Governing by Numbers - Key Indicators and the Politics of Expectations: An Introduction

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Walter Bartl, Christian Papilloud & Audrey Terracher-Lipinski[*]

Abstract: »*Regieren durch Zahlen – Schlüsselindikatoren und Erwartungspolitik. Eine Einführung*«. In this special issue of Historical Social Research, indicators are considered epistemic devices that render the world governable by quantification. While endowed with an aura of objectivity, indicators are not neutral devices. Instead they transform the world they claim to describe. Against the backdrop of a global proliferation of indicators, we argue in favour of research that strategically focuses on the processes that lead to the institutionalisation and systematic use of key indicators in politics compared to cases in which these processes fail. This type of research strategy could enhance the accumulation of systematic knowledge as well as the relevance of social studies of quantification. Furthermore, we propose a heuristic for analysing how indicators are involved in shaping imaginations of the future following the three distinct dimensions of meaning (factual, social, temporal) as introduced by Luhmann. We also review diachronic and synchronic approaches to analysing the genesis and use of indicators in order to derive testable hypotheses about the gap between indicator design and policy use. Finally, we introduce the articles of this special issue.

Keywords: Quantification, key indicators, politics of expectations, genesis and use of indicators.

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1. The Growing Relevance of Indicators

In recent decades the world has seen a considerable increase in the number of indicators in use. The rising relevance of indicators has been attributed to various developments that are partially connected to each other. First, growing complexity in an ever-more globalised world has nurtured demand for orientating and readily accessible knowledge (Rottenburg and Merry 2015; Mau 2017). Since numbers are said to possess crucial features that cater to this demand, quantification has become a pervasive feature of contemporary society. Second, the idea of output measurement and control began materialising in the 1980s, especially in the political sphere and in publicly funded organisations, in an attempt by state organisations to gain legitimacy for public action primarily through numbers. These policies, inspired by the discourse of New Public Management, strive to hold accountable through quantification the addressees of public regulation as well as the regulative public bodies and public service providers themselves (Power 2002). Based on a distinction developed by Fritz Scharpf, one could say that the use of performance indicators strives to demonstrate the effectiveness of policies *for* the people (creating output legitimacy) – in contrast to policies *by* the people (based on input legitimacy) (Scharpf 1999, 16-28). Beyond the state, civil society actors attempt to substantiate their political claims and mobilise support by referring to quantitative evidence (Bradley 2015; Urueña). Third, on the supply side of indicator production, these demands have been met with methodological innovations and the increasing technological capacities of quantification. Social research has brought about new methods of measurement (Land, Michalos, and Sirgy 2012; Malito, Umbach, and Bhuta 2018; Mungiu-Pippidi 2016), and improvements in information infrastructure – both analogue and digital – have facilitated the supply of numbers for public and private governance purposes (Anheier 2018; König, Schröder, and Wiegand 2018).[1]

This proliferation of indicators has not been free of controversy (Rottenburg et al. 2015). While underlining their potential instrumental value with respect to the coordination of actions and collective decision making, critics have warned about their naïve use, for example in politics, as well as about the different methodological issues attached to their production (Mayntz 2017). Measurement ambiguities create the potential for cultural repertoires of interpretation and particular interests to confound the validity of indicators by influencing the definition of categories as well as the selection of indicators and their aggregation to composite measures. Other critics regard indicators as an expression of a neoliberal form of governance that ultimately hollows out truly democratic deliberation (Brown 2015; Supiot 2017). They support the more

[1] See also the contribution of Rainer Diaz-Bone (2019) in this special issue of HSR.

general idea that indicators are not neutral measurement tools because they are rooted in mathematics and statistics. Instead they shape the social world by defining expectations through their methodological principles as well as their social and technological production processes. This is the main argument developed in this special issue on governing by numbers. Let us begin with the basics: what are indicators?

2. Indicators and Key Indicators

An indicator signals empirical information about the static or dynamic properties of an object (Porter 2015). An often-cited definition of indicators states that "desirable indicators are those that summarize or otherwise simplify relevant information, make visible or perceptible phenomena of interest, and quantify, measure, and communicate relevant information" (Gallopín 1996, 108). While this definition might not be entirely consensual, it underlines four key features that are typically associated with the indicators we are going to discuss in this section: First, indicators are a form of *quantification;* second, the information provided is the result of a *reduction in complexity*; third, indicators *make phenomena visible* that might not otherwise be directly observable; fourth, it is probably not a coincidence that the definition emphasises the *relevance* of both the phenomena of interest as well as the communicated numerical result. Let us look in detail at the four features typically ascribed to indicators, beginning with quantification.

Etymologically, the words indicator and index mean *pointing*; logically indicators point, detect or measure, but do not explain (Porter 2015, 34). Hence, words or icons could be conceptualised as indicators, but usually the notion refers to a form of *quantification*. Quantification is the process of producing and communicating numbers that claim to represent part of the world (Espeland and Stevens 2008).[2] Quantification allows things that formerly went unnoticed or that were expressed in words, to be represented by numbers. This gives these phenomena an aura of objectivity (Porter 1995). It is important to pay heed to different scales of measurement because they depict the relationship between the numeric sign and its referent in a particular way. For our purposes it is enough to distinguish between a nominal, an ordinal, and a metric level of measurement. In its most simple form, an indicator determines the equality or inequality of phenomena, which has been considered as a measurement on a nominal scale (Stevens 1946). The position that a nominal measurement, as defined by Stevens, constitutes a form of measurement at all has been

[2] Reference to an external referent is what distinguishes numbers from the formulae of mathematics. Mathematics constitutes a self-referential system of signs in which only internal consistency counts (Heintz 2007).

sharply disputed (Duncan 1984, 122-27). However, we think it is still useful to regard the nominal scale as a form of measurement since it is a formalised form of classification that depends on a prior definition of categories and coding rules and which very often leads to quantification through counting on an aggregate level (Stevens 1946). Ordinal measurement translates a verbal formulation of "more" or "less" of a particular dimension into numbers, allowing units of analysis to be ranked but without determining the exact distance between the measured values. On a metric scale it is also possible to determine the equality of intervals between values (interval scale) or the equality of ratios. The resulting numbers can be further transformed depending on the scale of measurement. Stevens summarised his notion of measurement by requiring there be at least a "consistent set of rules" for the assignment of numerals (Stevens 1946, 680). In a similar vein, Alain Desrosières states that quantification

> entails, firstly, *agreement,* that is deciding on the conventions, choice of objects and modes of equivalence and then, once these conventions have been finalised, proceeding with the *measurement* operations proper (Desrosières 2016, 184).

Hence, we suggest that indicators be regarded as the result of a process of assigning numerals to units of analysis based on a consistent set of rules.

Processes of quantification *reduce complexity* in at least two ways. First, the decisions taken in operationalising a variable reduce the plurality of meanings and valuations to a single number.[3] It is precisely the polysemy of language that can be overcome by quantification. Second, numbers can be further transformed, e.g. single indicators can be integrated into more abstract composite indexes. While the construction of composite indexes can generate particular methodological problems (Hagerty and Land 2012; Grupp and Mogee 2004), we would like to highlight the reduction in complexity that these transformative steps perform. When designing indicators, it should be noted that the more transformations an indicator undergoes during its production process, the less intuitive its interpretation will be to potential users. The seeming transparency of composite measures from the designer's point of view may give the impression of arbitrariness among policy-makers (Sébastien and Bauler 2013, 7). From a practical perspective, policy indicators should have a clear and accepted normative interpretation and be intuitively valid to the public (Atkinson et al. 2002, 21-24). An alternative strategy of capturing the multidimensionality of a problem is the compilation of a portfolio of indicators instead of creating composite indexes which might be difficult to interpret (Atkinson et al. 2002, 24-5). Important principles of this strategy are that the chosen indicators be balanced across different dimensions of the problem and not differ grossly in their weighting. In addition, the multidimensionality of a problem is more likely to

[3] See also the article by Thévenot (2019) in this special issue of HSR.

be expressed by indicators if they are developed as part of a participatory approach (Atkinson et al. 2002; Salais 2008; Eyraud 2017).

Furthermore, the definition of an indicator as cited above alludes to the fact that indicators make particular phenomena *visible* which have hitherto gone unnoticed or could not be directly observed (c.f. Porter 2015; Brighenti 2017). Again, there are at least two different possible readings with respect to this. First, when it comes to an indicator's validity, the observability of the features of the phenomena under consideration is a relevant aspect of the quantification process. While directly observable features are amenable to counting, features that are not directly observable require some form of measurement.[4] In contrast to counting, measurement implies "descriptive inference – using observations from the world to learn about other unobserved facts" (King, Keohane, and Verba 1994, 8; Mayntz 2017). Hence, otherwise latent phenomena become manifest by their operationalisation and description through certain indicators. In these cases, indicators use a limited set of observable parameters to measure phenomena that are not directly observable on their own. For example, the American census created racial categories that ultimately came to represent heterogeneous populations as homogeneous social groups (Mora 2014; Okamoto and Mora 2014). When indicators are based on indirect measurement rather than direct observation, questions of validity become especially salient. Indicators used in politics basically face the same problem as those used in science, but political indicators are very often treated with a sense of naïve realism (Desrosières 2007, 10; Mayntz 2017). The preconditions of quantification – categorisation, establishment of commensurability, and measurement – are not reflected as long as no doubt or critique about the validity of the measurement is voiced (Heintz 2007, 75). Second, beyond representational questions of validity, strong constructivist arguments claim that tools of statistical observation and calculation enact or demonstrate social reality (Osborne and Rose 1999; Law and Urry 2004; Callon 2007; MacKenzie and Millo 2003; critical: Didier 2007; Sparsam 2019). A weaker form of the performativity argument claims that quantification transforms pre-existing phenomena by making them more visible: While an agricultural survey quantifying "pickles" does not create the agricultural product in question, at least it makes it visible as an epistemic object to a superregional audience (Didier 2007). That said, while indicators are often conceptualised as measuring latent phenomena, we would like to suggest that the concept of indicators should not be restricted to only such cases. Instead, by including quantification processes that are based on direct observation and simple counting procedures, phenomena that had previously gone unnoticed are made visible to a wider audience. This broader concept

[4] Lazarsfeld and Menzel ([1956] 1993) referred to the former as individual and the latter as structural or global properties of social collectives (Mayntz 2017, 4).

enables the effect of the quantification process on the use of indicators to be systematically analysed.

Numbers, statistics, and indicators are often used interchangeably although there are significant analytical differences between these concepts. Numbers are numerical signs that refer to an external referent and can be used for mathematical calculations. The science of mathematics establishes calculation rules and functions entirely without external referents (Heintz 2007, 66). Statistics, i.e. the results of data gathering, are different from mere numbers since in a statistic, numbers are compiled and formatted in a way that eases their communication and analysis in order to be indicative. Early examples of data gathering about "the state" only occasionally resulted in quantification and only later in a format that we consider today to be a statistic (such as a chart or a graph displaying systematically selected units).[5] The distinction between (official) statistics and indicators has been a recurring theme in the literature on social and environmental indicators, with (official) statistics often being portrayed inaccurately as "raw data" and indicators referring to an analytical or normative concept (Horn 1978; Gudmundsson 2003, 4). In fact, no piece of data can speak for itself (Vollmer 2018). We argue, though, that too sharp a distinction between statistics and indicators is likely to conceal implicit concepts underlying statistics, while those statistics might nevertheless be of crucial importance for the practices in a given social field. When concepts remain relatively implicit, we consider reconstructing and explicating the pragmatically relevant concepts to be an analytical task. When indicators are not published in an isolated form but are instead grouped as a set of indicators or even as part of an integrated system of indicators (Noll 2014), the grouping itself provides an indication of the underlying concept.

Reiterating the fourth aspect of the definition of an indicator quoted above we will now discuss the *relevance* of indicators. How constitutive is it to conceive indicators as relevant? With regard to the supply side, it is evident that the production of indicators requires a substantial investment of time, money and epistemic work. Hence, in this respect, investments of this sort appear unlikely when there is no practical or conceptual relevance. However, the relevance of indicators certainly cannot be easily generalised– even though a more general relevance is very often insinuated. Even though indicators have become pervasive, their power and influence remain highly controversial. On the one hand, there are many examples of indicators that not only have come to be widely used but have even become crucial for the regulation of entire policy fields – two of the most prominent examples being the Gross Domestic Product (GDP) (Speich Chassé 2013; Lepenies 2016) and the unemployment rate (Innes [1990] 2004; Salais 2007). The GDP has been criticised for its hegemonial role

[5] The term statistics refers to the science of collecting, summarising, and analysing numerical data as well as the result of these practices.

as an informational base for collective decision-making (Anand and Sen 1994; Fioramonti 2017). Broadening the informational base of collective choices can be regarded as a crucial element of social inclusion (Sen 2011). Other indicators have not received as much attention and are largely hidden from public scrutiny. They are known only to highly specialised groups of professionals – such as the indicators defining the borders of electoral districts or the amounts transferred in intergovernmental fiscal relations. Nevertheless, these "silent" administrative indicators can still be purported to perform key functions in the formulation or implementation of public policies. On the other hand, the power of indicators is questioned time and again – as in the case of environmental or social indicators. At other times, indicators are used by civil society actors worldwide, such as the Corruption Perceptions Index (Beschel 2018; Urueña 2018; Musaraj 2018), but their degree of influence on official politics remains debatable. Against this backdrop we would like to focus our attention on those indicators that have become especially relevant for certain social fields. Therefore, we suggest the following definition of key indicators: Indicators are key indicators if they refer to a social phenomenon, if they are used collectively, if they are attributed a relatively consensual meaning, and if their production, publication, and use have significant consequences for the constitution, reproduction or transformation of a particular social field. Such consequences might be intended or unintended. By adopting such a focus, research activities can concentrate on processes of quantification that are systematically linked to collective practices. It opens up several potential lines of research, such as investigating the genesis, use, and consequences of key indicators as well as inquiries into alternative ways of social coordination.

In the following section we will sketch the role of key indicators as epistemic devices that compete in shaping future expectations in society.

3. Key Indicators and the Politics of Expectations

The future is essentially uncertain, yet political actors have to create expectations about the future in order to make plans and to take collectively binding decisions. While rational choice theories assume that the essential uncertainty of the future can be transformed into calculable risk, Jens Beckert (2016; Beckert and Bronk 2018) has recently proposed conceptualising expectations as fictional in the sense that those who rely on them treat them as if they were certain to become reality, but essentially they are only claims on the future. The fictionality of expectations creates an incentive for actors to try to influence the expectations of others by creating credible accounts of future states of the world. We propose that indicators are crucial epistemic devices in the "politics of expectations" that facilitate formal and calculable conceptions of uncertain futures (Beckert 2016, 79-85). In order to elaborate on how key

indicators evoke images and narratives of the future, we differentiate between a factual, a social, and a temporal dimension of indicators (Luhmann [1984] 2005, 59-102). We will first explain these three dimensions and consequently show how they are related to particular politics of expectations.

The *factual dimension* of indicators can be conceived as the relationship they establish with their external referent. This relationship can be established within a descriptive, causal, or normative framework. Descriptive cognitive frameworks of indicators are often chosen for a rather pragmatic reason, such as data availability. In such a descriptive cognitive framework, valuations are not absent, for counting is an assignment of value, however they remain implicit rather than being explicitly articulated. Information about objects of interest is recorded and compared in a social (cross-sectional) or in an ipsative (longitudinal) descriptive framework or a combination of both. A social descriptive framework means that similar units are compared at one point in time, while an ipsative descriptive framework means that the same social unit is compared to itself at different points in time. Sometimes such a purely descriptive approach is seen as a preliminary stage in the development process of an indicator system whose ultimate aim is to develop a more analytical or normative concept (e.g. Döbert 2007, 17). However, the systematic description of standardised features transforms the object itself by expressing its hitherto hidden serial characteristics (Didier 2007). Percentages are a simple but historically crucial technique of descriptive statistics that enable the comparison of different units (Prévost and Beaud 2012, 9-26). When indicators operationalise more complex phenomena, explicit concepts aid interpretation by establishing an epistemic object and relating the phenomena of interest to the chosen indicators (Lehtonen 2015, 78). Explicit concepts are needed when indicator development aims to draw a descriptive or causal inference about a phenomenon (Stinchcombe and Wendt 1975). Conceptual ambivalence within descriptive or causal models can be a threat to indicator validity as they create an exploitable space for the influence of cultural repertoires of interpretation and political interests in the quantification process (Mayntz 2017). In a normative cognitive framework, changes in an indicator's direction have a clear interpretation in terms of their desirability. While there are many indicators in which the desirability of the direction of change seems to be clear, this impression might nevertheless be challenged by disputes and critique: To what extent is a growth in GDP really desirable (Fioramonti 2017)? For whom is it desirable? However, the desirability of the direction of change becomes objectified when political targets are explicitly set in a numerical form, such as in (organisational) performance measurement (Carter, Klein, and Day 1992; Lewis 2017; Le Galès 2018) or in target-driven public policy (Hodson and Maher 2001; Bruno, Jany-Catrice, and Touchelay 2016; Boswell 2018). While quantitative measurement is not the only form of valuation and evaluation, its growing importance in current society is rarely disputed (Lamont 2012). Numerical targets may be set in positive or

in negative terms (prescriptive vs. proscriptive indicators), with proscriptive indicators having received less attention than their prescriptive counterparts (Carter, Klein, and Day 1992). Hence, with respect to the factual dimension of indicators, we summarise that indicators might be purely descriptive, integrated into a causal model, and/or become part of an explicit normative framework of directed social change. While the underlying cognitive frameworks could be seen as hierarchically ordered stages, with the higher stages requiring a full establishment of the lower ones, such an interpretation might be too strong. University rankings, for example, can be regarded as being descriptive indicators that are interpreted in a normative way, although it is not at all clear what a particular ranking position means in a causal model of the processes of higher education learning and research (Mayntz 2017). Therefore, the underlying concept of an indicator is not part of its inherent features but can only be inferred from typical patterns of interpretation and use.

The *social dimension* of indicators is based on categorical distinctions and might become relevant for the construction of social identities. The generated categories might be clear-cut or relatively ambiguous, such as when they are based on hybrid categories or indicate continuous properties. The social dimension of indicators is inscribed into the way it measures object properties and in the way it defines units of analysis. First, properties of interest of an object might be measured on a nominal scale according to social categories: gender, race, or ethnicity are typical sociodemographic examples. Second, the properties of interest might be measured on a higher scale (ordinal, interval, ratio) but are attributed to (individual or collective) social actors. When the population of a political territory is counted, for example, the resulting indicator is on a ratio scale because it has a "true" zero point. The social dimension in UN population statistics, for example, results from the fact that, in order to include persons and territories, they have to be defined as objects and/or political units of interest (Heintz 2012). Hence, UN statistics contribute to the constitution of the modern individual as being endowed with equal human rights and the nation state as a legitimate actor in international relations. While it is debatable whether space constitutes a separate dimension of meaning (Stichweh 1998, 2008), the territorial demarcation of space in politics is a clear marker of social inclusion/exclusion – brought into question by migration (Bommes 1999). Furthermore, the social dimension of territorial indicators is evident when their application becomes the basis for assigning responsibility to governments for taking action and for holding them accountable. Reports on fine particle pollution in cities, for example, assign the responsibility for reducing excessive values to the local government (Haus and Zimmermann 2007). In these cases, the territorialisation of a spatial distribution constitutes a political actor as a social addressee. Obviously, the social dimension of indicators can offer multiple opportunities for identification: e.g. when the labour market integration of foreign nationals in East Germany is higher than in West Germany (Winkler

2019), both the distinctions foreigners/natives *and* East/West Germany can be reinforced in further practices. The introduction of new categories of classification, such as the US census category "Hispanics", can change patterns of identification (Mora 2014). Counting the members of a group makes them "visible" (Brighenti 2017). Similarly, it can be assumed that avoiding the application of existing social classifications during the production of indicators, such as the dichotomous black-white distinction in the US census (Prewitt 2013), might contribute to a blurring of social boundaries (Telles and Paschel 2014) but also to a neglect of social problems relating to particular subgroups (Simon 2015). Similarly, problems of exclusion appear when there is a lack of data on certain populations with increased health risks (Davis 2017). Processes of social identity formation based on categorisation and quantification are not restricted to individuals but can also be observed among organisations (Kennedy 2008; Wheaton and Carroll 2017; Tyllström, Granqvist, and Durand 2017) and political territories (Heintz 2012). Overall, it can be assumed that ascribed properties are more prone to forming social identity than achieved properties.

Finally, the *temporal dimension* of indicators captures whether indicators measure past developments or whether they project future developments. Descriptive indicators are very often retrospective time series which implicitly assume that these developments will continue on into the future. An example of this would be school results where parents extrapolate their children's labour market chances from their results on large-scale standardised assessment tests (Peetz 2014, 161-67). If they are used in causal models, the implicit assumption is that the measured variables and their relationship will remain relevant in the future. Future projections explicitly aim to account for the contingency of the future by formulating assumptions about possible future developments. This contingency can be further highlighted through the explication of different possible scenarios such as in the population projections of statistical agencies (c.f. Anson, Bartl, and Kulczycki 2019, 5). While the projections themselves still retain the fundamental contingency of the future, social actors seemingly reduce this contingency through fictional expectations as if a particular scenario will come true. This reduction is essential for education planning, for example (Jones 1975; Magrini et al. 2011). While, in oversimplified conceptions, planning processes could be conceived as a unilateral action within a hierarchical governance setting, fictional expectations and the politics surrounding it are also essential for other governance settings such as markets (Reichmann 2018). As Beckert notes for capitalist dynamics:

> If resources for innovation are allocated based on promissory stories whose future success is uncertain, then actors will inevitably contest not just the distribution of these resources, but also the imaginaries surrounding innovations (Beckert 2016, 184).

However, there is a crucial tension between the competition for credible imaginaries and the emphasis on consensus building inherent in instruments of imag-

ination and foresight (Andersson 2017, 310). Recently, there seems to be an increasing relevance of prospective indicators across governance modes. Such a shift towards an explicit articulation of future expectations is obvious, for example, in inflation targeting (Bernanke and Mishkin 1997; Braun 2018). Nowadays, central banks assume that an inflation rate of around two per cent will support stable economic growth. They announce their inflation target, as well as policy measures that aim to achieve it, in order to influence the inflation expectations of other economic actors. Other examples are policy targets that are formulated in quantitative terms and progress that is measured by politically defined indicators as in the global governance of sustainable development (United Nations 2016). In other fields, such as innovation policy in nanotechnology, it has proven notoriously difficult to make quantitative projections about future developments. While there have been quantitative analyses of patents (Heinze 2004) and of the creativity of scientists in this field (Heinze and Bauer 2014), these approaches have not been used to make projections about future developments. Interestingly, existing attempts to develop quantitative projections (Palmberg, Dernis, and Miguet 2009; Papilloud 2010) increasingly have to compete with what has been termed "qualitative indicators", i.e. expert judgements about future developments in the field of nanomedicine (Gouze and Boisseau 2013). Although, these qualitative indicators are not quantified and hence not indicators in the sense of the definition used in this introduction, they are nevertheless devices used to shape expectations about the future. It is especially striking that this qualitative judgement device appears with a disguise ("indicator") that is typically associated with quantification. Apparently, this camouflage strategy aims at capturing the aura of objectivity attached to indicators while retaining the flexible case logic of expert judgement. A similar phenomenon of disguise is revealed by ethnographic studies on the production of economic forecasting: what appears to be a purely mathematical practice is in reality embedded in a discursive process of judgement and interpretation (Beckert 2016, 232; Reichmann 2018). In many cases the use of future-oriented target indicators is intended to mobilise collective action, such as investment by private and public actors. In other cases, future projections aim to mobilise disinvestment, such as in fossil fuel reduction (Ayling and Gunningham 2017), outdated technology (Knopf et al. 2010; Ward et al. 2017) or overcapacities in public schools (Bartl and Sackmann 2016). However, critics of future projections that indicate seemingly inevitable developments, such as negative demographic growth, argue that these projections will likely demotivate genuine political debate by suggesting overwhelming factual constraints (Barlösius 2007; Sackmann and Bartl 2008; Messerschmidt 2014). In urban development strategies, projections of growing population numbers are automatically translated into a requirement to build new housing (Brorström 2018, 22). Yet, in many cases, future projections are used in public to prevent their imagined content from becoming real (Lau and Beck 1989, 143).

In order to present an example of how the three dimensions of indicators interact in shaping imaginations and narratives of the future, we will take a brief look at the history of population statistics, which have become one of the most important key indicators of modern state governance. When observing the historical genesis and use of population indicators, it appears that their social dimension is more important than their factual and temporal dimensions as long as they are only descriptive and retrospective indicators. Population statistics ascribe a population of relevant social groups to a particular territory. Through quantification, the counting authority accumulates power knowledge and renders the epistemic object governable. Hence, by including and identifying certain groups, population indicators express social identities and social relationships. The census or register-based enumerations of populations are probably the oldest and most well-known examples of the production of indicators which, in their most rudimentary form, date back to Babylonian times around 4500 B.C. (Ventresca 1995, 26; c.f. United Nations 1969, 1). For a long time population counts were highly selective (e.g. only free men were included) and purpose-specific; a more inclusive definition of the population was only gradually established through transitional census activities at the turn of the 18th and 19th centuries. During the 19th century, the idea emerged that all individuals should be categorised and counted as members of national "imagined communities", which is constitutive of the modern census (Ventresca 1995, 40-45; Anderson [1983] 2006, 168-69).[6] Since then, statistics on population, territory and the economy have been designed more and more systematically by western bureaucracies (Desrosières [1993] 2005). Although the formation of informational capital has sometimes been contested (Loveman 2005), it has become fundamental to the organisation of state administration in general and to the structure of individual policy fields – not forgetting the administration of genocide, e.g. in Nazi Germany (Mackensen, Reulecke, and Ehmer 2009; Kühl 2014).

As long as population indicators are used in a retrospective and descriptive framework, it is their social dimension, the creation of identities, and the description of social relations that seem to be most salient. However, the stabilising effect of population indicators is diminished when they are projected into the future. First, projections have to make assumptions about causal relationships (the simplest one being a linear extrapolation of past trends) and second, they focus on change indicators rather than stock indicators. Apart from advances in science, several historical developments have contributed to the increasing relevance of technologies of foresight. The incipient establishment of the welfare state in Europe in the late 19th century, the economic crisis of

[6] Another strategy of counting populations is the establishment of population registers. "The earliest population registers in Europe were the parish registers of Sweden and Finland, which originated during the seventeenth century" (United Nations 1969, 1-2).

the 1930s, nascent environmental debates from the 1920s onwards, and the perceived threat of a nuclear attack during the cold war lead to the increasing use of technologies of foresight as part of modern state governance in fields such as social security, economic policy, the environment, and national security (Lengwiler 2010; Andersson 2017). Population indicators have been crucial variables in these technologies of foresight since natural demographic change is supposed to be highly predictable. Critics of demographic projections either see other variables – such as economic growth and redistribution – as more important in shaping the future of modern society or they emphasise that the projections themselves are inherently uncertain – e.g. because of unpredictable shifts in migration flows (Nullmeier and Wrobel 2005; Schultz 2015, 2018).

But demographic projections are obviously just one device used in the politics of expectations and more devices are still waiting to be explored by further research on this topic. In the following section we will give an overview of theoretical approaches towards the empirical analysis of the genesis and use of indicators in modern society.

4. Approaches for Analysing the Genesis and Use of Indicators in Politics

The objective of utilization (in politics) has been claimed as a defining feature of indicators (Lehtonen 2015, 78; Espeland 2015). At the same time this aim is very often not achieved or at least not in the intended way. Against this contradictory backdrop, how can we systematically describe and explain the use of indicators in politics? How can we explain that some indicators are not only used regularly and collectively but have become key indicators in the sense that they structure entire social or policy fields? Our impression is that the – very often contentious – processes through which indicators become institutionalized as key elements of policy formulation and implementation are still poorly understood:

> Research and development work in the area has hitherto overwhelmingly concentrated on improving the technical quality of indicators, while the fate of indicators in policymaking and the associated sociopolitical aspects have attracted little attention (Lehtonen 2015, 77).

Therefore, in this section we would like to scrutinise which theoretical approaches would allow the formulation of some propositions about the use of indicators in politics.

4.1 Diachronic Approaches

The use of numbers in state governance was among the earliest topics touched upon in the nascent field of quantification studies. In this subsection we present

approaches towards analysing the genesis and use of numbers in politics whose primary foci complement each other and which share a historical perspective, emphasising complex interdependencies and contingent developments.

The work of Michel Foucault shows how increasingly quantified knowledge has become a constitutive element of liberal state governance (Rose 1991). In his analysis of the history of governmentality he identified various technologies of power that dominated different historical periods; in the most recent, the governmentality of security, the production of knowledge and hence (official) statistics become crucial for governing modern society (Foucault [2004] 2006b).[7] Instead of only regarding the population as a multitude of legal persons who are the object of state domination, the 18th century witnessed the emergence of the notion that the population possesses its own "nature" and is a productive force in the political economy. Based on the latter notion of the population, the security dispositive focuses on the statistical observation of regularities in the economy and aims to examine the liberal government of risks, which requires systematic calculation based on statistics. Liberal policies of agricultural production were first implemented in England in the late 17th century, allowing for the market-based establishment of wheat prices with the possibility of exports and tariffs on wheat imports as security mechanisms. The liberal thinking of the French Physiocrats integrated the experience of the English experiment into a political economy of strategical *laissez faire* in which the population became a productive element. The German Ordo-liberals and the US Anarcho-liberals were two waves of economic thought that voiced critique against what they perceived to be "too much government". They strived to revive liberalism which had lost its influence during the turbulent first decades of the 20th century (Foucault [2004] 2006a, 442). The Ordo-liberals were informed by Weber and Husserl and conceptualised the market as an ideal-type that can only be approximated by reality. In this – mainly macro-economic – framework, the social and legal preconditions of the market must be actively prepared by the state for the market to function. In contrast, US neo-liberalism analyses different fields of society as if they followed the micro-economic rationality of the *homo economicus* and assigns the state the task of actively propagating the extension of market rationality, e.g. by creating quasi-markets (Glennerster 1991; Le Grand 1991; c.f. Rose and Miller 1992, 198-201) in order to maximise human capital and hence innovation. However, while Foucault analysed the discursive context in which the use of numbers for govern-

[7] What he describes is the hegemony of a legal-juridical mechanism that had been installed since the middle ages and the hegemony of a disciplinary mechanism from the 17th and 18th centuries which was paralleled by a security mechanism from the 18th and 19th centuries. While legal-juridical governmentality mainly linked forbidden behaviour to particular punishments, disciplinary governmentality put in place technologies of surveillance and intervention with the aim of changing the behaviour of 'deviant' individuals.

ance purposes became crucial, he did not study the production and use of numbers themselves. Complementary to Foucault, Ian Hacking (1990) analysed the bureaucratic supply side that came to produce "an avalanche of numbers" penetrating many social fields. According to Hacking, the development of the notion of the indeterminacy of the future, which is a crucial element in Foucault's security dispositive, depended as much on scientific innovation as on demands stemming from the industrial revolution and the development of statistical bureaus for practical state purposes. The practice of the modern census, for example, was first established in the colonies in the 16th century, and only used in the colonising countries themselves from the 18th century onwards to govern populations (Hacking 1990, 17; cf. Kalpagam 2014; Duminy 2017).

While Foucault and Hacking emphasise the strategic production and use of indicators by the state, other authors have argued that political numbers are not only a constitutive feature of democratic rule but that they also affect the governing as much as the governed (Rose 1999; Porter 1995). The space for individual discretion and "irrational politics" is diminished when "statistical rules" are implemented (Starr 1987; Prewitt 1987). In the context of public administration, key indicators work as catalysers, stop rules, and distributive allocation criteria within formalised procedures. This rationalising potential of numbers as a particular form of democratic rule was also emphasised by Theodore Porter (1995); he makes the point that the increasing production and use of numbers in modern society responds to a demand for more "mechanical objectivity". Objectivity in the philosophy of science should ideally mean the acquaintance with objects as they "really are"; but since that knowledge is basically unattainable, a consensus within a group of specialists is usually seen as sufficient for "disciplinary objectivity" (Porter 1995, 3). Objectivity is not only a scientific category but also relevant in moral and political discourse, usually indicating fairness and impartiality. The credibility of courts, for example, depends on the ability to elude charges of prejudice or personal interest that distort a judgement – and they do so through distributed decision-making and following the rule of law (Porter 1995, 4). But while judges were able to maintain significant autonomy in the face of demands for more mechanical objectivity, the discretionary space for expert judgement has been reduced more in weaker professions and groups of experts.[8] The problem of separating knowledge from its local context emerges not only in science but also in political and economic spheres (Porter 1995, 4-5). External demand for more "mechanical objectivity" stems from greater independence of people across large

[8] An example of how expert judgement unfolds its authority in public administration is note-writing (Mangset and Asdal 2018). The recording of information in written notes and the procedural evaluation of such notes within the practical life of bureaucratic hierarchies constitute a key form of expertise that yields authority. Another stronghold of expert judgement is peer review in academia (Hirschauer 2019).

(social and geographical) distances on the one hand, and the institutionalisation of the rule of law on the other. However, mechanical objectivity can never be fully mechanical because there always remains some ambiguity that cannot be resolved without some expertise despite all attempts of quantification according to strict methodological rules. Hence, it is very often expertise backed by mechanical objectivity that is resorted to in order to make authoritative public claims or to regain public trust (Boswell 2018). More generally speaking, democratic governance based on quantification and a related public discourse requires a certain numeracy of the population and of the bureaucracy itself (Cohen 1982; Emigh 2002). These competences undergo collective learning processes (Lampland 2010; Bartl and Sackmann 2016) which are hampered under authoritarian rule because official statistics are very often not made public but remain part of politicised bureaucratic procedures (e.g. Lippe 1999).

A similar point about the centrality of official statistics for democratic governance has been made from the point of view of the sociology of conventions. From his comparative history of academic and official statistics, Alain Desrosières concluded that official statistics form cognitive objects that function as reference points in democratic public debates (Desrosières [1993] 2005). He regarded public access to official statistics as a crucial feature of democratic governance which also led him to prefer the term *public* over *official* statistics (Diaz-Bone 2018, 355). Quantification processes resulting in public statistics require the establishment of conventions of equivalence (Desrosières 2016, 184). Desrosières conceptualised the genesis and use of statistical conventions as the result of a co-construction between state, market and society, and statistical practices resulting from the indeterminate circularity of knowledge and action (Desrosières 2005 [1993], 274-77). In this dynamic view, statistical objects interactively shape action and vice versa, i.e. the objects of knowledge as well as political programmes change according to pragmatic requirements of coordination. Following this idea of a dynamic co-construction, he elaborated a typology of corresponding historical forms of statistics and state intervention (Desrosières 2003, 2011). These forms should be understood as Weberian ideal types, as empirically they co-exist in history and may also conflict with each other. One possible source of conflict results from the process of quantification itself, which is organised in a highly specialised division of labour: the "statistical chain" (Diaz-Bone and Didier 2016, 16). Far from being entirely consistent across the statistical chain, different methods of quantification can produce conflicts of compatibility (Desrosières 2007).[9] Such conflicts of compatibility are especially salient with regard to international comparisons (Cussó 2016). Conversely, the harmonisation of methods (not

[9] In constellations of valuation – such as a statistical chain – potential conflicts are usually mediated by transsituational criteria of evaluation and material infrastructures (Meier, Peetz, and Waibel 2016, 313).

only of results), which is at stake when it comes to international comparisons, especially reinforced within the EU and OECD, would create an equivalence space that reaches beyond national conventions of quantification (Diaz-Bone 2018, 351-54; Åkerman, Auranen, and Valkeasuo 2018; Alastalo 2018). Compared to Foucault's analysis of dispositives, Desrosières' account of statistical conventions focuses more on the quantification process itself. It appears to be historically more nuanced since it pays more attention to the variability of ideal types of quantification-intervention co-constructions.[10]

These historical perspectives do not lend themselves easily to formulating expectations about the use of numbers in politics. What could be proposed is that the state, as an archetype of centralised decision-making, will generate indicators within administrative routines and strategically use these statistics in order to strengthen its position in society. Furthermore, it can be concluded that weak experts, e.g. those in disagreement, are more prone to back their authority with mechanical objectivity than stronger expert communities that agree on a specific subject matter. Finally, all of the approaches described above point towards temporal dynamics: typical constellations of quantification and (political) action as well as processes of collective learning.

4.2 Synchronic Approaches

Distinguishing between diachronic and synchronic approaches towards the genesis and use of indicators might suggest that the latter have a rather static view of their subject. While such a reading would be misleading, we use the term synchronic for those approaches that focus mainly on contemporary society and place their focus on a potential gap between the genesis and use of indicators. Such a gap has variously been observed when indicators are explicitly designed to influence policy but are perceived to fail in doing so (Lehtonen 2015, 88). Furthermore, our distinction between indicators and key indicators similarly reflects a potential hiatus between the genesis and widespread use of indicators. Such a hiatus is especially visible in the indicators developed since the late 1960s in the framework of the "social reporting movement" (Duncan 1969, 13) but also for more recent environmental (Hezri 2005) and performance indicators (Mike and Balás 2015; Henman 2018). Building on a case study of the use of local sustainability indicators, it has been critically argued that neo-Foucauldian tendencies that emphasise the power effects of governance tools and downplay problems of their application should be rebalanced by more nuanced accounts of how these tools enable resistance and agency (Rydin 2007, 621). In a similar vein, Rose and Miller (1992, 190) pointed to the potentially unexpected outcomes of seemingly perfectly designed governance tools

[10] The earlier work of Foucault (2005, 183) even assumed that only one episteme was present in a particular historical period.

resulting from inconsistencies with other bureaucratic routines. The remainder of this subsection will be devoted to approaches identifying determinants of the institutionalisation process of (potential) key indicators that lead to their effective use or non-use.

The intention of influencing public policy which, already at the stage of their conceptualisation, is crucial for many indicators, is present for example in a classical definition of social indicators. It states that they are statistical time series "…used to monitor the social system, helping to identify changes and to guide intervention to alter the course of social change" (Ferriss 1988, 601). Such an instrumental approach toward social change had and, to some extent, continues to have significant appeal; however, it also contains problematic and somewhat unrealistic implications: First, it implies that if politics were guided by objective, quantified knowledge, this would be more rational than politics that only has subjective arguments and speculative claims. Furthermore, if policy-makers were equipped with clear-cut problem definitions and demanded quantitative information, these demands could be met by indicator research. While, to our knowledge, there is no scientific theory that explicitly proposes a simple and direct connection between the development of indicators and their use in politics, it has variously been claimed that the practice of indicator research – which focuses almost exclusively on methodological aspects – implicitly displays such an assumption, at least as a lay theory (Boulanger 2007, 16-17).

In order to examine more in-depth the problem of indicator use in politics, a differentiation has been made between the production and the utilisation processes of indicators (Lehtonen 2015). The distinction between these two stages in the life-cycle of indicators emphasises that the two might involve different social fields with different sets of actors which could inhibit the intended use of indicators in politics. For example, indicators might be produced either inside state administrations or outside, such as in relatively autonomous research institutions or civil society organisations. Furthermore, indicators might remain peripheral to the policy cycle or become a central part of collectively binding decision-making and implementation.

However, only few papers have addressed the potential gap between the genesis and use of indicators in such a way as to enable expectations to be formulated with regard to empirical research. Richard Rose (1972), for example, addressed the potential use of social indicators in public policy from a bounded rationality perspective. Following March and Simon (1993), he starts from the assumption that indicators are not in competition with other potential sources of information but instead with the existing sources of information regarded as satisfactory by office holders. From this perspective, one precondition for the use of new information is that it matches the cognitive concepts in use: "What the policy-maker needs is help, i.e. information that can be related to the concepts that he uses; anything else, even if cognized, is no more than

'indigestible facts'" (Rose 1972, 123). Therefore, he proposes that indicators be used only if they refer to information that signifies something meaningful in terms of the cognitive and normative concepts used by policy-makers. He argues that several "costs" might inhibit the use of indicators, such as those of producing and consuming them, value conflicts arising from politically salient topics, costs of action resulting from the resistance of interest groups benefitting from the status quo as well as costs of inaction, such as media attention and external pressure (Rose 1972, 124-6). Hence, the "costs" of indicator use are partially determined by the design of the indicator itself and partially by its social circumstances. On the other hand, the potential utility of a new metric cannot be evaluated based on present data. Instead its utility, which could outweigh related costs, remains a claim on the future. Therefore, there is an expected tendency towards established information practices (Rose 1972).

A middle ground between the somewhat unrealistic expectation of a direct instrumental use of indicators in politics and a fairly pessimistic prediction of non-use of new indicators in politics can be found in utilisation research and in science studies. Since indicators are often developed by academics or by experts working in relatively autonomous research units of public administration, it has been suggested that a broader perspective be taken and that approaches be considered which describe not only the use of numbers but the use of scientific knowledge in politics more generally (Beck and Bonß 1984). The literature on knowledge utilisation has proposed several concepts of use (for an overview see: Gudmundsson et al. 2009, 38-55). A classic definition lists six forms of use that are ordered in a (normatively) hierarchical way: a) reception by policy-makers, b) cognition, c) change in reference framework, d) effort for adoption, e) adoption in policy decisions, f) implementation of policy, g) achievement of desired impact for citizens (Knott and Wildavsky 1980). With each step a (normatively) more significant form of utilisation is achieved. It is evident that this enumeration corresponds to a popular input-output model of policy-making. As far as it is useful to follow such a model, we think it would be fruitful to clearly distinguish forms of utilisation (a-f) from their impact (g).

A crucial finding in knowledge use research has been that there is no direct relationship between individual scientific results and particular policy decisions. Rather, it was observed that a critical mass of research in a particular direction can indeed influence the policy agenda and catalyse conceptual changes in policy-making (Weiss 1977). The diffusion of scientific knowledge through mass media is an important channel of information for policy-makers (Weiss 1979, 429). The diffusion of scientific knowledge through intermediary channels does not leave research findings unchanged but instead "trivialises" them (Beck and Bonß 1984, 384). Indeed, scientific knowledge becomes effective by losing its scientific identity and becoming part of the mundane common sense of the audience. While research on the use of scientific knowledge has not focused explicitly on the role of indicators, some authors in this line of

inquiry saw a great potential for establishing shared problem definitions through the provision of merely descriptive data (Lau 1989, 398). According to Lau, it is precisely the expertise necessary to choose between methods and the tacit knowledge required to implement quantitative methods effectively which provides a source for professional authority (cf. Porter 1995, 7). Applied to indicators, one could expect that periodical publication and interpretation of indicators, as well as their systematic integration, would increase the probability of them being used in politics or influencing the policy agenda. While the aspiration of influencing policy decisions was largely disappointed, it is recognised however that indicators influence the policy cycle most notably during the stages of agenda setting and problem definition (Innes [1990] 2004; Boulanger 2007). One strategy of overcoming the perceived gap between the production and use of indicators has been their participatory development (Innes 1998).

In important foundational texts, Actor-Network Theory (ANT) was not directly concerned with the use of indicators in politics but with the production and utilisation of scientific facts (Callon 1984; Latour 1986, 1987). Nevertheless, the authors suggested that the observed processes are of more general relevance. The problem of scientific claims is their hostile environment and the irreducible potential of refuting others.[11] Therefore scientists build up long chains of material and symbolic evidence, ultimately brought together in a scientific publication. A crucial element in summarising and "solidifying" research findings are numbers that are laboriously compiled throughout the research process, allowing for calculation across large spatial and social distances and for visualising evidence. Nevertheless, the attempt to build up persuasive power may still fail and later research may attack previously established facts by enlisting more allies in its network. Hence, in this account, numbers are inscription devices, elements that can travel across time and space without being changed (Latour 1986). However, the stability that they lend to scientific facts is only temporal. The process of interesting allies and audiences is conceptualised as a constant translation of interests that very often entails a transformation of the scientific objects themselves. That is why Latour (1987) argues for a model of translation rather than a model of diffusion of innovations. Slightly modifying the ANT model of translation, Star and Griesemer (1989) have argued that the problem of translating the interests of others in one's own language only requires a consensus between "boundary objects", not between the different groups. When cooperation occurs across heterogeneous social worlds, only an exchange of information is necessary, while the autonomy of these social worlds can be maintained. The parties willing to cooperate

[11] Bettina Heintz (2007) identifies a similar problem following Luhmann's theory of communication. According to the different features of language and numbers as media of communication, numbers seem better suited for overcoming the uncertainty of dissent.

develop an interest in boundary objects that are situated between their worlds. While communication across field boundaries accentuates the general properties of a boundary object, its specific aspects are crucial when used locally (Star 2010). Hence, boundary objects fit both general and specific purposes. This more general observation has been discussed with regard to the development and use of indicators as well (Bauler 2012; Turnhout 2009). However, taking into account the concept of Callon and Latour regarding the stability of objects as a constant struggle, it becomes clear that this ability to travel between social spheres is more an unstable achievement of significant investments than an inherent quality of objects (cf. Bauler 2012; Turnhout 2009).[12] When crucial allies leave the agencement of the network, the scientific project loses its usefulness (Callon 1984). On the other hand, if many actors have an interest in using an indicator, they will fight to keep it (Innes [1990] 2004).

This brief overview of central analytical approaches to the genesis and use of indicators yields the following results: Diachronic approaches conceptualise the genesis and use of indicators as a historically contingent process and therefore do not lend themselves easily to deriving analytical hypotheses. Governmentality studies suggest that public officials generate indicators strategically for instrumental and rhetoric purposes – according to Porter, especially when trust in their expertise is questioned. In these accounts the use of indicators seems to follow their genesis quite naturally. Synchronic approaches, on the other hand, emphasise that the institutionalisation and use of indicators very often fail – indicators designed to influence a particular policy field fail to do so in a direct sense. Research on knowledge utilisation suggests that they could gain conceptual influence through the intermediation of mass media. Latour and Callon would argue that the likelihood that an indicator is used in politics increases if it manages to translate political interests into the language of science and builds up consistent chains of reference: facts that seem to speak for themselves. However, creating such boundary objects requires many investments and is a highly risky endeavour.

Some twenty years ago Theodore Porter bemoaned that:

> The growing role of quantitative expertise in the making of public decisions is a development well known to scholars. Yet we have no satisfactory histories of it (Porter 1995, 6).

Today we have more histories of the role of indicators in politics; yet, we still lack sufficiently systematic accounts that would allow the diversity of results reflected by these histories to be integrated. On the one hand, many of the empirical contributions to this special issue further increase the diversity of existing results. On the other hand, some contributions are more conceptual in

[12] Callon (1984) parallels the process of "interessement" to the concept of "investment in forms" (Thévenot 1984).

nature and nurture the expectation that more integrated narratives are not completely out of reach.

5. The Papers in this Special Issue of HSR

The contributions to this special issue fit more or less into three categories: a) theoretical approaches to analysing the use of indicators in politics; b) studies of the genesis and use of key indicators in exemplary policy fields (economic policy, social and health policy, science and education policy); and c) alternative indicators.

In the first section on theoretical approaches to analysing the use of indicators, *Laurent Thévenot* proposes a clarification and revaluation of the meaning of "measure" as it has been used in the tradition of Alain Desrosières. He distinguishes between three meanings of measure, the first one being quantification, the second one being a balancing of a plurality of valuations and the third one being indicators. Reflecting on these three meanings of measure, Thévenot contrasts their use in national statistics, and shows a shift in governing by numbers, introduced by the digitisation of quantification and measurement that, accordingly to Thévenot, is mainly used today to track individuals.

Rainer Diaz-Bone pulls together the critical contributions of French theory on quantification (Alain Desrosière), French critical pragmatism (Luc Boltanski and Laurent Thévenot), and the microphysics of power developed by Michel Foucault. He proposes that statistics be understood as a means of control similar to what Foucault has called "panopticism" (Foucault 1995). He recalls the current importance of numerical data as a core element of social control, where numerical data are used to create a "statistical panopticism" as a new and powerful governance form in our societies.

The paper by *Timo Walter* picks up the temporal dimension of indicators by reflecting on the preconditions that enable central banks to engage in expectation management. Since the 1980s, central banks around the world have transformed their monetary policy from a "hydraulic" manipulation of money aggregates into the direct coordination of the expectations of market actors in order to control inflation. Focusing on the US Federal Reserve's prototype development of inflation targeting, this paper argues that under conditions of fundamental uncertainty that defy rational calculation, the formation of expectations inextricably depends on prior processes of formalisation. The reductionism involved in these processes might, in turn, decrease the overall effectiveness of the monetary policy. Therefore, Walter concludes that there is a need for a closer examination of how formal and informal modes of central bank coordination are mutually interdependent and what that means for their consequences.

At the intersection of political sociology and organisation studies, *Ingo Bode's* contribution inspects the role of numbers and quantification methods in public services at both an intraorganisational and a sectorial level. Theoretically reflecting empirical findings from several empirical studies, he argues that public services have been affected by a blurring of boundaries towards the capitalistic economy, whose use of numbers and indicators is the symptom. This process puts considerable stress on the agents and organisations involved. It aims to achieve a kind of "perfect service" where quantified techniques enable the rationalisation of management techniques, as Bode shows in the German case of human service provision.

In the second section of this volume dealing with the genesis of indicators in exemplary policy fields, *John Berten* historically reconstructs how, since the 1920s and 1930s, the *International Survey of Social Services* has produced methods of quantification of social security schemes worldwide in order to compare them. This historical analysis shows how difficult it was for the *Survey* to create a grounded comparison on a global scale, as well as the several methods which have been mobilised in order to attain this goal over the years.

Oscar Javier Maldonado and *Tiago Moreira* explore the historical genesis and use of standards and metrics in global health, and in particular the *Disability Adjusted Life Year* (DALY) indicator. The aim of introducing health metrics is to produce equity across populations worldwide through the comparison of health policies and practices across political territories. While the authors acknowledge that neo-liberal discourse supports such a global health policy, they also show that this kind of reasoning does not entirely capture the controversies and uncertainties around the DALY, which strives to dovetail measurements of health with normative ideals.

Michael Huber and *Maarten Hillebrandt* describe the development and use of new quantitative indicators in the German higher education system since the 1990s, being part of managerialistic performance-oriented resource allocations. In contrast to traditional cameralistic ways of using numbers - mostly in a retrospective fashion - these new indicators clearly engage in a politics of expectations by setting numerical performance targets and evaluating progress. Huber and Hillebrandt regard these indicators, combined with global budgeting, to be at the root of a shift, transforming universities, once considered to be overly rigid public bureaucracies, into adaptable organisations learning on the basis of quantified information. Central university bodies increasingly act in a strategic way by creating internal resource competition among their faculties and investing in promised achievements – usually backed by proof of past performance.

Also analysing the social life of indicators in recent public management reforms, *Lisa Knoll* and *Konstanze Senge* show the complex challenges related to the genesis of valid indicators of public debt in Europe. This process is strongly supported by the *European Commission*, which hopes to induce governments

to optimise their debt levels, and at the same time to find creative solutions at both levels of accounting and financing public services. They describe two models used by governments to attain this goal. The first is committed to accurate and impartial identification of national debt levels, and the second aims at a more efficient management of public debt via public-private partnerships.

Carlotta Mozzana investigates the use of indicators in the frame of the allocation of money to young people gaining their first professional experience in Italy. Numbers and indicators were systematised in an Italian national programme entitled *Youth Guarantee* and launched in 2013. This programme uses a profiling system to assess which young people could benefit from access to financial support in order to fill gaps in young people's educational and professional experience. The expectations nurtured by this assessment form the operational base for an investive social policy.

In times marked by increasing quantification, the survival of school inspectorates, a government technique based on direct observation and expert judgement dating back to the 19th century, may seem surprising (Clarke 2014). Against this backdrop, *Anne Piezunka's* paper explores the strategies of German school inspectors who try to maintain their external evaluations as an institution in the face of – in international comparison – relatively powerful teaching professions and school heads. Piezunka identifies two typical strategies: While their practice is based on a mix of standardised indicators and expert authority, school inspectors refrain from making very explicit evaluative judgements and focus on "mere" description. Furthermore, school inspectors give school representatives a greater say in formulating expectations for future school development. Playing down the potential control function of external evaluations, school inspectors use their indicators to catalyse deliberative interaction with school representatives as equal partners.

Falling into the third category of alternative indicators, *Philipp Lepenies* uses a historical approach to analyse how national governments have embarked on an OECD-driven endeavour of developing national alternative measures of well-being "beyond GDP". This project relates to a participatory process aiming to create new indicators able to renew the definition of progress in the 21st century. Lepenies underlines the revolutionary character of this aspiration. At the same time, he shows that many initiatives do not live up to their expectations. This has to do with the manner in which they were executed, with the political unwillingness to really consider alternatives to GDP and to allow broad participation. But it might also demonstrate that the expectations regarding the power of indicators to guide policies could be exaggerated.

Dynamic Stochastic General Equilibrium (DGSE) models, the dominant approach in recent decades for modelling the economy, have come under severe critique since the financial crisis (Haldane 2018). In response to this critique, *Oliver Holtemöller* and *Christoph Schult* compare the forecasting performance of DGSE models and their extended versions, taking alternative expectation

formation assumptions and financial frictions into account. The authors show that neither alternative expectation formation behaviour nor financial frictions can systematically increase the forecasting performance of simple estimated macroeconomic models. Only during periods of financial crises do financial frictions improve forecasts. In contrast, traditional price and wage rigidities systematically help to increase the forecasting performance.

6. Conclusion

As an introduction to this special issue on the use of indicators as governance devices and as calculative instruments enabling formal representations of imagined futures, we attempt to make three points that shall be summarised briefly: First, we proposed a rather broad definition of indicators that would allow for systematic comparisons between different forms of quantification. We argued for distinguishing indicators from qualitative devices of evaluating future developments – despite some of them being dubbed "qualitative indicators". Such a distinction allows for systematic comparisons between different media of communication. Second, we strategically put forward a definition of key indicators in order to further enhance the accumulation of knowledge and to increase the relevance of social studies of quantification. The concept of key indicators is geared towards stimulating systematic comparisons between institutionalisation processes of indicators with similar and diverging trajectories. Third, as a heuristic for analysing how indicators are employed in social power struggles to create credible accounts of future developments, we suggested paying closer attention to three dimensions of meaning (factual, social, temporal) because we assume this heuristic to be a fruitful starting point for nuanced accounts of the dynamics and consequences of indicator use. Currently it seems that future-oriented uses of indicators have gained momentum, highlighting the contingency of the future while at the same time working towards the coordination of collective expectations. Yet, it is still unclear whether the growing futurity of indicators will increase the volatility of reflexive expectations, rendering society more prone to crises. Or, alternatively, whether the use of retrospective indicators and the institutionalised programmes tied to them can compensate for the risks of risk communication.

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