Uses and Abuses of the Concept of Path Dependence: Notes toward a Clearer Theory of Institutional Change[*]

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Introduction

Path dependence has emerged as an important concept in explaining institutional change (see especially Pierson 2004, Thelen 2003, Greif/Laitin 2004). This concept has the potential to help us understand how process, sequence, and temporality can be incorporated into explanations of institutional change because path dependence draws our attention to situations in which the set of choices available at any given moment are contingent on the choices made in previous periods. One obstacle to this potential, however, is that path dependence is often used in a variety of ways to mean a variety of things: often it refers to the vague notion that history matters or that the past influences the future, sometimes it refers to the idea of institutional "lock-in" which makes change impossible or unlikely, at other times it is argued that path dependence is compatible with a number of mechanisms for path change (e.g. Beyer 2005). This variety of meanings and usages may indicate a positive attribute of path dependence: the concept's ability to "travel." Our suspicion, however, is that this variety indicates a problem with the path dependence literature: the propensity to engage in concept "stretching." As Pierson has suggested, "[T]he fuzziness that has marked the use of this concept in social science suggests that the greater range offered by looser definitions has come at a high price in analytical clarity" (Pierson 2004, 21).

Our goal in this paper is twofold: First, we want to show that current usages of path dependence are being unhelpfully stretched. Second, we propose a way towards conceptual clarity by developing a taxonomy of different sources of institutional change, of which path dependence is only one. Concept stretching is important to identify because it has two negative consequences for research. First, concept stretching undermines our ability to reliably code cases as similar and therefore to compare across cases. In the instance of path dependence, we argue, stretching has led to an over-diagnosis of institutional path dependence. By returning to the

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original parsimonious conceptualization of path dependence, we show that true path dependence occurs less often than is asserted in the empirical literature which tends to see path dependence at work in a wide and disparate field of cases. Second, concept stretching hinders effective and cumulative theory building because of the diversity of meanings ascribed to a single concept and the lack of distinction from different concepts. The danger with stretching (as well as with over-diagnosing) path dependence is that other explanations of change are obscured or subsumed. Recapturing the distinctions between path dependence and other processes of change, as we do with our taxonomy, is crucial for gaining a more precise understanding of institutional change.

This paper, then, is not an insular critique of path dependence, but a contribution to a better understanding of institutional change more generally. Our goal is to develop a taxonomy of institutional change explanations which specifies the relationships among distinct sources of institutional change. With this framework we can then properly place path dependence in a larger schema of institutional change explanations. Gaining clarity on the scope of path dependence and other processes of institutional change is an important step towards developing better theories of institutional change.

We begin in Part 1 by discussing the problem of concept stretching and its possible solutions. We then apply this theoretical discussion to the path dependence literature. Part 2 shows how the particular concept of path dependence has been stretched and discusses the negative consequences of such stretching. We argue that, although in the process of developing and applying the concept of path dependence a great deal has been learnt about institutional stability and change, by not sticking to a consistent understanding of path dependence analytical clarity has also been lost. Most importantly, when researchers subsume distinct sources of institutional change under the concept of path dependence, they artificially narrow the range of explanations at their disposal. Part 3 attempts to solve the problem of concept stretching for path dependence by systematizing the concepts and mechanisms of institutional change into a taxonomy. We argue that only those processes that can be shown to be both endogenous and self-reinforcing ought properly to be called path dependent. Moreover, the taxonomy clarifies path dependence's distinction from and relationship to other explanations of change. Thus the taxonomy should allow us to see 1) a clear relationship among existing concepts, and 2) the gaps where necessary concepts are missing. In Part 4, we apply our taxonomy to some promi-

nent cases of institutional change to illustrate the explanatory benefits of using clear analytical distinctions among different explanations of change. In particular, this exercise allows us to more clearly understand when and how multiple processes combine to explain change. We conclude by discussing a number of new questions about institutional change that thinking about the taxonomy exposes.

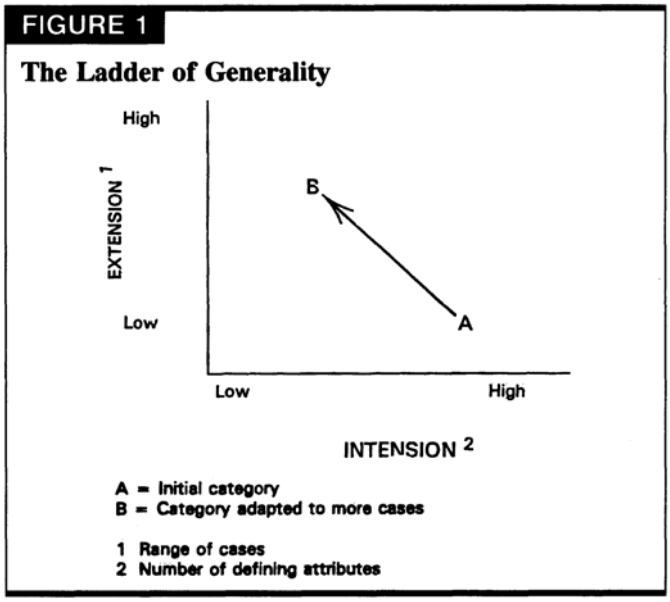
1. Concept Stretching: The Problem and a Solution

Building knowledge requires not only developing concepts but also applying these concepts to a range of cases, which in turn usually requires adapting or re-interpreting the original concept. At the same time, if concepts are not deployed with some rigor their analytical usefulness becomes limited. Sartori (1970) identified these two aims of research with the terms conceptual travelling, which refers to the application of concepts to new cases, and conceptual stretching, which refers to the distortion that occurs when a concept is changed to fit new cases. Applying and adapting a concept across cases is useful in that it allows us to make comparative analyses and to impose analytical order on the world without requiring new concepts for each phenomenon of interest. But taken too far, conceptual stretching runs at least two risks: 1) that of undermining the validity of coding and measurement across cases, and 2) that of hindering effective and cumulative theory building because of the diversity of meanings ascribed to a single concept. The challenge, then, is to achieve "the virtue of conceptual travelling without committing the vice of conceptual stretching" (Collier/Mahon 1993, 845).

To be clear, the problem is not that there are too many concepts with multiple meanings; we need conceptual richness to help explain social phenomena. The problem, rather, comes when the relationship between multiple concepts is not clearly and systematically ordered. Not all concepts exist at the same level of abstraction. A mechanism[1] (the link between cause and effect), for example, is subordinate to a process (the unit of cause-and-effect). Other concepts are at the same level of abstraction, and might interact as complements or as rivals.

[1] A mechanism describes a causal link between two phenomena. It falls short of a general theory, but nonetheless carries generalizable insights as it refers to "plausible, frequently observed ways in which things happen" (Elster 1989, viii). The emphasis on mechanisms is widely shared among social scientists today, even though they sometimes disagree on what types of mechanisms are appropriate (cf. the contributions in Hedström/Swedberg 1998).

The classic solution to the problem of conceptual stretching is to taxonomically order the relevant concepts according to what Sartori calls the "ladder of abstraction." Sartori first distinguishes between a category's extension and intension. The *extension* of a category is the set of cases in the world to which it refers, each of which share at least one attribute. The *intension* is the set of meanings or attributes that define the category and that identify which cases belong to the category. It is possible to think of intension and extension as having an inverse relationship; that is, it is likely the case that the more observations that fit into a category (high extension), the broader the meaning of that category (low intension). But this relationship does not imply that one dimension is more valuable than the other; social science requires concepts along both dimensions. Categories with high intension bring high discriminatory and thus explanatory power, especially within cases; categories with high extension bring generalizabiltiy and explanatory power across cases.



Source: Collier and Mahon (1993, 846)

The ladder of abstraction provides a solution to the dilemma between travelling and stretching because it allows us to trade-off concepts according to the required level of abstraction rather than distorting a single concept to accommodate different cases. The ladder is hierarchically organized so that higher level categories have high extension and low intension, and lower level categories have lower extension but higher intension. The lower level concepts, such as mechanisms, underpin the superordinate concepts, such as processes. We can climb and descend the ladder by making concepts more or less abstract and by lessening or augmenting the

specificity of their attributes. Categories that are in a hierarchical relationship must share at least one attribute of the higher order category. Categories at the same level of abstraction must be analytically mutually exclusive (although, note that this does not mean they cannot work in combination empirically). This taxonomical exercise constructs and deconstructs concepts into orderly and manageable units. The unfolding of the ladder 1) gives space to distinct concepts, 2) helps to clarify the relationship among concepts, and 3) helps to identify where concepts necessary for logical completeness are missing.

By undertaking this exercise with respect to explanations of institutional change, we stand to systematize several concepts which are currently either free-floating (such as layering) or bloated (such as path dependence). This, in turn, should improve how we deploy them to understand the empirical world. Accordingly, we proceed by first showing that there is a problem of concept stretching in the path dependence literature, and second engaging in the taxonomical exercise. The third step, for future work, would be to apply this taxonomy to empirical cases of institutional change.

2. Path Dependence: From a Narrow Concept to a Broad Theory of Institutional Change

Path dependence is one of the most widely used concepts in contemporary social science. And, indeed, it is a very useful concept, if it is applied carefully and rigorously. There are, however, two ways in which the concept is "abused" in the existing literature.

First, there are some instances of empirical research where an unspecified or at least underspecified reference to path dependence is meant to serve as an "explanation" for a particular institutional development. Such usage of the concept is abusive because merely referencing path dependence cannot stand in for analysis. Path dependence is only "a label for a particular class of dynamic phenomena, not a theory to account for the way in which such systems behave" (David 2007). Thus invoking the concept alone does not provide a satisfactory explanation. Constructing an explanatory account requires working out the precise mechanisms through which history influences present and future decisions (Thelen 1999, 391, Beyer 2005, Pierson 2004, 20-21, Genschel 2001).

In this paper, however, we are concerned with another problem: path dependence has been victim to concept stretching as a result of attempts to broaden its empirical scope. While the literature from economic history, political science and sociology, to which we refer be-

low, does attempt to specify mechanisms of path dependence, they nevertheless unduly stretch the concept. Some of the mechanisms to which this literature refers have properties that are out of touch with essential characteristics of the original concept. In order to show this, we will first outline the original and narrow concept of path dependence and establish its essential characteristics. We then move on to three extensions of the concept. These are broader in two respects. First, theorists have broadened the empirical scope to which the concept is applied. While it was initially designed to explain the development and diffusion of technologies, scholars began to apply it to the analysis of social institutions. Second, in doing so they have introduced additional theoretical mechanisms to explain instances of perceived path dependence. We will argue that applying path dependence to institutional analysis is highly productive for a better understanding of institutional change; however, not all of the additional mechanisms which scholars have identified as sources of path dependence can be subsumed under this concept. Rather, they should be given different places in a taxonomy of institutional change.

The Original, Narrow Concept

The concept of path dependence was developed in economics principally by two authors, W. Brian Arthur and Paul A. David. In their best-known contributions they deal with the adoption and diffusion of technological standards. They are proponents of the narrowest understanding of path dependence in the literature.

According to Arthur, the condition required for a path dependent development to occur is that a technology is subject to *self-reinforcement*, respectively *positive feedback* (Arthur 1994, 1 ff. and 112).[2] One condition for such positive feedback is the existence of increasing returns – a situation where the increased production or the increased use of a certain product leads to an increased utility. This will be the case if there are *high fixed or setup costs* so that the cost per unit decreases the more of the good is produced. Another condition that can lead to increasing returns is *learning*, which also leads to improved products and/or decreasing unit costs. Finally, Arthur considers *coordination effects* a potential source of increasing returns. These occur if actors derive utility from going along with the decisions of other actors. This effect is

[2] The citations to Arthur's work draw on the 1994 collection of articles. His ideas were developed in several published and unpublished papers from the early 1980s onwards.

relevant in network technologies (Katz/Shapiro 1086). This mechanism may also be at work if actors expect positive coordination effects in the future. Such a phenomenon may be termed adaptive expectations.

Paul David has refined this list of mechanisms in his seminal contribution on the "Economics of Qwerty" (David 1985) by arguing that the path dependent adoption of the Qwerty keyboard is driven by the interaction of three factors. The first are "system scale economies," i.e. increasing returns to production. The second is technical interrelatedness, which means that there needs to be complementarity between the "hardware" of the keyboard and the "software" of the person that has learned to operate the keyboard. Not only can positive coordination effects result from different actors choosing to do the same thing, but increasing returns can also result from the interaction of different technologies (in this case the hardware and software) that together may form a productive system. In the case at hand the Qwerty keyboard was combined with the newly developed system of typing with ten fingers, which led to victories in typing competitions. The attribution of these victories to the Qwerty keyboard were an important cause of its widespread adoption. The third mechanism is quasi-irreversibility of investment – once an actor has learned to operate one of the keyboards he or she would have to incur higher learning costs to switch to the other system.[3] This condition is responsible for the fact that the Qwerty keyboard continued to be used, even though the initial mechanical reasons for its design became obsolete (e.g. golf-ball typewriters and later Computers) and other keyboards would arguably have been more efficient by enabling quicker writing.[4]

On the basis of these mechanisms a path dependent development can occur in a dynamic system with several equilibria, which may initially be equally likely to be realized. Thus there is

[3] In fact, the idea is that the costs of learning either technique from scratch are the same, but the costs for learning a new technique once another one has been proficiently learned are higher.

[4] As economists, Arthur and David are intrigued by the notion that path dependence may explain why a (presumably) inefficient technology can persist. Liebowitz and Margolis (1990) have questioned whether the Qwerty keyboard really is inefficient; and subsequently a debate has unfolded (David 1997,Liebowitz, 1995 #3181). In any case, as David (2007, 103 f.) points out a path dependent development and economic inefficiency are not necessarily coupled. While market failure and path dependence may coincide if indivisibilites, i.e. increasing returns in the conventional economic sense, are involved, this need not be the case.

contingency at the beginning of the process.[5] But once initial choices have been made, self-reinforcement raises the likelihood that future choices will be the same. The system evolves along a particular path that has been "locked in." A first essential attribute of path dependence thus is the *reproduction* of an outcome. In such dynamics "history matters" in two respects: 1) past choices have an impact on present and future choices. Sometimes, these past choices may have been purely coincidental, or have at the time only been viewed as small and unimportant events but prove to have important consequences later on. 2) The sequence in which events unfold plays an important role.

While Arthur and David use the terms 'increasing returns'[6], 'self-reinforcement' and 'positive feedback' synonymously, we maintain that the latter two terms capture an important feature of the path dependence mechanism as they propose it: path dependence refers to factors which are *endogenous* to the process. Restrictions on present or future choices are derived from prior stages within the process itself and not from exogenous factors (i.e. those external to the process). We take this endogeneity to be a second essential characteristic of the original concept of path dependence. Both conditions of reproduction and endogeneity have to be met to characterize a process as path dependent.

Arthur and David are careful to argue that the condition of positive feedback is not existent in all social systems. While the class of phenomena to which this condition applies is large, e.g. in knowledge-intensive industries, they are exceptions to the rule of constant or decreasing returns to scale (Arthur 1994, 2-4, David 2007, 98).

We can conclude that their concept of path dependence is characterized by low extension and high intension. The concepts that we review in the following sections use a wider notion of positive feedback, and thus aim at increasing the extension of the concept.

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[5] Under the condition of increasing returns, equilibrium selection via the market process is different from the more commonly assumed situation of constant or decreasing returns. Whereas under the latter condition there will be one unique equilibrium, which will necessarily be efficient, this need not be the case under increasing returns, where it cannot be determined in advance which of several possible equilibria will be chosen.

[6] Note that not all these mechanisms can be subsumed under the notion of increasing returns to the scale of production as economists conventionally understand it (Arrow 2000, 178). In particular, coordination effects and adaptive preferences do not easily fit into this category. Arthur and David have, in our view correctly, maintained that the term increasing returns is warranted in a less technical sense (David 2007, 102).

The Extension of the Concept to Institutional Economics and Economic History

The concept of path dependence has subsequently moved beyond the issue of technological development. Douglass North (1990) uses it as a central concept in his theory of institutional change and thus applies it to the issue with which we are concerned in this paper. North defines institutions in the following way, and we follow him in that regard: "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" (North 1990, 3).

North argues that path dependence can fruitfully be applied to institutional analysis because there are increasing returns to institutions. All of the mechanisms identified by Arthur also operate in the case of institutions (North 1990, 94-95).[7] Nevertheless, he argues that institutional change is always taking place and is driven by certain actors' (organized) interests, which would stand to gain from a change in the institutional structure, and competition among these interests. But institutional change will generally be incremental and bounded because, although actors are innovators and learners, they are only limitedly rational and wish to minimize transaction costs. Since change is only incremental and bounded, he terms it path dependent, even though it is not a reproduction of the same outcome (North 1990, 98-99, 103-104). This is his first extension of the original concept.

North's formulation also extends the concept in another respect. Whereas Arthur and David see path dependence as an endogenous property of a certain class of social processes, North sees the existence of transaction costs and of boundedly rational actors, factors which will often be exogenous to the institution itself, as sources of path dependence. Also, these factors are almost omnipresent.

In consequence, for North institutional developments of many kinds, including gradual change, are considered to be instances of path dependence. His concept is characterized by high extension and low intension.

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[7] North substantive interest is to explain the long-term success of some economies and the lack of development of others. He develops the idea that different institutions within a society will complement each other and this will limit the possibilities for reform of any single institution. In this way, an institutional structure can be kept on a certain path: "the interdependent web of an *institutional matrix* produces massive increasing returns" (North 1990, 95, emphasis added). And different countries are likely to remain on different paths. This idea of institutional complementarity has later been adopted in the highly influential literature on "varieties of capitaluism" (Hall/Soskice 2001).

The following set of contributions leave the sphere of economics and have transferred the concept from economics to political science and sociology.

An Extension to Political Science

Paul Pierson is one of the first scholars to import the concept of path dependence to political science. While he stresses the danger of concept stretching (Pierson 2004, 21), Pierson argues that path dependence should very well apply to the political sphere. In fact, according to him, the concept should be even more relevant for political science than it is for economics (Pierson 2004, 10). He argues that the condition of increasing returns is always present in the case of political institutions because they create common expectations among actors and thus lower the transaction costs associated with coordinating behavior. Moreover, institutions often involve high set-up costs, create incentives for maintenance, and have learning effects.

In particular, Pierson argues that four factors of political life produce increasing returns, which he also calls "positive feedback": 1) The central role of collective action and corresponding collective action problems, which makes institutional reforms less likely than in the more competitive and thus flexible environment of a market. 2) The high density of institutions is a source of increasing returns, because the institutions complement each other. 3) Political authority and power asymmetries can be sources of positive feedback. Actors may use their power positions to change the rules of the game in a way that further enhances their power positions.[8] 4) Another source of positive feedback can lie in the complexity and opacity of politics. It is much more difficult to measure success in the political sphere than in the economic sphere and consequently it is more difficult to decide how to change an institution (Pierson 2004, 30-40).

By referencing these specific mechanisms, which did not play a role in the economic literature on path dependence, Pierson proposes a more specific extension of the original concept than North, who added the general features of limited rationality and transaction costs as sources of path dependence. Also, he does not challenge the notion that path dependence involves the reproduction of the same outcome. Under the mechanisms proposed by Pierson,

[8] Mahoney (2000, 523-524) adds a related source of positive feedback by stating that once an institution is established, it can define what is considered legitimate or illegitimate, and can thus increase its chances of reproduction.

however, the existence of path dependence comes to be contingent on actor and power constellations, factors which may be exogenous to the institution. Accordingly, for Pierson not every path is characterized by *self*-reinforcing sequences, but may depend on factors that are external to the process itself (cf. Beyer 2005, 10-11). He loosens the endogeneity requirement.[9] Pierson's concept of path dependence is characterized by medium extension and medium intension.

A Further Extension in Political Science: Historical Institutionalism and Path Dependence

Kathleen Thelen has tried to connect the insights from the discussions about path dependence summarized so far with earlier work in historical institutionalism that focuses in particular on founding moments and "critical junctures." While she agrees that the notion of positive feedback or increasing returns is important, she criticizes the concept of path dependence for being "both too contingent and too deterministic" (Thelen 1999, 385). It is too contingent because in the initial choice situation small events can make an overly big difference. It is too deterministic because once a path is adopted there is automatic stability.[10] In her view, the literature disregards that gradual change may occur, and that stability will have to be actively produced by political actors (Thelen 1999, 388-396).

This dual problem, according to her, can only be addressed if the analysis of institutional stability and institutional change is dealt with by a unified theory. In order to make progress on this front it is necessary to focus on an institution's "mechanisms of reproduction." Since there are different mechanisms of positive feedback, they will permit "openings for institutional change and evolution" to different degrees. Thus, there may simultaneously be processes of institutional reinforcement and processes of institutional undermining at work. The task is to understand how these interact to shape institutional development (Thelen 1999, 397). Thelen is not explicit as to whether the reinforcement and undermining processes are endogenous or exogenous to the institution under investigation. However, in most of the ex-

[9] Also, these factors do not necessarily produce increasing returns. Certainly, actor and power constellations can produce negative feedback and thus lead to a path change (Genschel 2001, 21-22).

[10] This criticism is heard quite often. However, in our reading, path dependence is not the absence of any change. While the term "lock in" may be thought to suggest that the path cannot be left at all, both Arthur and David, as proponents of the narrow concept, acknowledge that it is possible to (a) unlock a path dependent development and (b) gradual adjustments along a certain path. See our remarks on stability and change in the conclusion.

amples she discusses the undermining process is exogenous, whereas the reinforcement process is endogenous (Thelen 1999, 397-399).

She argues that this formulation enables the analyst to come to grips with an empirical reality of institutions, namely that their development is characterized by the simultaneous occurrence of stability and change. While institutions often stay on a certain "historical trajectory" or "developmental pathway," they are at the same time subject to gradual or incremental changes. While actors often do not have the capacities to effect fundamental change, they may nonetheless try to engage in gradual refinement. Over time this may even lead to a change of the institutional trajectory (Thelen 2003, 211).[11]

Two ways of gradual change frequently observed in reality are "layering" and "conversion" (Thelen 2003, 226-230).[12] Conversion means that an institution that was designed to pursue one set of goals is redirected to a different set of goals. Conversion is a technique that is backward looking. Rather than searching for new answers to new problems the actors try to locate old institutions that might be able to handle new problems (Genschel 1997, 59). Layering means that an additional institution is layered on top of an existing one. Institutional entrepreneurs may lack the capabilities to reform an institution directly, e.g. because of sunk costs invested in the institution, but may be able to work around the existing institution in order to exact at least some kind of change. Layering works by bypassing the existing arrangement and so may slowly change the institutional trajectory of an existing institution. Depending on actors' intentions the layered institution may provide external support to an existing institution or it may slowly subvert it.

Thelen acknowledges that these are not deductive theories, but were derived inductively.[13] She does not provide falsifiable hypotheses about when we would expect to see change, and under what conditions we will see layering or conversion. By connecting the concept of path dependence to other notions of historical institutionalism, she broadens the discussion to con-

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[11] In a recent article, Paul David also discusses such "path-constrained amelioration" (David 2007, 106 f.).

[12] See also Genschel (1997), who uses the terms "transposition" and "patching up" for the same ideas.

[13] It is generally acknowledged among historical institutionalists that there is a lack of deductive knowledge on issues of institutional development (cf. Pierson 2004, 139-142, Genschel 2001, 23).

sider the issue of institutional change more generally. In doing so, Thelen often refers to "institutional trajectories" or "historical pathways." Apparently, these terms are chosen to mark a soft version of path dependence under which almost all kinds of institutional development can be subsumed.

With this formulation, Thelen extends the concept in two respects. First, reproduction of the same outcome is not a feature of her soft version of path dependence; incremental change is subsumed under her concept. Second, she includes both endogenous and exogenous sources of change.

What can we learn?

All contributions to the theoretical debate on path dependence that we have reviewed in this section agree that path dependence is caused by increasing returns or positive feedback. However, they differ about which mechanisms can be understood as a cause of positive feedback. While in the narrow concept only high setup costs, learning, and coordination effects were considered to produce path dependence, North argues that institutions will always exhibit increasing returns for boundedly rational individuals in a world of high transaction costs. Pierson adds power asymmetries and collective action problems to the list of mechanisms that can induce path dependence. Thelen takes these insights as her starting point for investigations into all kinds of institutional change.

These extensions of the concept of path dependence are problematic as they depart from essential characteristics of the original concept. First, they often (unwittingly) identify exogenous factors as causes of path dependence. In the case of Douglass North, path dependence directly follows from the properties of actors and the physical world (bounded rationality and transaction costs). Pierson is more careful to identify particular actor and interest constellations that in his view can cause path dependence, but these are also external to the process itself. By doing so, one defining characteristic of path dependence, which is *self*-reinforcement, is not fulfilled. Thelen also conflates exogenous and endogenous sources of stability and change in her attempt to reconcile stability and change.

Second, while Arthur and David see the reproduction of the same outcome as an important feature of path dependence, North and Thelen also subsume incremental institutional change

under that concept.

This is not to suggest that the discussion that evolved around the concept of path dependence within the social sciences has been useless. To the contrary, it was highly productive in that it points towards many sources of institutional change and stability. For example, Thelen is right to argue that very often institutional stability will have to be actively reproduced by political actors, rather than following automatically. Pierson's focus on actor constellations and power relations points in the same direction. However, we maintain that not all of this can be subsumed under the concept of path dependence. Rather, such processes have to be explained by combining different concepts, which together can be used to construct explanations of institutional change. We turn to this in the next section, where we begin to develop a taxonomy of institutional change.

3. A Ladder of Abstraction for Institutional Change

Our aim in developing a taxonomy is to capture and systematize the range of possible categories available for explaining institutional change, and within this to make clear where path dependence belongs and how it relates to other explanations of change. Our taxonomy distinguishes concepts on two dimensions. First, it distinguishes categories vertically according to the level of abstraction at which the concept exists. At the top are the most abstract categories, with high extension and low intension. As we move down the ladder, the level of abstraction decreases, until at the very bottom we are dealing with specific variables which can no longer be generalized but need to be determined on a case-by-case basis. As a logical result of this conceptual exercise, the variables at the bottom of the ladder are not exhaustive but merely illustrative of the types of variables that might be invoked to explain the previous level of abstraction. Second, the ladder distinguishes categories horizontally, which represent the range of logically possible explanations of institutional change. At the highest levels, each level represents an exhaustive categorization of possibilities. Necessarily, as the lower levels become less abstract, it also becomes impossible to make them exhaustive. Processes of change depicted horizontally are analytically discrete, but may interact empirically. That is, boxes at the same level of analysis may interact to cause institutional change.[14]

[14] It would be a project for future work to create hypotheses about what outcomes different combi-

Ladder Level 1

We start our taxonomy at the broadest level of abstraction (high extension and low intension) that captures the variation we are interested in explaining: institutional change. This category includes all institutional dynamics, varying from change to no change. In the next level of the ladder we are concerned with conceptualizing the sources of institutional change. Here it is important to distinguish between two dimensions of change that often get confounded: the pace of change and the source of change. The pace of change simply measures the rate at which change occurs; i.e., whether it is fast or gradual, and in this sense it is a quantitative rather than a qualitative category. We are interested not in concepts for measuring change, but in qualitative concepts which seek to explain why and how change occurs. Because we see these two dimensions as distinct, our ladder focuses exclusively on categories that relate to sources of change. This move helps us to avoid the common mistake of taking path dependence simply to be gradual change—path dependence may indeed be a slow-moving process but this is best seen as a description of the process rather than an explanation of the process.[15]

Ladder Level 2

At the highest level of abstraction, there are three possible sources of institutional change: exogenous, endogenous, and the interaction of these two. These labels describe the full range of sources from which the independent variables available for explaining institutional change can be drawn. The three categories are distinguished based on where the source of the variables is located in relation to the institution itself. Exogenous change is change that occurs as a result of variation in environmental parameters—in other words, parameters outside of the institution in question.[16] Variables are exogenous when they are not controlled or determined by the institution in question, but they may nevertheless affect that institution's development.[17] Technological change, for example, might occur exogenously to, that is independently

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nations might produce. For example, a strongly self-enforcing institution faced with third party enforcement might lead to a different outcome than a weakly self-enforcing institution faced with strong third party enforcement.

[15] It is interesting to note that particular sources of change might imply a particular pace of change, but we do not explore this relationship here.

[16] Note that this does not mean that the parameters are not part of any institution. In a basic sense there is no non-institutional space in the social world, including the language that we use to talk about it.

[17] In some cases these factors may be influenced by the institution itself; however, when that is the case, then the parameters can no longer be considered exogenous but rather endogenous variables.

of, an institution and yet be a primary reason for change in that institution. The notion of "critical junctures" has been significant to the development of the concept of path dependence (Collier/Collier 1991, Thelen 1999, Mahoney 2000), but it is important to note that critical junctures—events such as wars, revolutions, or natural disasters—are themselves properly considered to be exogenous factors. That is, they are events not caused by the institution in question but which in turn cause the institution to change in some way. Endogenous change, on the other hand, refers to change that is determined by variation within the institution itself—in other words, internal variables unfold to affect the institution. The legitimacy of an institution, for example, is a property of the institution itself but it can in turn affect the development of the institution by making it, for example, attractive to investors. Learning is another example of something that can happen within an institution but might be expected to result in changes to that institution. Finally, the third logical possibility is that some institutional changes are best explained by a combination of exogenous and endogenous factors. We conceive of this possibility as a combination of discrete variables—exogenous and endogenous factors interact to produce a change.[18] This means that exogenous and endogenous variables do not "mate" to form a new hybrid source of change, but rather that discrete variables from both sides may be at work and interact to produce a change.

It is important to note that the distinction between exogenous and endogenous is in the first place an analytical one. The distinction is based on where the variables effecting change come from—from outside or from inside of an institution. In principle, any variable at any point in time can be either endogenous or exogenous. [19] Indeed, the same variable may be exogenous for one institution but endogenous to another; or a variable may be exogenous in one period but endogenous in the next. Whether a given variable is exogenous or endogenous must be empirically determined based on what relationship it has to the institution itself. Tracking

[18] This is in contrast to Greif and Laitin who see the combination as one factor which is exogenous in the short term but becomes co-opted by an institution and therefore acts endogenously over the long term. In our analysis this simply amounts to saying that any given variable at any given time can be either exogenous or endogenous. No new category is needed to capture this variation. Rather, the idea of a combination should be restricted to those explanations of change that rely on both exogenous and endogenous sources.

[19] The distinction between endogenous and exogenous sources of change has some similarities with the distinction between the concepts dependent variable and independent variable. We can analytically distinguish between a dependent and an independent variable on the basis of what role a variable plays in explanation. The difference is that whether a variable is dependent or independent is the choice of the analyst, whereas whether a variable is endogenous or exogenous is an empirical matter.

these distinctions empirically can, of course, be difficult. Nevertheless, the fact that empirics are messy does not weaken the usefulness of the analytical distinction. Particularly because, as the next level shows, by making this distinction we can better capture and categorize different explanations of change.

Some approaches favour looking for the sources of institutional change in particular locations. Rationalists, for example, favour exogenous explanations of change. According to rationalists, an institution is an equilibrium from which no actor has an incentive to deviate given other actors' behaviour. Logically, therefore, in this account change can only ever be caused by exogenous factors. Moreover, change in this account means moving from being in equilibrium to being out of equilibrium or from being in one equilibrium to being in another equilibrium. Historical institutionalists, on the other hand, have argued that this understanding of change is too narrow. The institution itself may give rise to dynamic forces because it has an effect on actors and actor behaviour. This in turn implies that internal factors may change an institution, and this change may be something less than a move out of or to a new institution. Rather, an institution may change without coming out of equilibrium by, for example, becoming more stable or by expanding its domain of activity. In order to capture these types of changes, we need to consider endogenous variables. What neither of these approaches does well, however, is to recognize that if we can identify two sources of variables, then there is the possibility that change is the result of an interaction of these two. For example, much of the overstretch in the path dependence literature likely results from a failure to properly distinguish whether the analysis truly rests on endogenous factors or rather on a combination of sources. Carefully distinguishing these possibilities can help us to better understand and tease out the different explanations of institutional change.

Ladder Level 3

Moving down the ladder, we can further disaggregate both exogenous and endogenous factors into three parallel but distinct processes of change. Exogenous factors can enforce, reinforce, or undermine an institution. Endogenous factors can lead an institution to self-enforce, self-

reinforce, or self-undermine. The language of returns-to-scale can be useful for thinking about what distinguishes these types of change.[20]

The enforcement or self-enforcement of an institution means that the institution is maintained in stasis (respectively either through exogenous or endogenous factors). No actor has an incentive to deviate from the agreed upon behaviors or strategies. If we think of institutions as cooperative equilibria, then this means that cooperative payoffs remain the same in each round of play. Thus, enforcement and self-enforcement are characterized by constant returns to scale; when we change the independent variable by a certain value, the dependent variable changes by the same value. Enforcement and self-enforcement of particular rules or behavior are processes that lead to institutional creation, which describes both the move from no institution to an institution and the move from an existing institution to a new institution. In other words, enforcement (through third parties) or self-enforcement (through the actors themselves) describes how particular rules or behaviors come to equilibrium.

The reinforcement or self-reinforcement of an institution means that the institution is not simply maintained but amplified (respectively either through exogenous or endogenous factors). In terms of cooperative equilibria, this means that cooperative payoffs increase from one round of play to the next. Thus, reinforcement and self-reinforcement are characterized by increasing returns to scale; when we change the independent variable by a certain value, the dependent variable changes by more than that value.[21] Reinforcement and self-reinforcement lead to a second type of institutional change: institutional reproduction, which should be understood as a change in the stability of an institution. Here reinforcement or self-reinforcement are processes that increase the stability of an institution by deepening or expanding the range of the equilibrium/institution. Path dependence is a self-reinforcing process and thus the kind of change explained by path dependence is the deepening stability of an institution.

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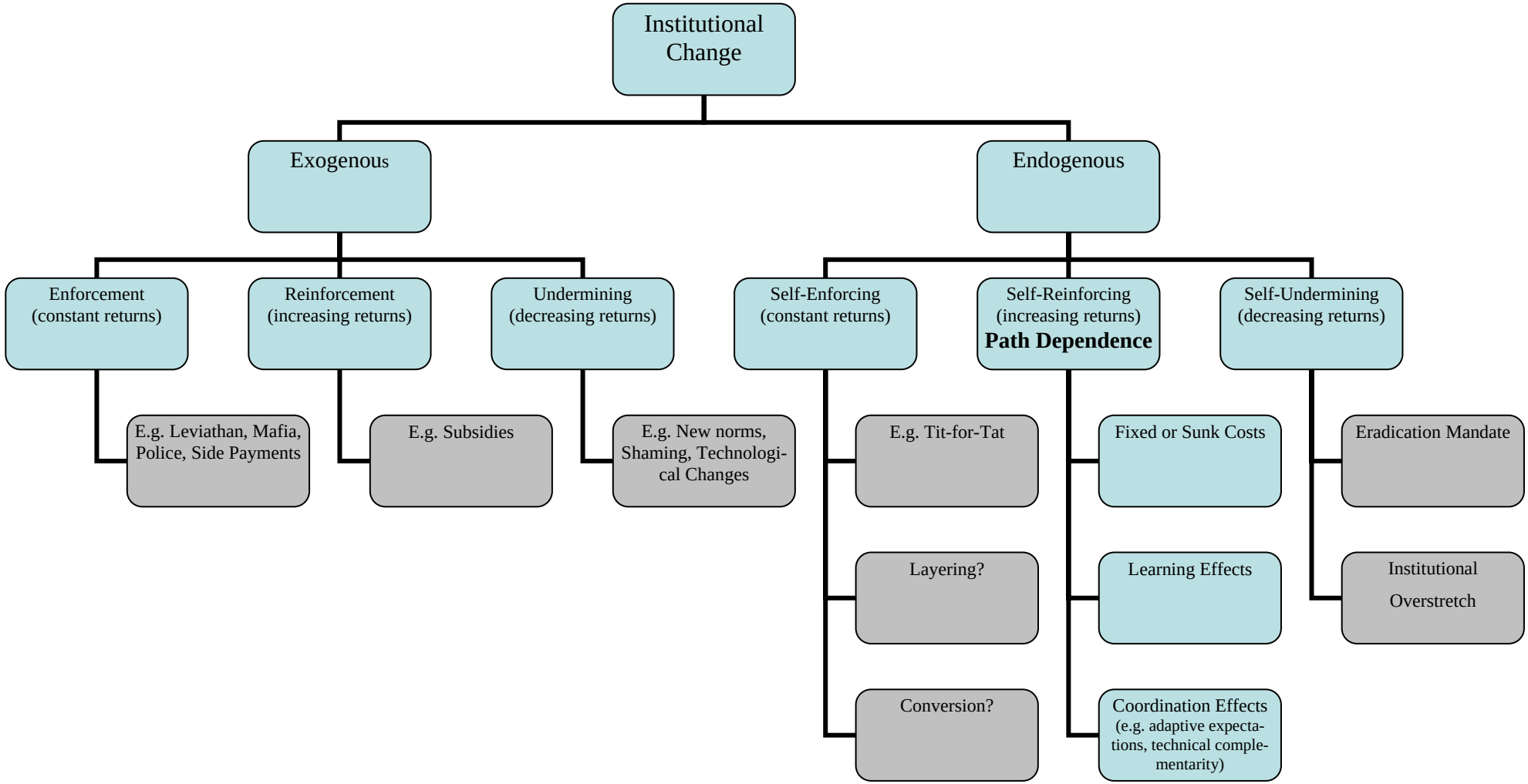
[20] In fact, as we have seen, the returns-to-scale language is already part of the path dependence literature.

[21] It has been argued that both sequential returns and increasing returns can be self-reinforcing (Hathaway 2001). In our view, however, it is incorrect to distinguish between sequential constant and increasing returns. Sequencing can be better understood as a way to get increasing returns. As the QWERTY example shows, a certain sequence of events can produce increasing returns which would not have been present had the sequence been different.

The undermining or self-undermining of an institution means that the institution is not being maintained but is in fact crumbling (respectively either through exogenous or endogenous factors). In terms of cooperative equilibria, this means that cooperative payoffs decrease from one round of play to the next until eventually cooperation (and the institution) ceases. Thus, undermining and self-undermining are characterized by decreasing returns to scale; when we change the independent variable by a certain value, the dependent variable changes by less than that value. Self-undermining leads to a third type of change: the breakdown of an institution through the process of self-undermining.

Figure 2: A Ladder of Abstraction for Institutional Change



Ladder Level 4

Each pair of processes—enforce/self-enforce, reinforce/self-reinforce, and undermine/self-undermine—thus shares a common logic that can be expressed in terms of returns-to-scale, but each pair is separable according to whether the variables are exogenously or endogenously determined. On the exogenous side of the ladder, enforcement, reinforcement, and undermining are all the result of variation in factors outside of the institution itself. On the endogenous side, self-enforcement, self-reinforcement, and self-undermining are all dynamics which result from variation within the institution itself. Endogenous, or "self," change can be understood in terms of feedback, which refers to causal changes that form a loop whereby past results influence future outcomes within the same model. There are innumerable exogenous and endogenous factors that can be at work in creating the six dynamics of change at level 3. Which factors will be at work in any particular instance of institutional change will depend on the specific case at hand.[22] Below, however, we offer some examples using the prisoners' dilemma (PD) game to illustrate the categories in our ladder.

In a one-off PD game, there is one Nash equilibrium possible. This equilibrium (mutual defection) is a self-enforcing outcome since no player has an incentive to deviate from it. Self-enforcement is the attempt to stabilize an equilibrium from within and can be considered neutral feedback since all information results in a return to a goal state. The Nash equilibrium in a PD, however, is Pareto inefficient since, according to the pay-off structure, there is another outcome that would make some players better off without making others worse off. To achieve this outcome in a one-off game, the optimal equilibrium would have to be externally enforced by, for example, a Leviathan, the Mafia, or the police.[23] In infinite iteration, the optimal outcome becomes self-enforcing when players use a tit-for-tat strategy; that is, when infinitely iterated all players have an incentive to cooperate and no player has an incentive to defect. Note, however, that the iterated PD is not self-*reinforcing*. This is because in a classic iterated PD, the pay-off in every round is the same as in the previous round. Cooperation is

[22] We have colored these boxes gray in the ladder because we are uncertain about their status. Specifically, we have two concerns: 1) We are unsure that the concepts we've put in the boxes are really at the same level of abstraction; 2) We are unsure where specific concepts such as layering and conversion belong in our ladder. These are conceptual issues we are still working on and we would appreciate any comments!

[23] These are negative examples of enforcement. In fact, external enforcement can be the result of increasing the costs of defecting (which is how the given examples work), or it can be the result of increasing the benefits of cooperating (such as through side payments).

sustained not because of increasing returns, but because constant return pay-offs accumulate over time.

A PD which is only finitely iterated, in contrast, would be characterized by self-undermining. That is, even if cooperation were possible, the possibility of defection in the last round of play converts all previous strategies into defection thus unravelling cooperation. This is *self*-undermining because the impetus for the unraveling comes from within the logic of the game (or institution) itself. In order to prevent self-undermining and maintain mutual cooperation under conditions of finite play, an external enforcer would be necessary. Some institutions might be purposefully self-undermining, like the March of Dimes. The March of Dimes was established to eradicate polio, and when the disease was in fact eradicated the March of Dimes logically faced collapse.[24] Thus self-undermining is a potential risk for any institution with an eradication mandate. Another possible source of self-undermining is institutional overstretch. When an institution's original mandate is expanded and it takes on additional tasks that it cannot fulfill, the entire institution might suffer. Snyder, for example, argues that this is one cause of the decline of empires (Snyder 1991).

In contrast to self-undermining, undermining occurs when an external factor destabilizes (rather than enforces) an existing equilibrium. This factor, either material or normative, gives players incentives to deviate from their agreed upon behavior. The "live-and-let-live" system that spontaneously broke out among WWI trench soldiers, inducing a cooperative cease-fire, was broken by officers who forced their soldiers into battle by demanding to see either prisoners or casualties (Axelrod 1984, 81-83). Slavery and apartheid, it has been argued, are institutions that have been undermined by society's changing normative beliefs (Kaufmann/Pape 1999, Klotz 1995). Other tactics which attempt to change the payoffs of cooperating actors, such as shaming or boycotting, can have similar institution-undermining effects.

The final combination to be discussed is reinforcement/self-reinforcement. Both of these are characterized by increasing returns. An institution might be reinforced, for example, through the payment of subsidies or bonuses which reward cooperation by increasing payoffs in future rounds conditional on past success. Reinforcement, however, differs from self-reinforcement

[24] In fact, rather than collapse, the March of Dimes engaged in conversion in order to maintain its equilibrium.

in a crucial sense: self-reinforcement has the additional attribute of being subject to positive feedback. Self-reinforcement, understood as increasing returns based on positive feedback (i.e. an endogenous process of cumulative causation), is what the literature commonly refers to as path dependence. Only those processes in which endogenous factors lead to increasing returns ought properly to be considered path dependent. Endogenous factors which can lead to increasing returns include sunk costs, learning effects, and coordination effects. Thus, our ladder has clearly isolated path dependence from a number of other processes that can be responsible for institutional change.

In the path dependence literature there is some debate about whether certain strategies used to maintain an institution, such as layering and conversion, are self-enforcing or self-reinforcing. The ladder can help to sort some things out here. First, our ladder makes clear that layering and conversion belong on the endogenous or "self" side because they refer to change that occurs as a result of the unfolding of an internal dynamic rather than an exogenous shock. Layering refers to the way an institution can be changed incrementally with the addition of rules or structures on top of what already exists. Conversion describes a situation in which an existing institution is re-oriented or re-invented in order to serve a new purpose. The next question, then, is whether these strategies can best be understood as self-enforcing or self-reinforcing. Thelen, who coined the terms, is unclear about the theoretical status of layering and conversion. According to our taxonomy, the test for whether layering and conversion are self-reinforcing is whether they produce increasing returns, since this is the shared attribute of all self-reinforcing processes. Boas (2007) has recently argued that layering and conversion do indeed produce increasing returns. We, however, are not entirely convinced. Since both conversion and layering attempt to maintain an institution they might be better understood as simply strategies of self-enforcement, or the maintenance of constant returns in the face of possible decreasing returns. If we are right, then layering and conversion are alternatives to path dependence, rather than sub-processes of it.

Value of the Ladder

With this taxonomy in hand, we can begin to ask how different concepts of institutional change might work together and what combinations could be fruitful. What we see by comparing the ladder to existing literature is that path dependence alone is often insufficient to explain institutional change. At some point or another, scholars often smuggle in exogenous

factors. Mahoney (2000), for example, does just this when he theorizes how critical junctures operate to create or end a path that is dependent. That is, he brings together two different understandings of change to create one argument. Greif and Laitin (2004) have also attempted to create a link between exogenous and endogenous change by introducing the concept of quasi-parameters and by drawing a distinction between self-enforcing and self-reinforcing institutions. The key to making such combinations effective, however, is to stay true to each concept's level of abstraction. The ladder reminds us, for example, that critical junctures as such are not part of the concept of path dependence but added to it so as to allow it to work in a way that it would not on its own. There is nothing wrong with combinations as such, but it is important that they be made in a theoretically-conscious and not ad hoc fashion. Thus we hope the ladder can be most useful to us in working out the as yet incoherent relationship between exogenous categories (driven by agents and the environment) and endogenous categories (driven by feedback loops).

4. Illustrations from the literature

[In this part we plan to discuss prominent accounts of institutional change from the literature and show how they would be changed by applying the insights of our taxonomy. While we have not written this section yet, we will include examples in our oral presentation]

Conclusion

Our goal in this paper has been to draw attention to the problem of concept stretching in the use of path dependence and to find a useful place for path dependence in a taxonomy of institutional change. In our literature review we found varying and sometimes contradictory understandings of path dependence. What is at stake in stretching is that cases of path dependence become over-diagnosed and other concepts of change get smuggled in haphazardly or remain obscured altogether. This, in turn, is problematic because there are significant aspects of change that path dependence alone, at least in its narrow conception, cannot explain. For example, our hunch thus far is that most applications of path dependence wind up including exogenous concepts to explain change.

In solution to the problem of stretching, we have made a first attempt to create a ladder of abstraction for institutional change. Our hope is that such an exercise will help us to identify missing concepts and mechanisms and to elucidate the relationships among existing concepts

and mechanisms. More specifically, current theories of institutional change – including path dependence – have yet to work out a coherent relationship between exogenous and endogenous change. The ladder is one step in sorting out what role agents and environment on the one hand, and endogenous processes on the other hand, play in institutional change.

Our ladder points to a further issue that warrants greater attention. We have explicitly built our ladder around a *spatial* understanding of institutional change (endogenous vs. exogenous), but there is also a *temporal* understanding of institutional change (gradual, punctuated, etc.). Our review of the literature suggests to us that these two dimensions are often confused. For example, path dependence is used both to describe the pace of change (gradual) and to describe the direction of change (deeper down a particular path as opposed to path-switching). The direction and the source of change (exogenous or endogenous) may well influence the pace of change, but this relationship needs to be systematically worked out rather than conflated or assumed.

Moreover, thinking about change in spatial terms might help clarify existing confusion regarding stability and change. As we have discussed, some interpret path dependence to be a concept of non-change, while others take it to be a concept of gradual change. A spatial perspective might mediate these views by suggesting that path dependence does indeed describe change, but a change within an equilibrium, that is a change in depth or space, rather than a change across equilibria. Because the change is one of institutional depth, it can easily be misread as non-change. Thus, stability need not mean non-change, but can instead refer to the fragility of a particular equilibrium, the extent to which it is embedded.

The most important task for us in revising this paper is to work on the quality of the ladder of abstraction. We would therefore be particularly grateful for comments and suggestions on the following questions: Are there further categories in use that are not represented on the ladder? Are there gaps in the ladder where categories as of yet do not exist? Are there processes or mechanisms missing?

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