most of the biggest spending sub-national government services, we need to quality-reweight the different main cost-weighted outputs delivered – in education, health and social care, and policing. Ideally, weights can be calculated using objective quality indices, such as a composite bundle rating based on a regulator's star ratings, indicators of organizational failures. E.g., for a hospital that might include the number of avoidable major incidents in hospitals, complaints data, adverse tribunal or legal judgements or redress pay-outs, or overall satisfaction in public survey responses.

Comparing productivity across SNG public agencies

At central or federal government levels comparing across agencies is difficult because every department or agency is unique, and other country equivalent agencies may be very dissimilar in scale or orientation. So here, focusing on over-time analysis offers the greatest insights (Dunleavy and Carrera, 2013). By contrast, sub-national studies of government productivity have benefited from being able to compare how multiple decentralized agencies in one country tackle the same sets of issues.

Yet even with SNGs, by far the best way of measuring productivity is to establish productivity tracks in single-agencies over time, because the circumstances of public agencies vary widely, and there are fewer 'market-unifying' factors at work. Comparing agency A at times t and $t+1$, $t+2$, $t+5$, $t+10$ genuinely matches for multiple environmental, organizational and policy factors that stay the same in A. It puts productivity change into centre stage, and greatly reduces the number of explanatory variables to be considered in establishing the causation of gains, stagnation or losses. This level of analysis is also far better suited to gathering data on variations in management approaches across agencies.

Comparing paired or multiple quantitative observations over time for a whole set of SNG agencies delivering the same service is especially valuable because it fully controls also for over-time background changes in each area (like the advent of digital technologies or shifting services online) that may none the less affect a whole set of public agencies in the same way. However, there are relatively few studies in this vein.

The next best approach is to analyse larger N sets of decentralized agencies on a 'whole government unit' basis. Most state or local governments within one country may deliver similar broad service categories. So, many studies have proceeded by selecting bundles of quantifiable metrics and analysing them against multiple possible explanatory variables covering the whole of government operations of an SNG area and population characteristics. This approach is less satisfactory because relatively few service indicators are used, often mixing up outputs and outcomes in illegitimate ways, and rolling up most service mix differences across agencies into the productivity readings. Even with large numbers of control variables, it is hard to separate out again situational variations across SNGs, and perhaps also service-mix and partisan or policy goal differences, from genuine TFP effects.

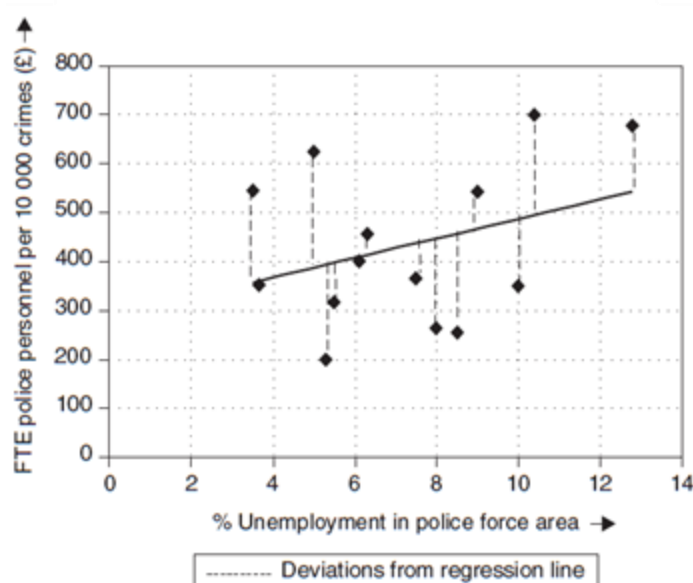
However, defenders argue that a potential advantage of whole-SNG studies is that they capture cross-dependencies across services. For instance, the performance of efficient agencies may be held back because they sit within wider regional or local governments confronting financial crises or constraints, limiting funding for innovations or possibly causing stand-stills in service delivery at the end of financial years if budgets have over-run. Alternatively, where SNGs are subject to strong partisan policy reversals or major changes of administrative quasi-paradigms, such changes are likely to consume resources short term, with productivity levels taking time to recover across both efficient and less efficient services.

Turning to the analysis techniques, Figure 3 to Figure 5 show that the main contrast in SNG studies has been between those using conventional linear regression approaches or data envelopment analysis (DEA). In 'regression tournament' approaches (Figure 3) the focus of multi-variable analysis is on matching the

overall explanatory performance of compound models (including variables deemed ‘significant’) against each other, attributing salience to the different variables, and then explaining the deviations left unexplained in the best-performing models. Critics argue that the definition of ‘under-performing’ units as those distant from a regression line is problematic, unless the multi-variate models include all relevant variables. Even then it may seem to be an estimate of potential gains that is somehow practicably attainable, an impression intensified where analysts compare the gains from lower quartile cases moving to upper quartile levels of estimated efficiency. Multi-variate studies tend to highlight a few general causal variables (like overall decentralization levels and sometimes ‘quality of governance’). And rather different results can be generated across countries and datasets within the same country, reflecting the normally restricted bundle of dependent variables chosen.

By contrast, in data envelopment analysis (DEA) studies the focus is on unit distances from the production frontier, and this is specified by letting the best-performing units scores define the production frontier (see Figure 4 and Figure 5). Advocates see this approach to single-service datasets as more endogenously grounded in evidence of different types of agencies’ likely variable performance across different regions of the production frontier. They also claim that (DEA) approaches do better in highlighting some service/policy mix variations due to political or policy situation differences (see below). But the blurring effect of a whole-government focus (averaging out performance scores across different services) cannot be easily combatted by DEA.

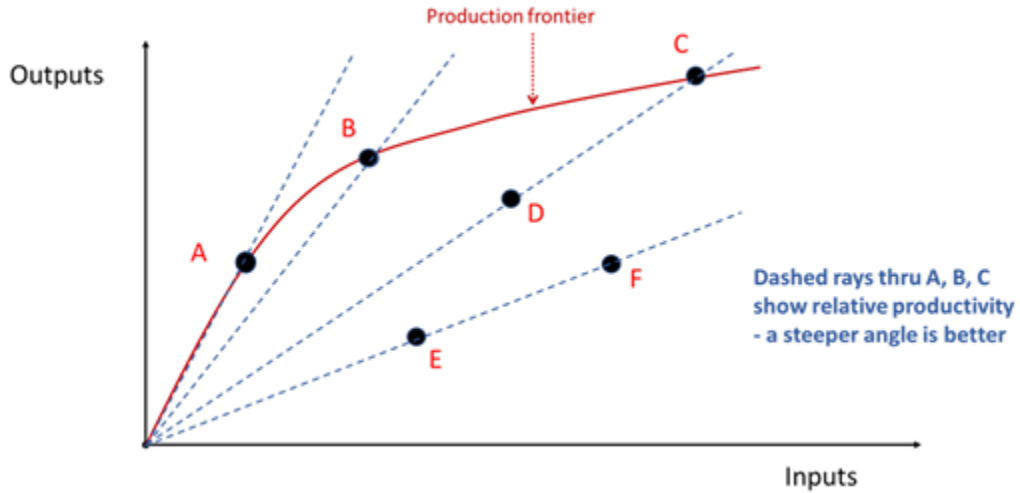
Figure 3. Regression approach to analysing of decentralised agencies’ data



Note: In this hypothetical example, the dependent variable is ‘police personnel per 10,000 crimes’ and the explanatory variable is % local unemployment. The line slope shows the pattern of association, with (dashed) residual lines indicating ‘under-performers’ above the line, and ‘over-performers’ below.

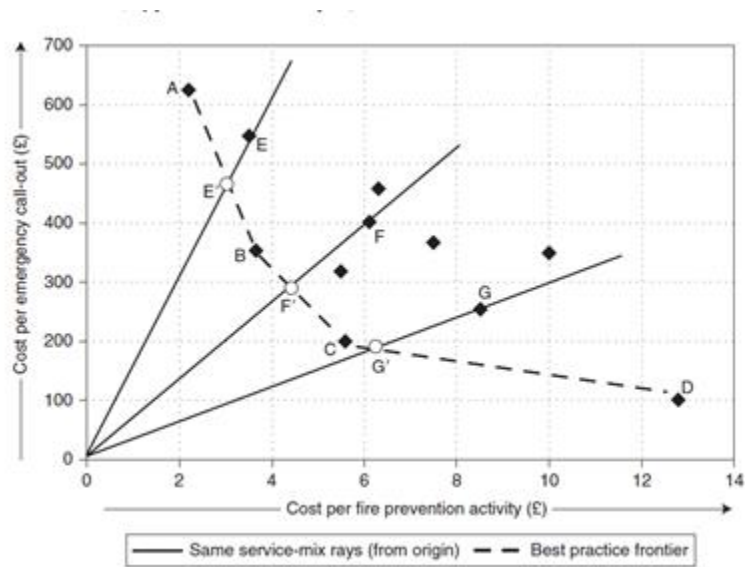
Source: Dunleavy and Carrera, 2013a, p. 212.

Figure 4. Data envelope approach to analysing of decentralised agencies' data (version A)



Source: Dunleavy and Carrera, 2013a, p. 212.

Figure 5. Data envelope approach to analysing of decentralised agencies' data (version B)



Note: In this hypothetical example, local fire services are compared for two core activities, emergency responses and fire prevention work. The production frontier is defined by the lowest cost local services closest to the origin. The rays from the origin show selected comparisons of fire services with the same outputs mix. The white dots show the hypothesized production optimally attainable positions for the SNGs with the E, F and G service mixes. The EE', FF' etc distances indicate inefficiency.
 Source: Dunleavy and Carrera, 2013a, p. 212.

Both approaches allow for multiple explanatory variables and interactions to be considered, which is particularly important in whole unit SNG studies in trying to disentangle effects in aggregate dependent variables. Regressions of panel data over time for state or regional governments allow analysis even when the number of units is restricted. Local authorities and agencies are more numerous in larger countries, and bigger Ns allow more scope for deeper analysis.

3 How regional and local public sector functions condition productivity

Some well-established theory in political economy generates predictions for factors shaping regional and local governments' operations, and how productivity varies in SNGs. I begin with theories of functional allocation across levels of the state. The middle part of the Chapter condenses out expectations for different SNG tiers' productivity from the current literature, drawing on what seems already clearly known. The Chapter closes with a note on the importance of cross-tier relations in the regional economic development sphere.

There are rival accounts of who does what and why within the public sector

Grounded in distinct theory positions, several alternative accounts of inter-governmental functional allocation feed through into shaping what we can expect of productivity patterns and changes in sub-national governments. The *economic theory of optimal allocation* (OA) is the first of these rival interpretations. It argues that functions should be distributed as follows

- *Unitary policy goals* that cannot be split up (such as national defence or national economic management) should be assigned to national level government. Highly scalable functions, those where operating costs can be lowered by operating with large or very large populations or areas, should also be handled centrally.
- *Local policy goals*, relevant only to a defined, small population or area, should go to municipalities, together with administrative functions showing no economies of scale. Tiebout competition between small localities is expected to generate pressures for different areas to offer varying tax/service mixes, with 'voting with the feet' competition a positive force for municipal efficiency, a claim for which evidence is at best mixed (Dowding and John, 1994). A range of new public management (NPM) initiatives have also stressed using transparent KPIs (key performance indicators), quasi-markets and performance league tables to strengthen citizen/customer power via exit or voice options (Dowding and John, 2008; Dunleavy, Margetts et al, 2006). However, the available evidence supporting Tiebout effects is inconclusive, partly because attractive physical environments are not uniformly distributed. In addition, welfare gains in efficient areas may be capitalized into higher house prices, in ways that offset pressures for municipal y/x efficiency. The evidence on NPM-style educational testing regimes (e.g., in fostering high school education standards) is also inconclusive on benefits. Social inequality and diversity goals clearly can be damaged by stronger adverse 'club heterogeneity' and club-exclusion effects under quasi-markets (Cornes and Sandler, 1996) – although some similar within-area micro-patterns of privilege and relative deprivation also occur with non-NPM public sector provision by multi-departmental municipal governments.

- In the optimal allocation model, region or state governments should handle *medium-complex goods and services*, whose production costs show an inverted U shape with a peak at middling levels of population or area, together with policy goals relevant to a larger, coherent population or area that is nonetheless still only a subset of the nation as a whole.

A second view is a ARD functional model due to Paul Peterson (2012), which argues that allocative, redistributive, and two types of developmental services need to be handled differently if we are to sustainably finance stable provision:

- *Allocative services* (A) are those used by most people in a given area and paid for by mostly the same people (such as local refuse collection and environmental services). They should be assigned to municipalities, because they can be financed via taxation at this level without better-off residents exiting. In addition, a subsidiarity principle operates in liberal democracies.
- *Redistributive services* (R) are those used by or paid to one group of low income or less fortunate people but funded by taxes on a (partly) different set of wealthier or more fortunate people (as with social security systems, welfare benefits and public health provision or insurance). They should be assigned to the national level, because only there can they be sustainably financed. Locating redistributive services at the region/state or local levels will lead to an exodus of well-off or healthier/luckier people from high stress areas, and a perverse allocation of resources to services (Peterson and Rom, 1989). Well-off areas will have high tax capacity but low needs, while areas with acute needs for heavy spending lose tax capacity via selective emigration (Rom et al, 1998).
- *Developmental services* (D) operate by subsidizing firms to invest and create jobs for citizens, who then pay taxes to governments (Peterson, 1981). Possibly some local taxes paid by firms will increase as well. Who runs such policies should be split, depending on how far the job, tax and other benefits are localizable. If they are, as in seaside towns or holiday/casino centres, local provision of developmental economic facilities and aid makes sense. But if the jobs or tax benefits spillover to other areas, and so cannot be spatially constrained, developmental aid and services should only be provided at the national level or by sufficiently inclusive large-regions. (Perhaps it should even be transnationally funded within the EU). Subsidies to FDI by international companies may need to be nationally funded and run. Notice that the Peterson model is hostile to fostering competition between regions or states on redistributive issues, which will misallocate resources and need (Rom et al, 1998). It is also sceptical of competition on any but the most localizable development policies. Tiebout competition is potentially suitable only for allocative services.

The third account is not really a theory but simply an empirical generalization by liberal authors, partly linked to the first two accounts above. The *SHEW proposition* is that the highest cost services in social services and care, health, education and welfare have tended to be nationalized in liberal democracies (Sharpe, 1993). There are some exceptions or mixed patterns reflecting historical and constitutional factors. In Denmark local authorities deliver welfare services, but operate with a centrally-provided budget. In European countries and Japan, the central state funds teachers but localities provide schools. In the USA states and local school boards run education with little federal involvement. In Australia, health care is split, with the states and territories running hospitals and the federal government Medicaid.

A fourth view, the *'dual state' or 'triple state' thesis* (DST), is favoured by corporatist and authors using radical Weberian or Marxist theory. At any period, the critical functions for business (or capital) are centralized and insulated as far as possible from direct democratic control, as with locating regulatory functions at the European Union level or monetary policy with independent central banks. National governments, quasi-government agencies and some para-state bodies run business regulation and major tax and economic policies to keep them remote from democratic control. Meanwhile the most visible tiers of government at the state/region or local levels run 'collective consumption' functions of lesser significance for business, such as SHEW services, housing and local planning (Saunders, 1982; Lowndes and Gardner, 2016) - partly to provide a 'show politics' of easily understood issues to distract citizens' attention and

channel their political activities into less salient and dangerous-to-business pathways. Where business sectors (or 'fractions of capital') are spatially concentrated in a given area - such as agricultural and flooding/irrigation policies in large rural areas, or the mining industry in relevant areas - then their regulation and specific subsidization or taxation is managed by those parts of state or regional governments that are least visible to (and most insulated from) public opinion and electoral control.

The final approach relates to the transition to a digital economy, arguing that the reorganization imperatives evident in private sector businesses going digital also operate within the overall state or public service system. As in rapidly modernizing retail corporations already, those functions that are most susceptible to digitization and online delivery will be centralized and done once in the most efficient way (Margetts and Dunleavy, 2013). Meanwhile services that require costly in-person fulfilment and interactions will be localized as far as feasible. The differential development of computerization and now automation will create an '*intelligent centre/devolved delivery*' pattern, with high productivity/higher capital intensity national services and low productivity/labour-intensive local services (Dunleavy and Margetts, 2015). Regional or state governments fit uneasily in this framework as an intermediate tier whose productivity will vary across the functions handled, but can be expected to be less than that in national agencies, but higher than that in local services.

Finally, relations *between* tiers of government will also likely shape public sector productivity levels across them, as Figure 6 shows. At a macro- or constitutional level, in federations (like the USA, Australia and Germany) specific powers are constitutionally reserved either to the federal tier or to the states, and policed by a supreme court. But agreed, fixed spheres of action may not apply outside these nominated functions in federations, and across most policy domains in states with only devolved sub-national governments, as in the UK, Spain, France, and at the EU-wide level. Hard and fast divisions of responsibility either may not apply, or may have been bridged because of funding or redistribution needs. Relations between governments at different tiers can be

- harmonious, pulling towards common goals in an integrated and consensus way;
- discordant, pursuing partly incompatible or conflicting goals and strategies, such as increasing aggregate outputs or growth, versus 'levelling up' inequalities across areas; or even
- directly conflictual, as in the UK or Spain where the central government is prioritizing the national union, but the SNP in Scotland and secessionist parties in Catalonia are pursuing independence.

At a more micro level, politicians and senior officials may be differentially active on policies with concentrated benefits for small groups and only diffuse costs for the wider public; and they may be particularly inactive on issues with both concentrated costs and benefits (Wilson, 1973). Actors at different tiers of government confront divergent logics, and so constantly tussle or wrestle for control, especially of new and fashionable policy fields. At the same time, they seek to offload unattractive tasks or those with negative political appeal. In an average large European country, there are now four levels of government which can create complex patterns of interaction shown in Figure 6, where any tier may compete to acquire some policy responsibilities or to keep what it has; or alternatively try to avoid taking on other policy areas, or to export those it already holds. For instance, in Australia the federal government has financial and policy responsibility for family doctors and Medicaid, while the state governments run hospitals and community services. An OECD study argued: 'Federal-state shared responsibilities continue to affect the efficiency of healthcare service delivery in particular. A clearer delineation of roles in shared functions and possibly a reallocation of responsibilities in some cases, are important' (Koutsogeorgopoulou, and Tuske (2015, p.3). Proposals for major reforms have not progressed, but federal-state relations on health finance are constantly tweaked (Biggs, 2018; Australia Institute for Health and Welfare, 2020). In the EU there is arguably a shifting balance between the centre and member states, with the latter seeking to offload no-win issues to Brussels (like farm subsidies or regulating over-fishing) while yet giving the centre just enough positive issues to handle to ensure its viability (Dunleavy, 1997).

Figure 6. Policy competition and stability possibilities across a four-tier system of government, as in the European Union

EU sees policy area as:							
Attractive, want to acquire or keep	Unattractive, want to offload	National government see policy area as:					
Competition to acquire	Stable	Attractive, want to acquire or keep	Competition to acquire	Stable			
Stable	Competition to offload – possible inaction	Unattractive, want to offload	Stable	Competition to offload – possible inaction			
		Regions or states see policy area as:					
		Attractive, want to acquire or keep	Competition to acquire	Unattractive, want to offload	Stable	Attractive, want to acquire or keep	Cities or local authorities see policy area as:
		Stable	Competition to offload – possible inaction	Unattractive, want to offload	Competition to offload – possible inaction	Unattractive, want to offload	

Source: Author's elaboration.

Each of the five approaches above is founded on a coherent political economy framework and can draw support from a lot of consistent evidence. Their core propositions also overlap a lot, so that there are many mutually consistent predictions between two or more theories. They generate many of the same functional patterns, but often attribute them to different actor motivations, economic imperatives or institutional pressures. A null hypothesis critical of all five viewpoints might be that the allocation of functions across tiers of government is shaped only by institutional and historical accidents or specific events, allied to subsequent strong path dependence effects and the difficulties of remaking historically-fixed constitutions. (For example. the USA is unusual amongst affluent and secure liberal democracies in not having a strong public health care system. The continuing fierce controversies around the US state's role here could be seen as an historical anomaly, somewhat similar to its highly permissive firearms laws).

Integrating different accounts to predict productivity drivers and barriers across tiers of government

In productivity terms, the null prediction is for more or less random fluctuations in productivity across public agencies, and a very imperfect empirical fit with any of the predicted patterns in the previous sub-Chapter. However, in practice, we can distil out from the existing literature a reasonably articulated list of likely drivers for productivity change in SNGs (contrasted with the national level), and some of the likely barriers. Many of these expectations derive (in a mediated way) from the five views considered above and these are indicated in Figure 6 below, while others can be grounded in more specific literatures.

Generally speaking, we should expect to see higher public sector productivity levels in stable policy areas with clearly agreed mutual roles, and lower productivity in areas that are contested or in transition between governments at different tiers, because of inconsistent or fragmented policy efforts. In particular, the unifying potential of online services to simplify things for citizens and enterprises, and of synergistic big data/artificial intelligence (BDAI) to personalize public services, are undermined when different funding and policy regimes create separate websites and online processes for different tiers or types of agency.

The extent and patterning of these areas of settled allocations across tiers and others of contestation will also vary depending on the relative sizes of units. In Europe, large member states are more likely to vie with the EU centre for control of policies that they feel competent and resourced to manage (e.g., support for high-tech or biotech), whereas smaller member state would not – and so on with the relations between nation states and larger and richer regions or smaller and poorer regions. Similarly, state or regional government relations are often tense where large cities dominate their population and economies, as in Australia where the capital cities are very large. Comparability in size and resources may tend to foster policy rivalries on issues like transport infrastructures where policy roles are divided (as in New York). In other cases (like metropolitan Mumbai with less than a fifth of the Maharashtra state population) tensions may arise because of competition for tax revenues, and closely-related functions are split across diverse tiers (LSE Cities Programme, 2007). Table 2 summarises the main expected drivers for, and barriers to, productivity increases across levels of government.

Table 2. Expected drivers for and barriers to productivity increases across levels of government

Level of government	Expected influences on public services productivity	
	Drivers	Barriers
National	<ul style="list-style-type: none"> - Predominance of transactional agencies in tax, welfare and regulatory services, which were best adapted to earlier computerization [O, A] and are also faring well under modern big data/artificial intelligence (BDAI) approaches [I] - Scale economies in medium to large administrative units, perhaps with an inverted U curve across countries, peaking at 15 to 94 million clients (Jugi, 2019) [O] - National governments can borrow, so ‘invest to save’ innovation may be more feasible [D] - Greater specialized expertise and better HR systems in national civil services [O] - Procurement and legal advantages for central governments [D] - Strongest public sector expertise in digital advances [I] - Strongest robotics potential (defence, passport controls) and RPA (robotic process automation) [I] 	<ul style="list-style-type: none"> - Unique and large service organizations with only overseas comparators, operating in different contexts, inhibiting organizational learning [D, A] - Officials in taxing and regulatory agencies with coercive or semi-coercive roles may lose track of ‘demand’ for their services [D] - Officials delivering transfers or benefits to clients have few incentives to increase the useability of forms or processes, since clients may come anyway (to get funding) - Some big delivery agencies produce relatively intangible benefits (e.g., precautionary regulation) or services that are rarely tested by full implementation (e.g., defence) [D] - Citizens often use taxation or regulatory transactions services only annually (e.g., income tax assessment) or at longer intervals (e.g., passports every 10 years), greatly limiting their ability to learn how they operate [D] - Operating at very large-scale (e.g., above 50 million clients) increases data systems and logistical complexity [O, A]
Regional or state governments and metropolitan/ large cities	<ul style="list-style-type: none"> - Operate at a tractable scale [O] - Services are immediately salient for and quite intensively used by citizens and enterprises, on a weekly, monthly basis. So, clients learn how to use familiar services - Service offers can be revised or ‘re-tuned’ in less time [O, I] - Cross-service synergies and skilled consumers help learning and co-production [D] - Expert staffs and a favourable service-mix aid joined-up digital changes [I, A] and see (Ali et al, 2018) - Housing and living costs in regional metropolitan centres are lower than in national capital areas - A more ‘liveable’ scale of urbanization and strong cultural life can compensate somewhat for national capital attractions (Florida, 	<ul style="list-style-type: none"> - Limited number of domestic comparators (especially in small countries) so restricted information and competition effects. - Second in queue below national government departments and agencies in attracting skilled officials, especially digital change expertise [I] - Also, second in attracting engagement by IT and digital change companies [I]

	<p>2005; Mellander and Florida 2021)</p> <ul style="list-style-type: none"> - Small numbers of domestic comparators (5 to 50) [O] 	
Cities and larger towns	<ul style="list-style-type: none"> - Cities operate at a tractable medium scale (Boyne, 1995) [O] - Close local political control fosters service responsiveness [D] - Many domestic comparators facilitate piloting innovations and increases policy-learning capacities [O] - Delivery and professional services supplied are familiar to clients, and many are used frequently, enhancing citizen and enterprise learning [A, I] - Many synergies occur within cities' services bundle, creating a potential for more joined-up and personalized service delivery [I] - Services can be more easily co-produced, and collaborative governance is simpler [A, D] - Community ICT learning capacities (e.g., in SMEs) around city apps and low-cost innovation can boost public service agencies' responsiveness - Housing and living costs in smaller cities are lower than in national or state capital areas - Cities' more 'liveable' scale of urbanization can partly offset national or regional capital attractions, especially if there is a strong local cultural life 	<ul style="list-style-type: none"> - Cities are third in line for attracting skilled professional staff [I] - Cities also come behind national and state governments in attracting engagement by IT and digital firms [I] - Cities cannot sustainably finance redistributive services [A] - Only economic developmental policies with low levels of spatial leakage are sustainable [A]
Small towns and rural areas	<ul style="list-style-type: none"> - Local services are simple to produce, stable, frequently used and hence familiar for clients and the wider public [D] - They may also help some community-based IT innovations around local apps etc and low-cost innovation [I] - Close community surveillance of service performance and involvement with services is common [D] - These features may foster collaborative governance - There are many comparators for policy learning across towns - Where a substantial rural economy remains, there are many comparators for rural authorities too 	<ul style="list-style-type: none"> - Small-scale governments find it hard to recruit qualified staff, especially in peripheral or less dynamic regions, dampening innovation rates [O] - This problem is especially acute where private sector regional productivity levels and wages are low - Securing engagement from digital and IT firms (even at lower intensity) is problematic [I] - Small scale operations and low resources mean that towns are normally late 'technology takers', investing on the 'down' curve of trends - Only very spatially constrained economic developmental policies are feasible [A] - In many countries rural areas may have weaker broadband and telephone access than urban areas [D, I] - Rural agencies are often digital tech laggards [A, D, I] - 'Legacy' modes of administration and IT systems constrain collective learning across numerous small agencies - In urbanized countries, relatively few rural agencies may operate, all in peripheral or lower income areas - Even with multiple rural agencies, performance data may be scarce and learning capacities restricted

Note: Key for generic theory source: [O] optimal allocation; [A] ARD or Peterson model; [S] SHEW hypothesis; [D] dual state thesis; [I] intelligent centre/devolved delivery

Source: Author's elaboration.

Public sector efficiency (PSE) studies

The account given so far diverges substantially from one influential approach that is related at some level to the productivity of regional and local governments, namely some very aggregated, country-level and whole-of-government 'public sector efficiency' (or PSE) studies in public choice accounts and some micro-economic studies. I digress briefly to cover this literature¹, although (as I argue below) it actually has limited value in generating insights into the productivity of sub-national governments.

PSE studies focus not on productivity per se (y/x) but instead on efficiency, which is characteristically defined in a very ambitious way:

'By the *efficiency* of a producer, we have in mind a comparison between observed and optimal values of its output and input. The exercise can involve comparing observed output to maximum potential output obtainable from the input, or comparing observed input to minimum potential input required to produce the output, or some combination of the two. In these two comparisons, the optimum is defined in terms of production possibilities, and efficiency is technical....' (Fried et al, 2008 p. 9)

Efficiency studies inherently involve the counterfactual identification of what is either the optimum attainable total outputs level, or alternatively the minimal necessary inputs, at the production frontier.

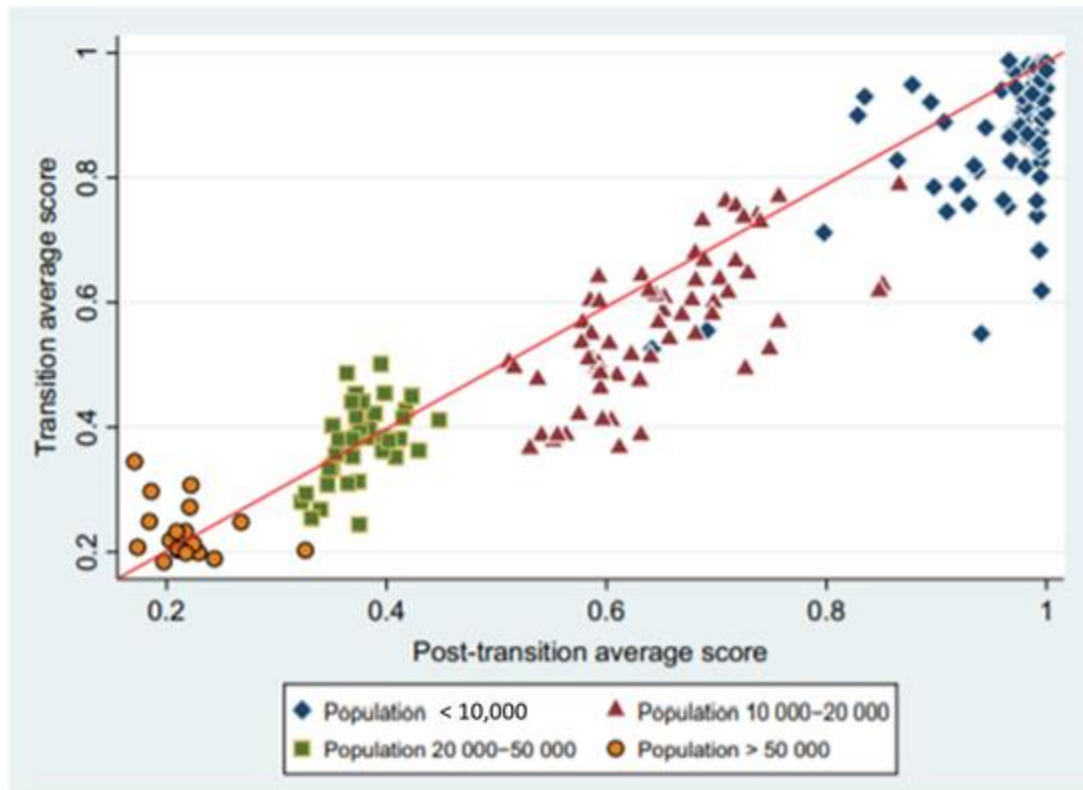
Productivity studies are more modest in their ambitions. They primarily seek to track variations in y/x ratios across time for given agencies (using index numbers); or to compare y/x levels across sets of multiple agencies at a given time. There is no suggestion that productivity findings in themselves can suggest how large 'efficiency losses' are. Although DEA analysis posits a production function position that is potentially attainable for any agencies with a given outputs mix, this is only indicative.

By contrast, public service efficiency studies are motivated by the belief that it is relatively straightforward to specify actual outputs, potential optima, and inputs for public agencies, using relatively small bundles of variables for each. Early studies in this vein were often undertaken at national level, comparing PSE across whole countries and hypothesizing an internationally useful production possibility frontier (Afonso, 2005). Subsequent improvements have expanded the number of countries considered, the number of variables included in output and input bundles, and the analysis of potential causal variables (Afonso et al, 2010; Antonis et al, 2011; Afonso et al, 2013 and see Endnote 1). Cross-national studies have yielded relatively few insights. In most studies an overall measure of decentralization of expenditures to state or local governments is the top variable linked to estimated efficiency levels, with highly decentralized provision seen as more efficient, and less decentralized systems as lagging. However, a few studies have found that decentralization failed to register large or consistent effects, or that a positive effect was conditional on other variables.

Looking only within single countries public sector efficiency studies have generally been more developed, because more comparable data sources can be assembled, both to measure the dependent variable of total sub-national government outputs, and to specify potential independent variables (e.g., Beidas-Strom, 2017). In recent studies these go well beyond previous rather rudimentary profiles of the spending mixes for different sub-national governments and their relation to the basic socio-economic character of local areas. However, the general PSE focus on whole-of-government' (SNG unit by unit) comparisons may still tend to blur much of the key variations in services productivity through aggregating different services together. And in search of the maximum number of cases to add depth to the analysis, some of the indicators chosen may over-focus on functions that are common to all localities.

To appreciate some of the continuing problems with PSE analyses, Figure 7 shows a quite representative example of key findings from an analysis of how local authorities in the Czech Republic responded to the transition to liberal democracy between 1989 and 2000. The country has 6 250 municipalities, the vast majority of them being small in size, and their structure has largely survived unchanged over long periods of time – although 14 regions (including Prague) were created as top tier SNGs in 1999. The scattergram in Figure 7 shows that in the pre-transition period there were distinct grouping of municipalities' PSE scores according to size, with the smallest units under 10 000 (blue diamonds) scoring highest and the relatively few cities with more than 50 000 people scoring worst. In the transition period most of the smallest localities experienced a strong austerity squeeze, cutting their input costs but with less change on their estimated outputs. Almost all of them improved their post-transition PSE scores as their locations below the parity line show – most indeed moved to the top score. Areas with 10 000 to 20 000 people also improved considerably. But larger towns and cities showed mixed results and no consistent trends.

Figure 7. Scatterplot of average public sector efficiency scores for Czech local authorities before and after the transition to liberal democracy



Note: A legend misprint in the source is corrected here.

Source: Šťastná and Gregor (2015).

However, as in other PSE studies, it is unclear if a strategy of defining outputs indicators relevant to all municipalities (large and small) copes in any way with the well-attested Wagner's Law effect for urbanization to increase the demand for collective services, and for more specialized services to cluster in larger urban centres. Although often mistakenly interpreted as just about state growth (e.g., see Karceski and Kiser, 2020), the Law actually refers to broader collective consumption, which since the 1980s may be privatized (see Dunleavy, 2019). Given that the service mix in Czech local government is dominated by transport, water, administration and environmental services (Nemec et al, 2016, Table 1) there seems to be a strong possibility that smaller places might just be incurring lower input costs and delivering less in outputs. Some of the PSE score 'improvements' may reflect either substantive service reductions or quality shading in the strong austerity pinch that particularly affected smaller areas. Other OECD economics commentary has noted that having so many local authorities for a small country of 10.7 million people (in addition to 14 regions) is likely to impede public services modernization and inhibit levels of digital and other innovation (Lewis and Fall, 2016).

This example illustrates a more general point that is inherent to 'efficiency'-orientated studies wherever actual performance is compared to a counter-factual optimum:

'Measured inefficiency may be a reflection of the analyst's failure to incorporate all relevant variables and, complicating the first problem, to specify the right economic objectives and the right constraints... If not all variables reflecting the objectives and constraints of the principal and the agents are incorporated into the model, agency and related problems become potential sources

of measured (if not actual) inefficiency. [In practice] it is as difficult for the analyst to determine a producer's potential as it is for the producer to achieve that potential' (Fried et al, 2008, p. 9).

However, some versions of a PSE type of analysis may be apt for exploring factors linked to political control or policy choices of sub-national governments. For instance:

- García-Vega and Herce (2011) argued that the length of tenure in office by one party or coalition had clear dampening effects on capital productivity in Spanish local governments.
- Studies of regional governments 'quality' across Europe have been undertaken based on survey data showing respondents reactive perceptual measures of corruption and levels of trust in regional and local governments (Charron et al, 2014). Charron et al (2012) claimed that high levels of trust in governments fostered better services, and even yielded detectable effects in boosting the wider productivity of regional and local firms. The effects claimed were higher for smaller firms across regions, and in high tech clusters areas.

4 Key empirical studies of productivity in sub-national governments

Studies of public sector productivity that focus on single coherent tasks or policy areas, can avoid the aggregation problems of whole-of-government and PSE studies, avoiding the blurring across service areas and allowing much better ex ante identification of control variables. They have recently also been important in seeking to explicitly measure key but normally elusive or intangible variables. Of key importance here are the impact of management/leadership variations on agencies' productivity, and of different policy choices, rather than these being left to just plausible surmise as part of an unexplained residual. I focus here on four studies or sets of studies covering key public sector functions delivered by sub-national agencies (or para state agencies in some cases) – delivery of election services by local governments in Italy; comparative analysis of the role of management/leadership in public health system hospitals (some privately run); some more detailed work on the same theme within the UK's National Health Service alone; and comparative work on the management/leadership role in secondary (high) schools (mainly under local government or under trusts receiving state funding).

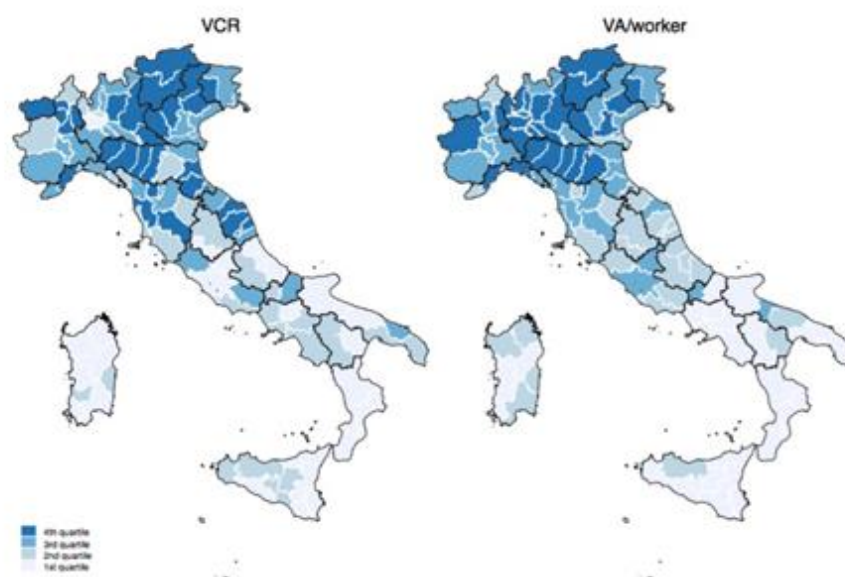
Local and regional productivity in Italy

Ilzetzkiyand and Simonelli (2017) undertook a methodologically strong Italian study of productivity across the nearly 8 000 Italian municipalities responsible for counting the 100 million votes cast on paper ballots in the 2013 House of Representatives and Senate elections, and two referenda in 2016. Local authorities recruited and organized the thousands of volunteer voter tellers involved. Standardized staffing was used for electorates, and the workers carried out identical tasks across the country for exactly the same remuneration, all prescribed in national legislation. The technology deployed by counters was minimal and the recruitment and management of volunteers was substantially the same.

Having held so many features of local situations constant, Ilzetzkiyand and Simonelli analysed the time taken to count votes, controlling for the size and complexity of counts, and then looked at the patterns evident at the level of Italy's 110 provinces. Figure 8 shows the key results for the vote counting rates and the value-added per worker in the study. There was a strong positive (isomorphic) association with wider regional labour market differences in Italy. Studies of private industry productivity levels show a marked productivity gap of 20% between the best-developed northern regions and Italy's south, with other regions of lower productivity occurring in poorer rural areas in the middle of the country, especially along the spine of the Apennines, and in Sardinia. In the election counts the productivity gap in election counting was even wider, at 28%, with almost all lower quartile provinces located in southern provinces, and the highest value added per worker occurring in the most successful industrialized regions of the north. Figure 9 shows the pattern of dispersion of value-added per worker across provinces, charted against the vote count rate (fully

controlling for the size and complexity of counts in each local area for different contests, and including the extent of challenges and the closeness of election races).

Figure 8. The vote-counting rate in Italy's 8 000 municipalities at provincial level in 2013-16, and the value added per worker



Note: The left panel shows a map of Italy with vote counting rates (VCR) averaged at the province level for the elections. Shades reflect quartiles of the VCR distribution, with darker shades reflecting faster vote counting. The right panel shows value added per worker, shaded by quartiles, with darker shades reflecting more productive provinces.

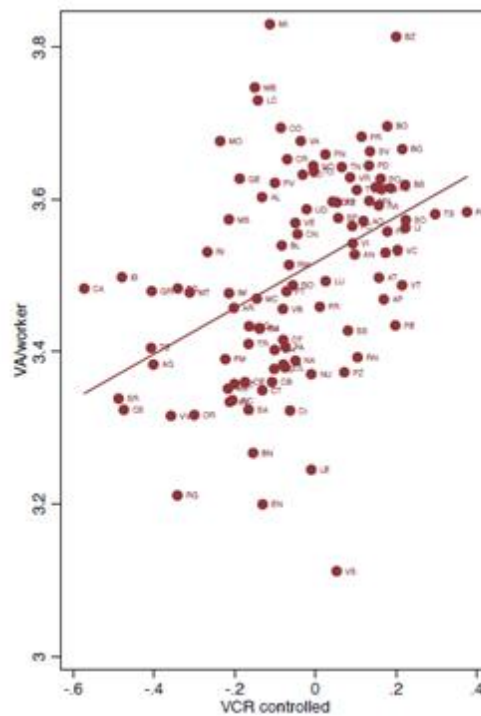
Source: Ilzetzkiyand and Simonelli (2017).

Ilzetzkiyand and Simonelli's primary argument is that their data sheds light on variations in output *per worker* across Italy, in contrast to most productivity studies which only explore output *per firm*. They have good data on the background of the vote counters, who must have completed eight years of full time education but actually have mean education levels of 12 to 15 years, depending on their seniority and role in the count process. The authors show a close association between education levels across localities and local productivity. They also separated out employed workers (who by law must be given time off work by employers) from others, including students. Years in education was a key variable boosting count rates in all elections, while being in employment and the proportion of students were also important in simpler election counts. Workers' previous counting experience proved important in the more complex Senate PR election count involving vote transfers (see their Table 3).

Using a development accounting exercise, the authors showed that just over a fifth of the variance in output per worker could be captured by a production frontier that included only physical capital differences across areas. Adding in human capital estimates to the production frontier increased the variance explained somewhat, if a strong or medium effect of human capital was specified. However, adding in labour efficiency to the production frontiers as well yielded a very marked increase in the variance explained across areas, whatever level of human capital effect was assumed:

'We find that our labor efficiency measure accounts for nearly half of the variation in output per worker across provinces, Equalizing labor efficiency would substantially compress the provincial dispersion in labor productivity and would halve the north-south productivity divide ' (p.31).

Figure 9. Value-added per worker using a controlled vote count rate (VCR)



Source: Ilzetzkiyand and Simonelli (2017).

The authors also demonstrated that productivity in counting the votes is negatively correlated with a separate measure of work ethic, namely absenteeism levels across regions, and positively correlated with levels of citizen trust across Italy. In low-trust regions challenges to the vote-counts were much more likely to occur, and normally resulted in slowing the process down. The authors also controlled for a bundle of area fixed effects

Although the authors standardized for tasks and are correct that counting pencil and paper votes involved minimal modern technology, their approach did not really control for managerial differences in the organization of vote counting across regions and localities. Although national legislation specifies many aspects of the process in exact terms, election administration nonetheless is almost certain to respond to different levels of managerial expertise in the overall organization of counts. For example, more permanent and senior staff are important in recruiting and training staff in good time for the events, ensuring vote-counting premisses are available, solving dozens of local implementation problems, and the detailed management of a myriad politically raised concerns. Part of this management effect might be located in the wider productivity gap between northern and southern regions evident in vote counting (28%) than in industrial productivity (20%). And part might explain the substantial variations in the residual shown in Figure 9 above.

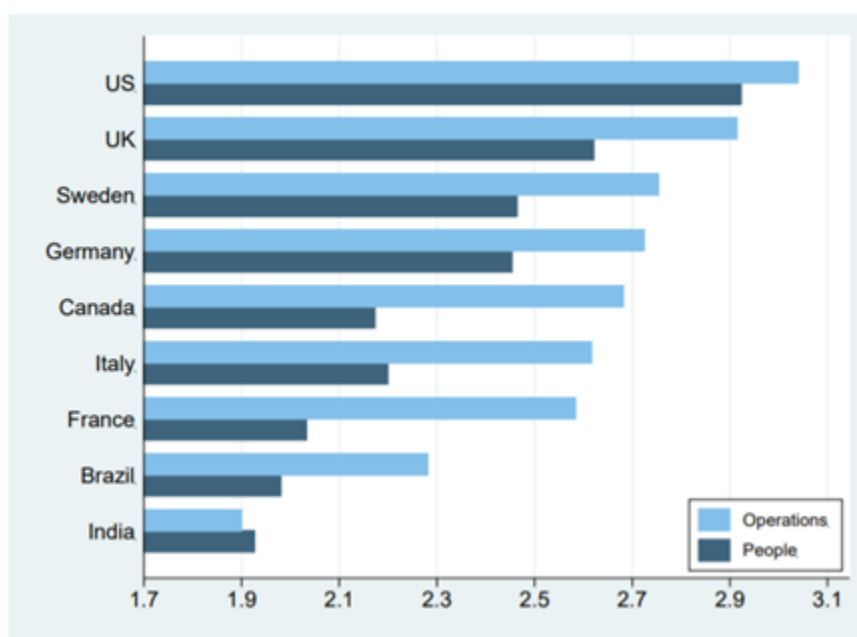
How management quality affects hospitals' productivity across countries

There is a strong economic consensus that management is a key 'intangible' factor affecting productivity variations across firms, and a range of studies led by Nicholas Bloom and John Van Reenen attempted to tie this down more precisely. Bloom, et al. (2010) assessed the modernity of a large set of firms' managerial practices, using in depth qualitative interviews conducted with one or two management-level informants

per firm. Interviewers sustained a full dialogue with interviewees around a set of 20 basic management practices, uncovering in detail the style of management employed. These responses were then coded up on to a grid where each firm was graded from one ('worst practice') to five ('best practice') on 20 concrete dimensions. These could be broadly divided into three main areas: the modernity of firms' operations, how far management set (stretch) targets, and human resource management. The main measure of management practices was the average score across these areas. After implementing numerous controls for other firm characteristics using fixed effects, the management variable emerged as strongly positively associated with firms' productivity levels (Bloom et al, 2012 and 2013).

This research team also used almost exactly the same international approach to analyse variations in performance across public and private hospitals in nine countries (Bloom, Sadun and van Reenen, 2014). The management indicators broadly paralleled those used for firms, but with more of a focus on operational modernity (e.g., a smooth flow of patients through from admissions to operating theatres and then to wards, HR policies for dealing with poorly performing staff etc.). The instrument used made many adjustments to reflect the importance of professions and semi-professions, which extensively condition hospital HR practices. Nonetheless, because of its original business sector formulation, the emphasis upon targeted and active management in this and other Bloom-Van Reenen studies can be thought of as somewhat more aligned with NPM management styles than with the consensus management practices in many non-NPM countries' public hospital systems.

Figure 10. Average scores for hospitals' management of 'people' and other 'operations' matters across countries



Source: Bloom, Sadun and van Reenen (2014).

With this caveat in mind, Figure 10 shows that US and UK hospital practices were on average at the top of the good management rankings, followed by modern European systems less influenced by NPM in Sweden and Germany. Canada, Italy and France scored markedly lower on 'people management' aspects, because of the stronger staff protections that often make it harder to fire or even move non-performing staff. Scores for Brazil and India were lower again. Generally, management scores were higher on operational matters across all countries, with HR scores appreciably less.

Figure 11. Hospital characteristics that affected their score on targeted management index



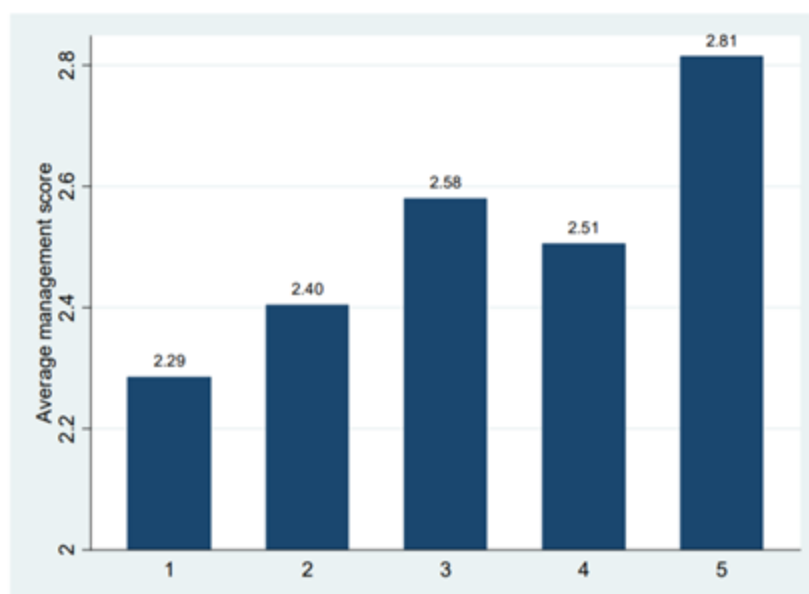
Source: Bloom, Sadun and van Reenen (2014).

Analysing the patterning of the management scores by different variables Figure 11 shows that overall public sector hospitals within the sample performed less well than private ones (whether run for profit or not). This effect held up in multi-variate analysis controlling for many background and patient load variables. However, the Figure shows that both public and private sector management scores (after multi-variate analysis) improved greatly if there was competition for patients between two or more hospitals in the locality. Scores were also higher where the top managers in hospitals were clinically trained – common in the USA, Germany and Sweden, but rarer in the UK where ‘generalist’ managers predominated as the chief executives of hospital trusts. However, some detailed studies of changes towards NPM style management suggest that they had little impact (e.g., Alonso et al, 2015).

More detailed studies of UK hospital productivity and performance

The Bloom-Van Reenen team also conducted a more detailed analysis of 161 NHS hospital trusts in the UK in 2008, all set up as local public corporations but in fact wholly funded centrally by the health ministry, mainly in relation to their achieved patient loads. Using the same management quality tool, the team showed a marked and very consistent positive relationship between average management scores and clinical indicators, such as survival rates for emergency heart attack admissions (Bloom, Propper, Seiler, and Van Reenen, 2010), Sophisticated multi-variate analyses controlled for a wide range of other possible causal factors. Less surprisingly higher management scores were also strongly and consistently associated with financial performance (such as avoiding budget deficits) and with the ratings for hospitals

Figure 12. Average Bloom et al. management score by quintiles of the main health regulator's score in 161 UK hospital trusts in 2009



Source: Bloom, Propper, Seiler, Van Reenen (2010).

given by a care standards regulator partly independent from the financing central department, shown in Figure 12.

One of the key causal determinants of better management scores was once again the presence of competition between hospitals within the form of 'quasi-market' operating at that time. The NHS system allowed patients (and family doctors acting for them) some restricted choices (up to four options) about where to go for operations and outpatient care, with patients also helped by some limited 'league table' information on hospital and surgeon performance. Activating this potential was difficult in more rural and peripheral areas, where only a single hospital was close spatially. It was also tricky in some isolated large cities with only a single large hospital there that was regionally dominant in most specialisms. By contrast, in conurbations multiple choices were much more feasible in terms of travel and patients' and doctors' familiarity with services at different sites. The team estimated that: 'Adding another rival hospital increases the index of management quality by one third of a standard deviation and leads to a 10.7% reduction in heart-attack mortality rates' (Bloom, Propper et al, 2010, p.4).

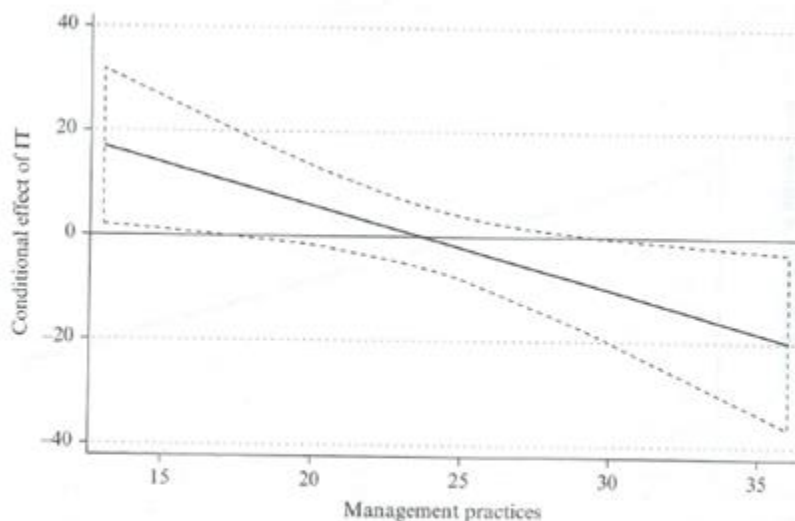
Although the UK hospital system is heavily insulated from regional or local political control, with professional doctors and senior managers setting almost all key policy lines internally, its direct administration by a powerful ministerial department in Whitehall also opened up some potential for political ('rent-seeking') influences to operate. Hospital closures showed a U shape pattern, with the likelihood of implementing them higher in constituencies that were safe for the governing party (Labour in 2009) or had no chance of winning, and lower in marginal Labour seats and those that were potentially winnable by the party.

In a single country study, the Bloom et al. method perhaps has some significant weaknesses because the specification of the main management score is actually based on phone interviews conducted with only one or two senior informants per hospital trust. These conversations were admittedly long and detailed, their codings were checked by several researchers with the full transcripts available, and in the multi-variate analysis variables were also entered to control for interviewee and interviewer characteristics.

Nonetheless, with any reactive survey of this kind there is a likelihood that interviewees may seek to tell interviewers what they think they want to hear, perhaps glossing performance. Respondents may especially seek to represent local practices in the most effective ‘fashionable’ terms, where the prevailing ‘humanistic’ NPM ethos in 2008-09 accorded closely with the central thrust of the Bloom-van Reenen scores. This may seem an acceptable limitation in an international study, but less so in a single country analysis.

An alternative approach by Dunleavy and Carrera (2014, Chs. 7 and 8) sought to assess the elusive importance of management and of digital/ICT changes across 154 English NHS hospital trusts by measuring a range of objective variables gleaned from annual reports and trust websites and documentation. Each component variable in itself was a small (possibly almost inconsequential-seeming) indicator, which on its own signified little reliably. However, by compiling 41 digitally available sub-variables into the composite management quality index and 18 indicators of digital service/IT quality sub-variables into a separate IT quality indicator, useful scores were created to serve as independent variables. Both overall indices varied markedly across trusts. They were included in analyses, along with total outputs measured in a way weighted both by administrative costs for different operations and by quality weights (again fixed from a set of objective indicators). The multi-variate analysis suggested that London hospital trusts were substantially less productive than those outside. But it was unclear if this was because the available case-mix data was insufficiently controlling for the specialist nature of many of the capital’s historic and large hospitals (which have national health roles also). However, the results were consistent with earlier work that showed London hospitals as performing worse than elsewhere because of lower retention of in-house staff and much greater use of agency nurses, with apparently adverse impacts on patient morbidities (Bloom, Propper et al, 2010).

Figure 13. The conditional effect of IT use on improving productivity, given management practices, across 154 UK acute hospital trusts



Note: The dashed line area represents limits the upper and lower 90% confidence intervals. The marginal effects and standard errors used for this figure were calculated according to results from Model 2.

Source: Dunleavy and Carrera (2013).

The main Dunleavy and Carrera finding is shown in Figure 13 above, modelling the conditional effect of management practices on hospitals’ use of IT, which was often badly lagging at this time. For trusts with low and medium scores on the management index greater use of ICT positively improved productivity, but

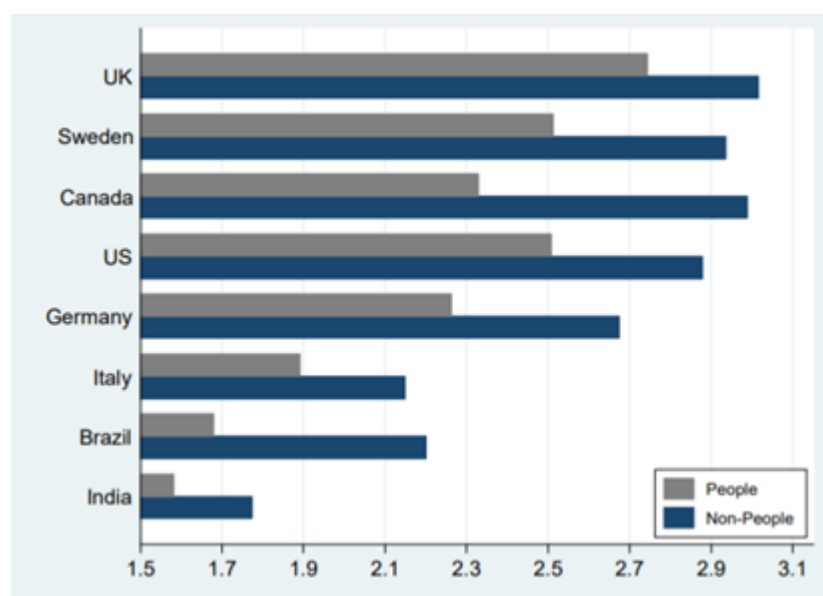
not in already well managed trusts. The authors concluded: “This may suggest that as trusts become more complex, it is possible for managements to develop an over-focus on using ICTs that may not be beneficial for yielding higher productivity levels” (p.262).

How management quality affects schools’ productivity across countries

A final set of cross-national insights on the importance of management in improving public sector agencies’ performance was offered by an extension of the structured qualitative interview-based approach to analyse the performance of 1 800 high schools (those educating 15 year olds) in eight countries (Bloom, Lemos, Sadun and Van Reenen. 2014). The survey covered public sector schools run by municipalities or school boards, charter or trust schools run a micro-local agencies with public funding in some NPM countries, and private schools.

Figure 14 shows that in terms of operational (‘non-people’) issues the management scores for schools in the UK, Sweden, Canada and the USA were broadly comparable, and well ahead of those in Italy, Brazil and India, with Germany in an intermediate placing. In the UK’s secondary schools, managed as micro-local units in a strong NPM ‘quasi-market’/league table system, management scores for people and staffing areas were somewhat ahead of the next four countries. Italy, Brazil and especially India all showed markedly low management scores on average. (However, a careful study of Indian schools showed that actually changing governance structures had very little effect on performance (Muralidharan and Singh, 2020)).

Figure 14. Average scores for high schools’ management of ‘people’ and ‘other’ issues across countries



Note: ‘Country-level averages for people management vs. non-people management practices. Broadly speaking people management involved pay, promotions, hiring and firing, while non-people involved school operations, monitoring and targets’. Surveys were undertaken with 1800 high schools in 2012-13.

Source: Bloom et al, 2014.

Multi-variate analysis showed that one of the most important variables conditioning management scores and schools' performance was autonomous governance in schools (so that they could be publicly funded and regulated, but with substantial local control over their own operations), as in the UK's NPM model and 'charter' schools in the USA. These schools fitted more with the Bloom/Van Reenen management scoring, out-performing both private schools and regular public-funded schools controlled by local authorities or local school boards. Echoing some previous work on the importance of school principals (headteachers) in 'setting the tone' for staff expectations and student behaviours (Chubb and Moe, 1991; Gintis et al,), Bloom, Lemos et al, 2014) concluded that: 'Almost half of the difference between the management scores of autonomous and regular government schools is accounted for by principal leadership and governance'.

5 Can improving regional and local public sector productivity help local economies?

Would enhancing sub-national governments' productivity positively improve economic growth and the productivity of firms in their wider regional or local economies? Most applied economists' focus on micro-economic policies related to industrial strategy (often just looking at the manufacturing of physical goods, or high tech products). This pattern is also closely followed in the other parts of the current OECD study of local and regional productivity. My first sub-Chapter here notes that this stands in rather stark contrast to the more macro-orientated and 'political/cultural' explanations in political economy and sociological accounts, emphasizing either consumption and service-based innovations, or land and property development processes at the urban level. The next sub-Chapter considers the largely neglected potential that large public sector organizations themselves may have for helping small or medium firms to keep in touch with the expertise and management skills needed to run larger organizations. Finally, section 4.3 briefly notes some continuing barriers to using the physical movement of government functions as tools to boost lagging local areas' productivity.

Micro-economic rationalism versus macro-political economy influences on regional and local growth performance

Most attention from economists has focused on specific policy initiatives to stimulate economic growth and enhanced productivity levels. Within this now vast literature (considered in the other papers of this project) the evidence about whether more effective regional (or big city) governance can contribute to boosting productivity levels in the regional economy varies a good deal. However, the range is largely from no proven effect, through some suggestive indications of benefits, to some claims of substantial positive benefits.

Part of the PSE literature (see the third subsection of Chapter 2 above) suggests a positive correlation at the whole-locality (or whole region) level between the extent to which citizens express trust in regional and local politicians and officials as impartial and non-corrupt policy-makers in surveys, and the performance of economic development programmes and local firms' productivity levels (Charron, Dijkstra and Lapuente, 2012, 2014a, 2014b).

Clearly, in economic theory terms, the local administrations most likely to foster more economic growth in their economies should be those that seek to be rational welfare-maximizing. In this case they would rigorously use the best available evidence and strategies in shaping policies, to draw on area-specific research advice, to reach out and engage positively with regional and local businesses, and to evaluate policy impacts as far as possible. Localities or regions good at gaining EU or national level grants can also help firms, and countries with better targeted national industrial strategies and funding regimes may also do better – although causal analysis is hard to do. There are studies supporting each of these factors.

However, there are multiple pathways and mechanisms of any possible influence from SNGs on firms in general, especially in influencing the small and medium enterprises that SNGs focus most on. The problems here include:

- multiple overlapping policy measures, run by up to four different tiers of government as in Figure 6 above,
- whose economic goals may or may not be convergent.
- In countries with partisan alternation in power, policy interventions, development programmes and even tax regimes may often last for periods that are too short to conceivably generate productivity or effectiveness data.
- Individual policy effects are very hard to disentangle, when layered one on another.
- Even in longer-lasting programmes with developed evaluation stages (such as EU regional development policies) process-tracing evidence remains difficult. For instance, European Court of Auditors analyses of regional and social programs remain rather rudimentary, and critical learning points are often contested by the Commission.

So, the evidence supporting the rationalistic hopes and expectations about perfecting micro-economic policy stimuli is not that strong.

There are also rival political economy or sociological/cultural accounts, which stress that the emergence of urban or regional ‘growth coalitions’ is shaped by far more holistic processes. Far from being dependent in any meaningful way on this or that policy initiative, this literature sees creating a flourishing regional or city economy as primarily a matter of establishing strong political elite connections and confidence, and growing supportive political support bases and organizational cultures. In many eastern and southern US cities growth coalitions in the 1980s were fuelled by the emergence of entrepreneurial black mayors and governors. They could ‘broker’ political support in a consistent way from their ethnic communities and local electorates, while also assembling a supportive business coalition, and they proved important for city-regeneration programmes in the 1980s and ‘90s (Logan, 1986; Cox, 2017). A series of bargains needed to be struck (around things like casinos and urban redevelopment projects) that inevitably stretched over many years, with economic wobbles and recessions along the way, and strong competition between cities and regions (Mazar, 2018). Elsewhere, some successful entrepreneurs with strong state or city roots, championed their local area when building up rapidly growing firms. Although they were sometimes in remote or ‘unlikely’ locations, over time they nonetheless exerted a gravitational pull that then attracted other supportive enterprises.

Similarly, competition at the level of multi-city regions has been important. The rise of the Silicon Valley and San Francisco areas, the more dispersed New York and eastern seaboard ICT developments, and subsequent movements of high tech industries to other areas like Texas, the development of Boston’s health and IT cluster – all these reflected complex political economy bargains, often between the emergent super-firms (i.e. GAFAM Google (Alphabet), Apple, Facebook, Amazon, and Microsoft, plus Amazon, Netflix, Twitter and others) and start-ups, and state and city authorities. Lifestyle benefits for knowledge-workers and their families were also important aspects of achieving development momentum ((Florida, 2005; Mellander and Florida, 2021) and will remain so post-COVID-19 (Florida, 2021). And in the Australian states (each dominated by a hegemonic capital city) ‘community power structures’ played important roles in sustaining a thirty year record of continuous economic growth with no recessions (Uhr, 1996). Regional policies focused on states and big cities absorbing new waves of immigrants and developing city and hinterland property markets and transport infrastructures. In each of these cases, the pattern of close political to business linkages across different periods and settings has also unfortunately been associated with controlled (but still significant) levels of malfeasance or corruption, including by powerful actors (such as the big banks in Australia). Such adverse political economy linkages tend to fuel some level of public distrust.

Can productive public sector agencies hold lessons for private industry in lagging regions?

Some of the key issues involved in the effective development of firms centre on the difficulties of scaling up organizations, and adopting to the modern management practices and business analytic technologies that larger scale normally requires. One of the acute problems in lagging regions is that useful private sector business models may be thin on the ground for small and medium enterprises there. The large private firms of the Fordist period have largely disappeared in many regions and localities within the most de-industrialized economies. Data here are weak. But it seems clear that in 'left-behind' regions the ending of mass production of goods and materials, and the transition to a services-dominated economy, has meant that in many places the largest local organizations are now in the public sector. In Europe 'public employment is systematically higher in low productivity regions' (Kessing and Strozzi, 2016, pp. 22-3).

In larger towns and cities with lagging economies, and even in some whole regions, the biggest employers and the only remaining centres of expertise in managing large organizations may be:

- (i) the local university,
- (ii) a large public sector hospital and/or health authority,
- (iii) the local authority or city government,
- (iv) regional or state agencies in regional capitals, military bases (especially in countries that are great powers). In the USA, for instance, the Pentagon maintains and constantly updates and renews a list of 3 000 defence facilities that have been deliberately located for political reasons across all 50 states and most of the 450 congressional districts,
- (vi) sometimes, re-located offices of central government bureaucracies that have been re-located to lagging regions, and
- (vii) regional or state bureaucracy operations in the state capital, or re-located from there to help lagging towns or regions.

These public organizations will still typically have concentrated local workforces of many thousands or hundreds of people, along with the complete apparatus of a large and modern organization – such as HR departments, developed training programs, sophisticated IT and computer operations, and developed evaluation and analysis professional staffs (whom Mintzberg (1983) labelled 'the technostructure'). In non-NPM countries public agencies' internal 'support services' are retained mostly in-house. But in NPM countries there is often a substantial local 'para-state' of privatized support services, often to local units of big contractors for IT, catering, cleaning, property and ancillary services, but perhaps also including some local SMEs.

Public services generally (and linked para state organizations) are heavy employers of graduates in professional-level jobs, especially those in the social sciences (Bastow et al, 2014, Ch.9) and many STEM sciences; and they are a large market for new graduates (and perhaps PhDs) with the latest knowledge. In universities' STEM science departments, health care systems, and parts of policing and regulatory agencies, they deploy costly high tech equipment that is in a different league from those available to most SMEs. In bureaucratic administrations, their computer systems and analysis techniques are often less modern in some aspects, especially where 'legacy systems' still prevail or are linked to others (Dunleavy et al, 2006). Yet the agencies above have substantial expertise in handling difficult problems at scale. Having a legalistic bureaucracy can inhibit innovation in some non-NPM countries, but other Weberian-style systems show no such effect (Lapiente and Suzuki, 2019). Some NPM bureaucracies are fairly dynamic early on, but a politicized administrative context harms public service innovation.

Especially in lagging regions, public agencies may stand out as multi-divisional 'colossi' compared with a local landscape of SMEs that are 'simple organizations' in Mintzberg's (1983) terms, or local units of

nationally organized firms (with scant locally-located management expertise). Very few such SMEs and branch plants may have more than 50 or 100 employees. In 'left behind' cities or regions, the main organizations where anyone is reading the management, business or applied economics press, or 'keeping up to date' with the management training and professional literature, may be the university, hospital, local authority or regional/national outstations. Evidence from the USA shows that public employer training boosts employees earning power a lot more than in the private sector, while in the UK the effects were less but more comparable (Méndez and Sepúlveda, 2016; Dearden et al, 2006). Could public service organizations play a larger role in fostering the development of local or regional industries? I look at the general prospects, the role of universities (mostly state sector), and the role of public hospitals.

On the *general prospects for cross-sector influences*, the prevailing assumption from economists and business schools has been that government sector agencies have stable or lagging internal productivity levels. If so, they may have nothing to offer by way of expertise or help to private sector firms operating in competitive markets and with specialized productions processes, however small or weak these firms may be. Politicians on the political right have predominantly given an even starker message. In their account government activity is necessarily slack and inefficient, over-budgeted, unnecessary and backward compared to the private sector. Each of these claims can draw on a substantial literature in economic theory to back it up, such as generalized rent-seeking models, or Niskanen's still widely cited (1994) account of public bureaucracies that are up to twice their optimal size. So, on this view it is fanciful to imagine any exemplar or supportive role from public agencies towards helping SMEs tackle organizational growth, better training, improving organizational structures, or absorbing more technology.

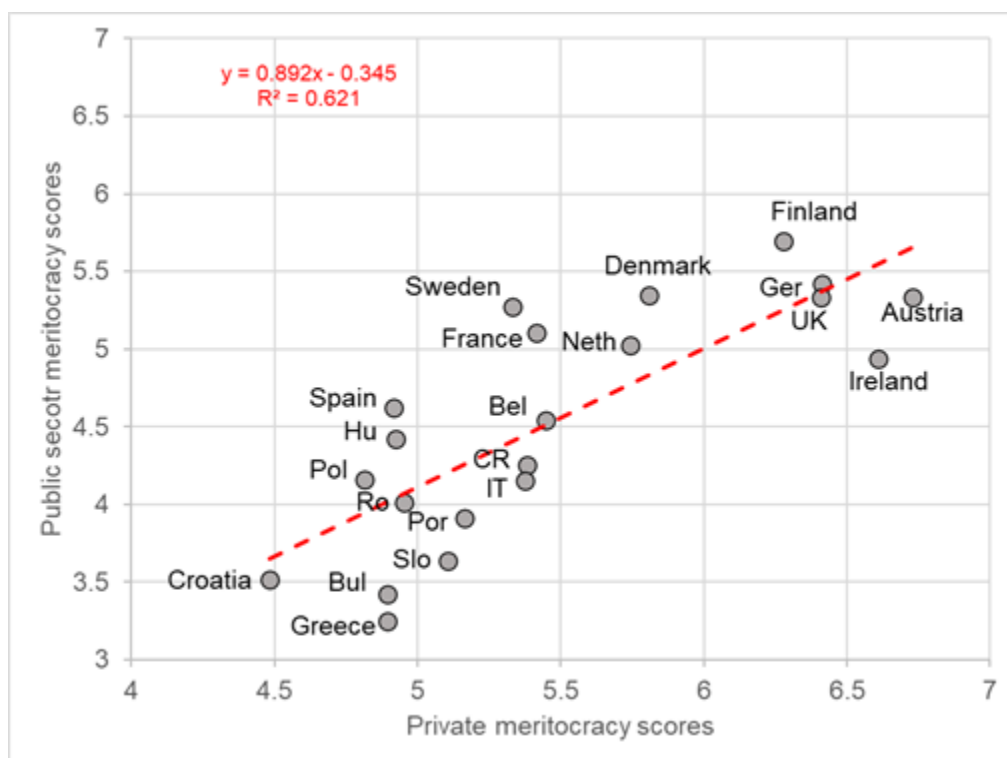
The likely scope for any public sector role here may be linked to wider societal perceptions of how the public and private sectors operate. Recent research by Kohei Suzuki and Hyunkang Hur (2021) used data from a sample of 53 500 citizens across 21 European countries in 2013 to measure how far the public sector is seen as meritocratically organized or not, and compares these ratings with those for the private sector in the same countries. The relevant questionnaire item was a scale item from one to ten, where:

10 = 'In the private/public sector most people can succeed if they are willing to work hard'

1 = 'Hard work is no guarantee of success in the private/public sector for most people – it's more a matter of luck and connections.'

Figure 15 and Figure 16 show the level of aggregate private sector meritocracy scores for countries on the horizontal axis (running from 4.4 to 6.8), and the generally lower scores for the public sector on the vertical axis (running from 3.2 to 5.7). Figure 15 shows the bi-lateral linear relationship between the two calculated by Suzuki and Hur, which is noteworthy, accounting for 38% of the variance. In this account, positive views of public sector organizations generally rise in line with positive views of the private sector – so country scores are lower in some east European countries and Greece, but higher in more advanced economies. (See also Suzuki and Demircioglu, 2020; Lapuente and Suzuki, 2019 on closely related aspects).

Figure 15. Public perceptions of meritocracy in the private and public sectors in European liberal democracies, linear trendline



Source: Suzuki and Hur (2021).

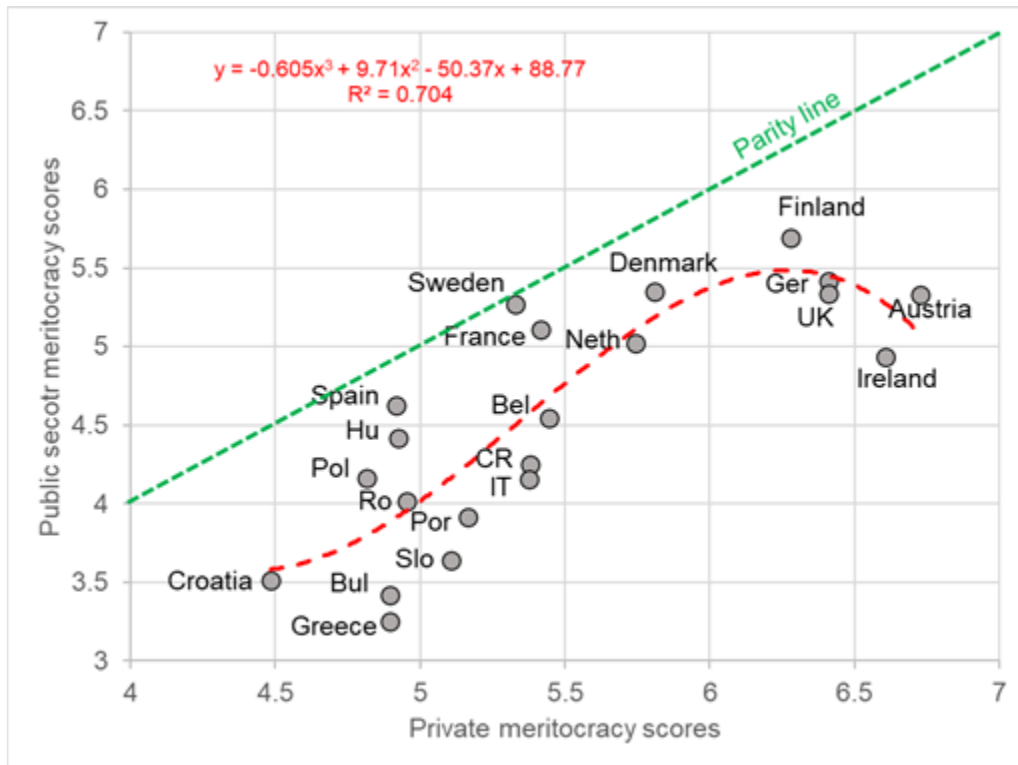
However, in considering what is left unexplained here, it is useful to focus not on countries' vertical distance from the trendline (as Figure 15 does), but rather on the 90 degree distance by which countries diverge from the parity line shown in Figure 16. The public and private sectors are seen as equivalently meritocratic in only one country (Sweden), although France, Spain and Denmark come close. This Figure also shows that positing a more complex (polynomial) relationship between perceptions of the two sectors considerably strengthens their positive association and improves the variance explained to 49.6%. At low or medium levels of confidence in private sector meritocracy, there are wide variations in views of public sector (witness the vertical gaps between Spain and Greece, or between Sweden and Italy). In countries where private sector meritocracy is rated highly, there are more convergent and somewhat lower ratings for the public sector.

Given these patterns, it is unsurprising that very few if any government policies across advanced liberal democracies recognize the reality of local economies dominated by public agencies, except to deplore and seek (unavailingly) to reverse that situation. Few national governments or SNGs have policies designed to help make public sector management expertise more readily available to growing SMEs. Political parties and politicians critical of state intervention may especially decry or under-estimate the positive pool of managerial expertise and learning that government sector bodies may offer in many parts of the country.

Turning to *universities' roles* in regional economies, there are some partial exceptions to the pattern above, however, with many policy efforts in the area. The UK's Research Excellence Framework awards around 29% of general research support funding to universities on the basis of how departments' and faculties' research has contributed to economic development or positive social change outside the higher education sector. But even here the funding given is for numerous different kinds of effects, only a section of which may be economics or business focused. Within this amount, only a part of universities' impact is regionally

or locally focused. Major universities especially may often operate 'in a region' but not be 'of the region' in terms of their engagement.

Figure 16. Public perceptions of meritocracy in the private and public sectors in European liberal democracies, the parity line and a polinomial trendline



Source: Author's elaboration from Suzuki and Hur (2021)'s data .

Nonetheless, universities have been amongst the lead cases where public-private collaboration fostering organizational learning on both sides has developed strongly in the last two decades. Bastow et al (2014, Ch. 6 and 7) chart 12 different types of university and business collaboration, and some paralleled forms of government-university collaboration that are most developed in the STEM science departments, but also less often encompass social science disciplines too. Links to universities seem to play a large part in public sector organizations' innovation efforts (Demircioglu and Audretsch, 2019). Even in the most tech-specific of such linkages, general organizational relationships and trust are fundamental to cross-sectoral working (Dunleavy and Tinkler, 2020, Ch. 10; Shneiderman, 2016).

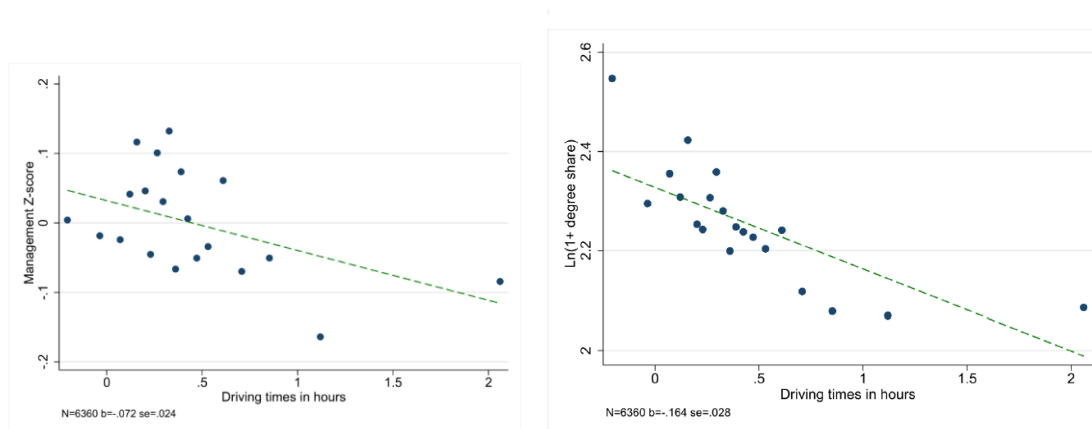
Universities and the other public agencies mentioned also have long histories of relative growth and evolution that have brought them to their current scale. Some French, English and Scottish universities have survived and grown since the twelfth century. Many globally salient universities now operate with budgets and endowments that dwarf the majority of private sector firms, making them important centres of financial knowledge also (Valero and Van Reenen, 2016). In a country like the UK, where repeated studies have shown that overseas managements outperform domestically-owned companies (Bloom et al, 2007, 2010) university managements arguably have been much more successful in competing internationally over long periods of time than has British industry. It does not seem far-fetched to suggest that the sector can contribute something to their regional economies in constructive ways, helping innovation as they clearly do in the public sector (Demircioglu and Audretsch, 2019).

In an international study of economic growth across 1 500 regions and 78 countries (Valero and Van Reenen, 2019) found that firms' productivity was greater the more staff had degrees and the closer firms' key locations were to the nearest university – see Figure 17 based on Feng and Valero (2020). This draws on a sample of 6 360 firms across 19 countries and shows a scatter plot of average management Z-score and $\ln(1 + \text{degree share})$ varying by the average travel time from firms to the nearest university, with the data grouped into 20 evenly sized bins. Variation is within country. The dashed line represents the line of best fit. They established that two pathways had a modest role in explaining this effect, with universities improving the management quality and human capital of regions close to them (not just those they are situated within), and also tending to improve innovation processes. The authors concluded:

'We found robust evidence that increases in university presence are positively associated with faster subsequent economic growth. A 10% increase in the number of universities is associated with over 0.4% higher GDP per capita in a region. This is even after controlling for regional fixed effects, regional trends and a host of other confounding influences. The benefit of universities does not appear to be confined to the region where they are built but spills over to neighbouring regions, having the strongest effects on those that are geographically closest... The relationship between GDP per capita and universities is not simply driven by the direct expenditures of the university, its staff and students' (Valero and Van Reenen, 2019).

Apart from the two effects mentioned above, however, the mechanisms involved in the larger part of the university effect remained unclear in their area-based data set.

Figure 17. Management scores and staff with degrees declines the greater the travel time from the firm to the nearest university



Source: Feng and Valero (2020).

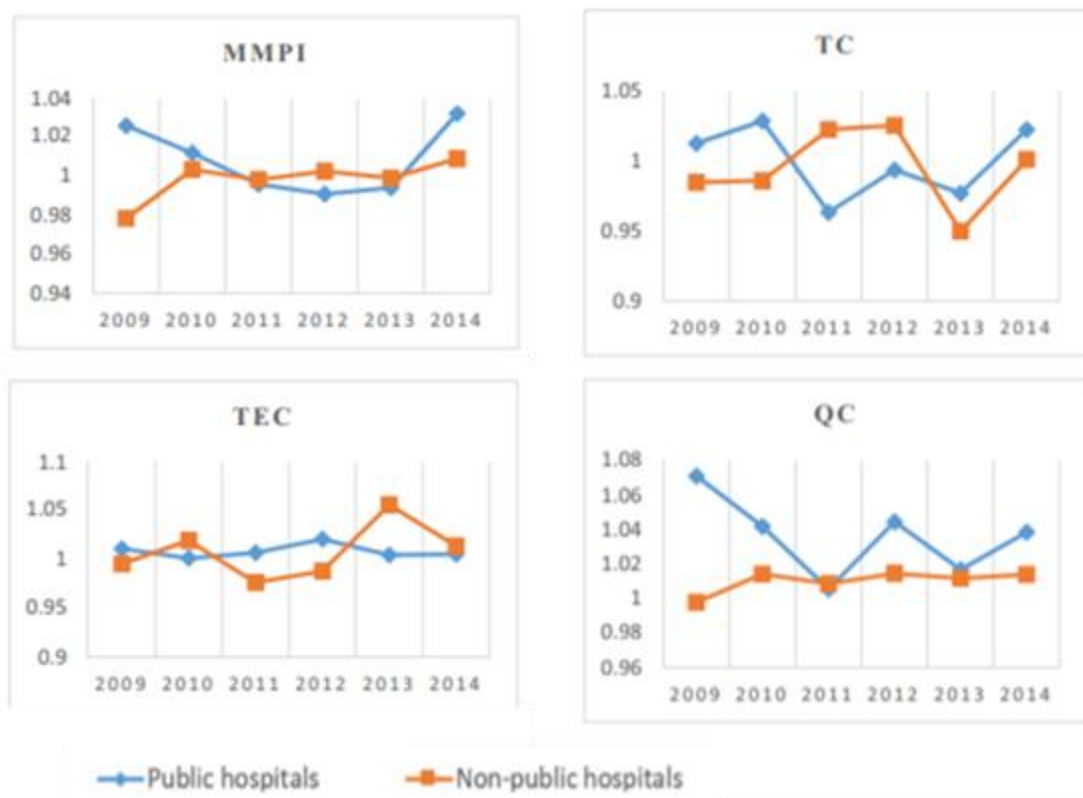
If we turn attention next to *public healthcare*, there are strong reasons for expecting that publicly owned and run hospitals will confront a continuous series of organizational and technological decisions that are essentially very similar to those in private sector hospitals – even extending to the mantra that 'growth = productivity + price recovery'. Of course, 'price recovery' in the public sector may be 'budget recovery' – which may be structured in very different ways where there is no competition between hospitals, or little transparent evaluation of performance available to legislators or citizens at large. But especially in NPM-influenced countries, common funding regulations across public and private hospitals, competition between alternative suppliers, and some costly quasi-market mechanisms (like the largely unavailing quest to define 'prices' in health quasi-markets) have strengthened tendencies for convergence across public

and private sectors. Different studies of whether public or private sector hospitals perform more effectively in terms of technical efficiency and quality outcomes for patients have reached different conclusions (Bel and Esteve, 2020; Alonso et al, 2015). But it is certainly clear that given the right organizational set up (such as a degree of competition for budgets and workloads, and incentives for innovation and improved performance) there is not much in the inter-sectoral difference (Bloom, Propper et al, 2015).

For instance, Figure 18 shows an interesting study of public and private hospitals in Taiwan's NPM-influenced health care system (Chen et al, 2019). Both sectors had relatively similar levels of productivity, and responsiveness to the same changes in techniques and technologies in this period, although the authors generally concluded that public hospitals performed better over time.

Thus, there is every reason to suppose that there can be positive influences for local and regional economic development from the top two of the seven public sector organization types listed above on page 46, just as much as many larger private firms. Indeed, where university science or health sector efforts come together in strong regional clusters, as in the Boston area life science health cluster and in Silicon Valley, there is particular evidence of strong synergies benefiting a wide range of SMEs and attracting significant FDI from larger players (Baily and Montalbano, 2018).

Figure 18. Comparing the productivity of public sector and private sector hospitals in Taiwan



Note: MMPI Malmquist Productivity Index. TC technical change index. TEC technical efficiency change.

QC Quality change index. A score above 1 shows that productivity in that year was increasing, while a score below 1 shows a decrease.

Source: Chen et al, 2019.

The key to achieving wider effects with all seven types of public agencies is likely to involve generating well-based and systematic knowledge of SNGs' productivity performance, effectiveness and efficiency in defined areas. Greater 'process tracing' is needed to follow actual and potential links from regional or local governance to their areas' economic performance and to the experiences and behaviours of firms. This could help avoid many current kinds of 'black box' imputations. Improved lesson-drawing would be greatly encouraged by the key steps above and by OECD and EU sponsorship of critically engaged academic work and practitioner expertise across different service sectors.

Why moving public agency locations may not stimulate local economic growth

Deconcentrating staff from a national or state/regional capital has often appealed to both right- and left-wing governments as a way of fostering regional or local economic developments – e.g., in February 2021 the UK government announced that it would move a tranche of Treasury staff from London's Whitehall to Darlington in the north east region. However, there are constraints and limitations on such strategies (Nickson et al, 2020).

National pay scale systems and collective bargaining for public services staffs are present in many countries. They are normally stoutly defended by trade unions, and social democrat or socialist parties as a way of boosting wage levels in lagging regional and local economies. Yet national pay scales can create some significant recruitment and retention problems for regional public sector agencies in high cost, metropolitan areas. For example, in the UK's National Health Service relatively standard pay arrangements prevail except for London, where a flat-cost 'London Allowance' (which is standard across many different public sector services) is added to accommodate higher housing and transport costs. Yet even after this nurses' wages in the capital are uncompetitive with other occupations' pay scales there, and lower than the rates staff can get by working for private agencies in-filling gaps that arise in staffing. There is strong econometric evidence that the weak pay rewards for in-house staffs at London hospitals causes significant quality problems. Extensive reliance on 'agency' nurses (working only temporarily in any given ward) has been specifically linked to higher morbidity rates than patient characteristics suggest should be occurring (Propper and Van Reenen, 2010). Having to use temporary staff is especially likely to be corrosive of productivity gains, which rely on multi-year efforts to change and improve organizational and care arrangements, for which team instability and low levels of personal familiarity and trust can be barriers.

Under NPM national collective bargaining agreements have tended to be disaggregated and eroded to match wider regional wage rates. This has potentially adverse externality effects, however. Instead of being better paid than other local jobs, public sector staff working locally are then paid in line with depressed industrial wages, reducing the positive multiplier effects of deconcentrating work to the regions.

Skills gaps can also occur in deconcentrating from high to lower skills or productivity regions. In the UK's Department of Work and Pensions tens of thousands of routine and call-centre staff were deconcentrated into giant offices and call centres to recognized 'deprived' areas in northern England over several decades, as part of a bi-partisan regional policy effort. Yet lower average educational attainments in the poorer regions created substantial and continuing recruitment problems – in finding and retaining staff who were suitably skilled for operating complex legacy systems adapted for contact and call centre use (Dunleavy et al, 2009). Relatively complex issues of legislation and entitlement often arose in combatting mistakes and fraud attempts, and clients have always had complex situations and needs. At the end of the 2000s 23% of staff were churning each year in northern contact centres, some well-trained staff leaving for better paid jobs locally (many in the public sector also), but others because they could not meet the training barriers to become regular operators. Even when low skilled or poorly educated staff did succeed in joining the workforce, they often proved slower workers for the long term. With fewer high skilled staff than in London or the south east, local managers also became more dependent on their minority of fast workers if they were to continue to meet demanding NPM targets. So, the de-concentration of national government sector

activities from capital cities to regions had mixed effects on total factor productivity. Narrowly defined labour costs (wage rates) decreased, but lower throughput rates per staff member and reduced expertise offset some of these gains (Dunleavy et al, 2009). These effects partly contributed to the responsible Department of Work and Pensions (DWP) failing to increase its productivity over twenty years, despite some heavy capital investments (Dunleavy and Carrera, 2013, Ch.5). Combatting these problems might look simple, e.g., by paying somewhat over the local wage rate. But this approach risks 'the potential sorting of talented individuals from the private sector into the public sector' (Kessing and Strozzi, 2016, p.23), which could well depress growth rates.

6 The COVID-19 crises and the turn towards government resilience

The COVID-19 pandemic proved to be a demanding test of all governments across the advanced industrial nations, and one that many failed badly. The two countries rated top and second in the 2019 GHSI health security ratings from John Hopkins university were the USA (where COVID deaths exceeded 600 000 people by mid-June 2021), and the UK (where deaths topped 126 000 in the same period, for a population 1/5th the size) (GHSI, 2020, p. 26). In practice, their performance was poor (Stribling et al, 2021, Figure 1), on a par with Spain (rated 15th), Belgium (19th) or Italy (31st). A number of Asian and more isolated countries performed better, but again the rankings had variable predictive power. Whereas highly placed countries like Australia (3rd), Thailand (4th) and South Korea (9th) did relatively well, so too did Vietnam (not included in the overall top 40). At the least these indicators suggest that predicting which governments had a resilient state capacity to handle the pandemic was a bit of a hit and miss affair before the event, just as the global financial crisis of 2007-9 exposed the acute vulnerabilities of many countries' financial regulation systems.

Some suggestive pointers suggest that countries most strongly focusing on 'new public management' (NPM) ideas of paring back state spending suffered particularly in both crises (Dunleavy et al, 2006). For instance, the UK launched an intensive austerity campaign in the period 2010-16, which pared back public spending in an optimizing/minimizing mode, including in health care and allied services. Yet the savings aimed for and achieved by the Cameron-Clegg (Conservative-Liberal Democrat coalition government) appear to have been dwarfed by the later pandemic costs. In planned 2020-21 expenditure (prior to the COVID-19 pandemic) the UK central government agency Public Health England (PHE) envisaged spending GBP90 million for its activity heading 'preventing infectious diseases' amongst the 55 million people in the country, an average of GBP1.60 per person (PHE, 2020, p. 15). Other PHE programs were also relevant to the later COVID-19 crisis, including a small and centralized testing apparatus employing 2 400 staff and grants to local authorities. Public Health England was a typical NPM agency, operating semi-independently of the Department of Health and of the National Health Service and local authorities. An earlier less centralized system that involved NHS and local council environmental health departments far more, in total employing around 12 000 staff, was abolished in 2012. The previous network setup was replaced by the highly centralized PHE agency partly to increase professional standards, but also as part of the austerity measures.

Following on the onset of the COVID-19 pandemic the UK's small in-place capacity for 'test and trace' activity recommended by the World Health Organization broke down completely within a month, so that for some weeks in early 2020 no tracing was done and almost no testing. Eventually a huge, scaled-up replacement testing capacity was constructed hurriedly under PHE auspices. A track and tracing effort was also put together, lead by private management consultants Deloitte and diverse other contractors operating in a complex structure created in part by using private company staff affected by the COVID-19 lockdown (such as staff from travel agents and students). By spring 2021 this effort had cost GBP22 billion and was scheduled to spend another GBP15 billion in the rest of the calendar year (National Audit Office, 2020b). Meanwhile the additional budget costs arising from three major lockdowns of businesses, and the need to subsidize their survival and fund their staffs, added GBP304 million to the overall central government budget for 2020-21, which was largely financed by borrowing.

These numbers cast a dramatic light on the dilemmas that governments confront in investing resources in precautionary planning and preparing for unlikely events that are nonetheless extremely serious when they do occur, not least in creating chaotic governance and public service conditions at the height of crises. Critics argued that new public management policies over the last three decades, and the political push by neo-liberal political parties in the same period, has led to a fragile state – one that is optimized for a particular concept of efficiency at the expense of government resilience and ability to absorb shocks (Mazzucato and Quaggiotto, 2020; Mazzucato and Kattel, 2020; Bentham et al, 2013). A 2016 UK government report by its Foresight unit had noted (p.18):

In a potential pandemic of an acute respiratory infection, there is a race between the production and delivery of vaccine and the spread of the virus. Early containment of an epidemic could potentially make more time available for the development and production of a vaccine.

Yet it is also clear from the wider Foresight report text that the scientists who wrote it envisaged that this risk was primarily something that could affect developing countries, not those like the UK with sophisticated healthcare facilities in place. (Only infections in animals were discussed in relation to the UK).

Outside the USA during 2020 and Brazil in 2020-21 (both operating under national leaders who seemed to hold views denying the severity and risk posed by COVID-19 and so gave inconsistent policy steers), state or regional governments and local agencies close to communities seem to have generally fared better in the pandemic crisis than large and remote central governments. In the UK, for instance, the clearer guidance and swifter actions taken by governments in Scotland, Wales and even Northern Ireland were taken by public opinion to have demonstrated the advantages of more moderate scale. (Along with Japan, England is one of the largest and most unitary governments in any liberal democracy). The UK national 'test and trace' system failed in part because it excluded local governments and the NHS sub-national apparatus completely. Instead, an ad hoc coalition of contractors was put together by management consultants. The staff and organizations involved lacked almost all the 'implicit knowledge' of how local areas are connected and what their character is that local governments always have. The failure of the French national contact-tracing app and its UK equivalent (downloaded by 32 million people but which proved unable to process information received from pubs and restaurants on their clientele) also reflected this deficiency. By contrast, small or medium-sized state or regional governments may be able to cultivate a better awareness of inter-connections and adjust for different cultural patterns across areas also.

It seems likely that most of the liberal democracies that fared worst in the pandemic - especially those in Europe, north America and Latin America - will want to strengthen their local and regional capacities in public health. At the same time, they will need to rebuild the higher tech national competencies in laboratories and testing which misfired so spectacularly in the case of PHE and the early 2020 operations of the Centre for Diseases Control (CDC) in the USA. Lipton et al (2020) argued that CDC was slow to identify the virus at early stages, weak in developing clear messages, had poor data, and used out-of-date technology. The UK government has also already announced a new health security organization to replace Public Health England, and launched on a major reorganization of the National Health Service - replacing a complex, failed NPM quasi-market scheme implemented in 2012, with a new emphasis on locally integrated health care systems (although still with some competition for patients and some contractors involved in service provision).

Even when the COVID-19 pandemic has been successfully controlled, other vital aspects of public health services productivity will undoubtedly take a massive hit. Caring chiefly for COVID-19 patients during three lockdowns meant that the numbers of patients waiting for operations in the UK National Health Service grew substantially. At the time of writing, it is not clear how many months or years it will take to address the resulting backlog of 5 million cases, which includes many patients with serious conditions for whom delays in treatment are likely to be painful or fatal. Public health system's productivity numbers are bound to take an apparent hit, and achieved health outputs and outcomes may trend downwards. In the peak

crisis period care was necessarily diverted to aid elderly or already-ill patients with acute COVID infections, but perhaps yielding small gains in quality adjusted life-years (QUALYs being one main index of how much a patient can benefit from treatment). At the same time other (younger) patients necessarily lost out massively in QUALY terms through delayed treatment. This gloomy picture again underscores the importance of building in resilience to prevent systems being thrown so badly out of balance, and to ensure that future crises do not become so severe that basic priorities (like keeping a working hospital sector in being at all) completely displace higher order goals.

Looking more widely, it is also clear that the COVID-19 pandemic is not a unique experience. COVID-19 followed on shortly after the global financial crisis of 2007-9, which had its origins in the NPM idea of 'light touch regulation' and led to a major economic recession and the imposition of austerity conditions by many European countries. The UK had to nationalize many of its largest banks and acquired a public debt overhang that will last for at least two decades. Most advanced industrial countries had to implement costly macro-prudential policies (like larger bank reserves) so as to safeguard their financial institutions for the future (Haldane et al, 2017). Despite the implementation of a wide range of these precautionary measures designed to increase financial systems' ability to withstand shocks, possible economic crises still loom large.

In the aftermath of such shocks renewed attention has been given to the likelihood of new and unexpected crises further testing the resilience of government systems. In addition to potential future pandemics, these might be financial crises, disruptions to vital services (like electricity or transportation), and disruptions produced by conflicts. 'Expecting the unexpected' is additionally complicated by potential combinations from unexpected directions linked to climate change. For instance, another future financial dominos collapse might be caused by the alleged 'carbon bubble' of collapsing prices for the carbon-assets of mining and petroleum companies, a risk that many financial institutions have begun to price in since 2015 (Ongena et al, 2018). Or a banking collapse might be triggered following a slump in city property markets – e.g., due to a collapse of over-inflated ocean-front housing if climate turbulence and ocean flooding increase, or a spectacular reversal occurs, such as a couple of hurricanes hitting a high value city, like Miami Beach.

Inherently improving the resilience of government is difficult to do since it involves 'expecting the unexpected'. The question of what level of resources are needed to prevent future crises is as difficult to resolve as issues around what the appropriate level of defence spending should be. Major crises tend to trigger large responses. Domestically, the 9/11 catastrophe led to American airport security becoming a federal government function, and to a rapid growth of homeland security budget in the USA (Brill, 2016). The challenge that both 'resilience' and 'sustainability' policy issues pose is most acute for narrowly optimizing NPM strategies, such as those leading to the 2012 creation of an unfit-for-purpose Public Health England.

The economic legacies of COVID-19 will also lie chiefly within the policy spheres of regional and state governments. Some of the areas with greatest potential for productivity growth are healthcare, construction and ICT (McKinsey Global Institute, 2021, Exhibit 2; Bentham et al, 2013). Increased levels of 'working from home' (WFH) have gone a long way in public administration. The wider WFH trend has already endured far longer than initially predicted and triggered major changes in city commuting patterns that are likely to endure in a toned-down way (Florida, 2020). E.g., most American employees are likely to work 2-3 days from home in future (Barrero et al, 2021), and in the London metropolis WFH changes in demand have lowered city mass transit demand by 20% for the foreseeable future. The knock-on consequences of WFH, plus a massive shift of consumers towards online retail, may have similarly grave implications for demand for city centre or high street retail shops, creating an urgent need to rewrite strategic plans.

Productivity levels in public agencies themselves are also likely to be closely bound up in WFH transformations, with some staff shifting to only 2-3 days a week in the office, and others potentially going predominantly remote. Some public administration agencies suffered fewer or smaller output reductions

than many private industries in the pandemic, successfully outsourcing work away from offices and contact centres to WFH staff. Investments in modernizing public services digital systems yielded some spectacular gains, as in the UK where a costly and much-criticized digital service (Universal Credit) successfully absorbed a surge in claims of 1.2 million in the first six weeks of the country's first 2020 lockdown. Similarly, large central tax agencies in the UK and Germany processed new 'furlough' support services in record time with strong established digital systems.

In other ways the 'searchlight' effect of the COVID-19 pandemic in seeking out governance system weakness also highlighted the shallow foundations of earlier producer and consumer resistance that had previously greatly slowed down or constrained digital change in public administration and healthcare services. In the UK health services in 2019 only a small minority of family doctor (GP) consultations were carried out remotely, almost all by phone, and 'digital transformation' was a slow process (National Audit Office, 2020a). During the pandemic the proportion of GPs' phone and online consultations rose above two thirds for a time, and hospital doctors also moved to this approach for outpatients in many cases. Both patients and most doctors found that remote but in person consultations – especially face to face video over Zoom or equivalents on PCs, tablets or smartphones – were almost as good as in person meetings. They even had some strong advantages – such as reduced travel and wait times for patients and increased throughput or time-per-case for doctors. If even a large fraction of the switched-across services stick online there is a considerable potential for productivity improvements here, possibly reducing the scale of premisses needed and speeding up transfers from hospital to community settings.

The long lags in adaptation to changing societal conditions was also underscored by the need for remote-triaging of patients at the height of the pandemic in the UK, Italy, Spain, New York and other nearly-overwhelmed hospital systems. The UK switched everyone with COVID-19 symptoms and a need for testing to a non-urgent 111 phone service, only allowing the most serious cases to dial 999, and even then, sending ambulances or paramedics to patients' houses - who frequently refused to admit to hospitals patients with severe symptoms nonetheless judged bearable at home.

During the COVID-19 pandemic it seems still that no 'blue light' emergency services worldwide were geared up to take video calls from patients or their families on smartphones, although the capability for citizens to do this was widely distributed in civil society in advanced countries. In the UK a more developed digital interface between 'blue light' services and patients or their families might have saved a great many lives by improving the ability to triage patients in the peak-COVID-19 period. Adapting emergency services to recognize pervasive smartphone access and enable video calls is likely to require a ten year investment programme, even in the most advanced countries with 5G phone networks - if indeed it happens at all within that time span. Interfacing public hospitals' AI systems with consumers' own health applications on phones or digital watches is another challenge that will likely take even longer. Hundreds of millions of people are already monitoring their own health conditions in ever more sophisticated ways, and they will soon expect to be able to transit timely and clinically useful information to public hospitals and doctors.

7 Regional and local public productivity and the ‘green transition’

Improving productivity in SNGs and achieving a ‘green transition’ are linked in several key ways. Local city planning plays a central role in achieving the long-run redesigns of cities and transport systems, towards forms that help combat adverse climate changes and global warming. Minimizing carbon production can be strongly accelerated at the local level (see Sethi et al, 2020, for a comprehensive analysis). Urban utilities can be re-engineered in ways that cut waste and carbon use. Building regulations can encourage home working, maximize broadband access and limit car garaging or parking spaces. Investments in walking and cycling routes, and other localized green transport, can discourage car use and facilitate non-polluting transport. Installing charging points and places for electric vehicles is already a key regulator of the transition away from cars using fossil fuels. Re-localizing employment facilities out of city centre offices (a trend likely to be strongly accentuated by COVID-19) can reduce home-work distances – but only so long as employment locations and genuinely affordable housing are co-located, and housing sizes expand to allow for home offices

Regulatory policies to combat adverse climate change can be improved using the now standard ‘consensus-nudge-regulate’ sequence. This begins by establishing a pro-green consensus that spans across SNGs, local public opinion, local and social media, and also pulls in local industries, and property developers, builders and project funders. It is followed up by SNGs repeatedly ‘nudging’ industry firms or property developers to comply with stricter environmental requirements voluntarily, in order to sway discretionary regulatory or planning decisions their way. A third phase of the cycle is for national, state or local governments to enact the new standards into regulations, plans and zoning provisions. Some evidence suggests strong progress on many fronts in European cities (Hsu et al, 2020).

The ‘smart city’ movement is a much hyped effort to go beyond these already well-functioning approaches so as to build in digital and ‘Internet of Things’ infrastructures in cities. In theory these could help implement future cost savings or quality improvements, make better use of land (e.g., by encouraging the growth of autonomous vehicles to cut parking spaces and street capacity needed) or use existing infrastructures in better-fitting ways (e.g., automatically and remotely changing traffic lane flows and speed limits at bridges or congestion points so as to maximize traffic throughput).

Yet there is also probably quite a lot of hype around smart cities at present. Radically new infrastructure can only really be installed in a mass capacity way in completely new towns, districts or developments that are planned and constructed from scratch. But developing ‘future proof’ investments here is a lot harder than it sounds. The risk of installing systems and infrastructures across a whole new district would be that they all obsolesce at the same time, becoming a barrier to incorporating unexpected ‘next step’ technologies. On the other hand, incrementally changing infrastructure as it becomes due for renewal (e.g., replacing old street lighting with new ‘Internet of Things’ lights that monitor their own activity) is a more

feasible investment strategy, but can take a long time to work through. It can also complicate local authority services as different generations of tech get installed across different areas.

Regional and local government exemplars already operate strongly in campaigns showing firms and NGOs in their areas how to use all-electric vehicle or other low-carbon fleets, improve buildings' energy efficiency, develop 'circular economy' and recycling solutions, and move towards 'zero carbon' modes of operating. Digital tech innovations in delivering local public services also have great potential in building environmentally positive changes. And of course, via their training, education and outreach activities, SNGs can play a very strong role in encouraging home working, home shopping, and reskilling for the online economy more generally. These 'showcase' efforts are widely funded by national governments already, and they could be integrated with the recommendation in Chapter 4 above that the productivity enhancing capacity of public services agencies in small firm or lagging regions be more generally recognized.

8 Conclusions

Economic approaches need to recognize public services production as a necessary element in overall economic functioning and resilience. And economists and statisticians need to radically improve and spread the measurement of public agencies' productivity, making up for past academic neglect. There are large academic and policy dividends to be gained by seeking to better measure, analyse and develop total factor productivity in state and regional governments, city authorities and municipalities. National governments should invest in better-focused research on total factor productivity in defined service areas, covering similar types of agencies within the country (and potentially across wider areas, such as Europe or related groups of countries) and using the best of methodologies reviewed above. The tradition of 'whole of government' studies of SNGs should also transition to seek more disaggregated total outputs measures. Over-time studies of TFP trends should seek to track the same SNGs over a substantial period – a minimum of five years, and ideally ten years.

These steps may seem technical, but they are key in achieving a better analysis of how regional and local public agency productivity paths may foster the evolution of local economies. Over the next two decades, the service mix that SNGs provide, and the regulatory and administrative activities they undertake, are both favourable for sustained productivity advances through better use of BDAI (big data/artificial intelligence), robotic process automation, and the physical linking of robotics and IoT implementation technologies. Policy approaches need to recognize the important role that SNGs (and central government agencies) can play in driving up the overall productivity of the economy, both via micro-economic policies, and via macro-strategies linked to successful growth coalitions. Just as public agencies have played key roles in developing demonstration projects of how to adopt more environmentally sustainable initiatives, it should be possible to develop their capacity to provide organizational and technological insights relevant to SMEs seeking to scale up, especially in lagging or 'left behind' regions devoid of large firms.

Endnotes

* I am grateful to all the participants in the OECD project, 'Productivity for Places' in October 2020 to April 2021, for many arguments and points incorporated here.

1. Sources for the public services efficiency literature relevant for regional and local public services productivity include: Adam et al (2014); Afonso et al (2005); Afonso et al (2010); Afonso et al (2013); Antonis et al (2011); Beidas-Strom (2017); Cornille et al (2017); Estache and Saussier (2014); Fadic et al (2019) Førsund, F.R. (2013); Fox (2013); Giordano and Tommasino (2013); Radnor and Johnston (2013); Šťastná and Gregor (2015); Stroobants and Bouckaert (2013).

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