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Path Dependence: More than a Metaphor in Economics?

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1. Introduction

Even if there is no fully articulated and generally accepted theory of Path Dependence it has eagerly been taken up across a wide range of social sciences – primarily starting from economics. Path Dependence is most of all a metaphor that offers reason to believe, that some political, social or economic processes have multiple possible path of outcomes, rather than a unique path of equilibria. The selection among outcomes may depend on contingent choices or events – outcomes of path-dependent processes require a very relevant study – a perception of history.

Normally a path-dependent process is one whose outcome evolves as a consequence of the process' own history. The concept of Path Dependence is intended to capture the way in which small, historical contingent events can set off self-reinforcing mechanisms and processes that "lock-in" particular structures and pathways of development. In New Institutional Economics there has been different and well known studies of Path Dependence concerning technological "lock-in" (Qwerty-nomics), dynamic increasing returns, institutional hysteresis and as regional economic evolution.

Also Keynes' General Theory is seen by some interpreters[1] as if it is created as a path-dependent system, because Keynes in this treatise operates with uncertainty, expectations and historical time. It is a so called non-ergodic view which has the implication for the analysis, that Keynes is much more occupied with a concept of tendencies than a concept of equilibrium. To paraphrase Joan Robinson: The present is nothing but a moment in the passage from the immutable past to the unknowable future. In this optic an actual process is path dependent helping to determine the character of a situation rather than it being pre determined.

The intention of the following is a critical examination of the notion of Path Dependence and its applicability in economics. In this setting the aim is to clear up the conceptual framework:

- Is Path Dependence more than a metaphor?
- Of what kind are the organizing concepts of Path Dependence?

[1] See Chick (1998, 2003), Setterfield (1999), Jespersen (2002, 2004, 2007), Fontana & Gerrard (2004)

- Does path-dependence only capture slow forms of economic evolution, since major and radical changes must always originate from outside? Path-dependence seems to have a worrying inconsistency: On the one hand small events can have large and long-term consequences. On the other hand exogenous shocks can enable the system to break free from the path and evolve a new path dependent trajectory.
- It is also a known critique that Path Dependence in some versions implies a very deterministic way of looking at history. It leaves us with questions like: can there be different kind of types, degrees and causes of path-dependence?
- By help from other social sciences it is possible to talk about path creation, path shaping and path breaking – can that be useful in economics?

The use of Path Dependence in other scientific areas shows that it has considerable potential for providing the basis of substantial empirical studies where complex causal relations are difficult to study by help from traditional statistical and qualitative methods. That might also be at help in economics.

2. It is all about Time

"The future never resembles the past – as we well know", Keynes once said[2]. Taken for granted it gives the economist a rather difficult agenda, but it was very clear why: "… unlike the typical natural science, the material to which it (economics, ed.) is applied, is in too many respects, not homogeneous through time"[3]

In his heritage from Marshall, Keynes states in Treatise on Money, that he is working on a theory of a moving system[4] - he is well aware, that it is "… a new step forward …- namely, an advance to an understanding of the detailed behavior of an economic system which is not in static equilibrium. This treatise, in contrast to most older work on monetary theory, is intended to be a contribution to this new phase of economic science"[5]

Later on in his early preparation of The General Theory Keynes is still working on giving up the concept of equilibrium:"I should, I think, be prepared to argue that, in a world ruled by uncertainty with an uncertain future linked to an actual present, a final position of equilibrium, such as one deals with in static economics, does not properly exist"[6].

And finally in the General Theory:" … as soon as we pas to the problem of what determines output and employment as a whole, we require the complete theory of a monetary economy. Or, perhaps, we might make our line of division between the theory of stationary equilibrium and the theory of shifting equilibrium – meaning by the latter the theory of a system in which changing views about the future are capable of influencing the present situation"[7]

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[2] Collected Writings XIV, p. 124
[3] Collected Writings, XIV, p. 269
[4] A Treatise on Money II, p. 365: "Unfortunately Marshall, in his anxiety to push economic theory on to the point where it regains contact with the real world, was a little disposed sometimes to camouflage the essentially static character of his equilibrium theory with many wise and penetrating obiter dicta on dynamical problems. The distinction between the long period and the short period is a first step towards the theory of a moving system"
[5] A treatise on Money II, p. 365
[6] Tilton-papers (1933) CW XXIX, p. 222.
[7] The General Theory (1936), p. 293.

In this prelude it is now indicated, that time should play a crucial role in economic thinking and the question is if the concept of Path Dependence can play some of that role. This is the opportunity – to get closer to reality by taking time seriously. And as stated by Currie and Steedman[8]:"… more and more economists seem to be acknowledging that substantive progress in economic analysis can only come from confronting the formidable difficulties associated with time".

It is not an easy task – but a as economists as Hicks, Shackle, Kaldor and Robinson have recognized it is a difficult but necessary task to deal with. The primary concern in this paper is to look further into the "immutable past"!

[8] Currie, M. and Steedman, I. (1990): Wrestling with Time, p. 241

3. Path Dependence, Qwerty, increasing returns and institutional change

In the 1980/90 s the two Stanford colleagues Paul A. David and Brian Arthur published several papers that now are regarded as the foundation of Path Dependence with a focus on haw inefficient technologies may become locked in as industry standard. Douglass C. North has adopted this approach for an economic study of politics and institutional change. All of these authors are well known from New Institutional Economics.

In 1985 David[9] presented the story of Qwerty or how a standard of a typewriters keyboard were introduced. It is the empirical illustration of Path Dependence – a concept that he defines in the following way:

"A path-dependent sequence of economic changes is one of which important influences upon the eventual outcome can be exerted by temporally remote events, including happenings dominated by chance elements rather than systematic forces. Stochastic processes like that do not converge automatically to a fixed-point distribution of outcomes, and are called "non-ergodic". In such circumstances "historical accidents" can neither be ignored, nor neatly quarantined for the purpose of economic analysis; the dynamic process itself takes on an essentially historical character"[10]

David described how James Densmore in 1873 in an effort to reduce the frequency of typebar clashes on a typewriter made a four-row, upper case keyboard approaching the modern Qwerty standard. A famous arms maker took over the manufacturing of the machine – E. Remington and Sons.

The typewriter had a boom in the beginning of the 1880's and thus witnessed a rapid proliferation of competitive designs, manufacturing companies and keyboard arrangements rivalling the Remington. After 20 years Qwerty was still "The Universal" keyboard – it was so to speak "locked in" as the dominant keyboard arrangement.

[9] Paul A. David (1985): "Clio and the Economics of QWERTY"
[10] Ibid, p. 332

Why was that? David gives three reasons: Technical interrelatedness, which means that the overall user cost of the system would decrease as it gaines in acceptance relative to other systems and second economies of scale, where the intersystem competition lead towards standardization through the predominance of the Qwerty-system. In this situation with unbounded decreasing cost of selection, each stochastic decision in favour of Qwerty would raise the probability that the next selector would favour Qwerty – in formal theory this is known as the socalled "Polya urn scheme"[11] And finally third, quasi-irreversibility of investments in specific touch-typing skills – all because of the early alliance between the Qwerty-developer and the Remington any potential keyboard conversion cost would go up. Typewriters were as such already Qwerty-programmed.
This is the basic ingredients behind what might be called Qwerty-nomics and it is as were David's final comment a rather intriguing story for economists: competition in the absence of perfect futures markets drove the industry prematurely into standardization on the wrong system![12]

It is well known, that the later "Dvorak" keyboard system might give a faster way of typewriting, than use of the Qwerty-system. We would all be better off if the Dvorak-system were used all over – but as described in this situation competition did not force participants in the market to choose the most efficient technology.

As a parallel Arthur (1990) claims, that traditional economic theory on the assumption of diminishing returns often does violence to reality[13]. Diminishing returns imply a single equilibrium point for the economy, but positive feed back gives increasing returns – make for multiple equilibrium points. It is a crucial point to Arthur, that the acceptance of positive feedbacks, economists' theories are beginning to portray the economy not as simple but complex, not as deterministic, predictable and mechanistic, but instead as process dependent, organic and always evolving.

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[11] David refers to Brian Arthur, who has been working on the increasing returns problem that fits a general probability schema formulated by the mathematician George Polya. As David describes it, an urn containing balls of various colors is sampled with replacement, and every drawing of a ball of a specified color results in a second ball of the same color being returned to the urn. The probabilities that balls of specified colors will be added are therefore increasing functions of the proportions in which the respective colors are represented within the urn. As in his later book from 1994 Arthur states, that the outcome will be crucially affected by the early draws, which can lead to large changes in the proportions of the two colors in the urn and in contrast to Polya Arthur also allows for a more general and nonlinear function.
[12] For David this is no surprice and he gives an example from Veblen (1915), where he talkes about Britain's undersized railway wagons compared to Central Europe
[13] See Arthur (1990): Positive Feedbacks in the Economy

In later works Arthur (1996) develops on mechanisms of increasing returns that exist alongside those of diminishing returns. He[14] makes a rough proposition, that diminishing returns hold sway in the traditional part of the economy – the processing industries. Increasing returns reign in the newer part – the knowledge-based industries. In this kind of industry the process of positive feedback and increasing returns can turn this early lead into marked dominance.

Why is it then, that Arthur can give reasons for increasing returns?
At a first glance it is the so called Up-front Cost: High-tech products are by definition complicated to design and to deliver to the market place and requires high Research and Development costs.

Second: Network Effects where high-tech products needs to be compatible with a network of users – coordination effects are especially significant when technology has to be compatible with linked infrastructure.

Third: Customer Groove-In, which means that the products are difficult to use and therefore require training and users experiences are likely to spur further innovations in a product. Fourth: Adaptive expectations: The self-fulfilling character of expectations on how to "pick the right horse".

David and Arthur both tell a story of Path Dependence. It's about VHS videotapes ctr. Betamax videotapes or IBM's choice of Microsoft's DOS in stead of Digital Research's CP/M[15] . Users became familiar with VHS and DOS and establish a market lock in.

The story of Qwerty-nomics is an illustration of a path dependent process that in stochastic terms possess an asymptotic distribution that evolves as a consequence or a function of the process's own history – it is a non-ergodic stochastic process. Further more the idea of Path Dependence and increasing returns argues that the market does not always yield the best of all possible worlds and that there might be a place for government intervention[16]

[14] Arthur (1996): "Increasing Returns and Two Worlds of Business"
[15] Arthurs theory has also provided some of the intellectual underpinnings of the US Justice Department's case against Mircrosoft.
[16] Ian Kaplan (2000): A Review of Arthur's "Increasing Returns and Path Dependence in the Economy"

The economic historian and Nobel Laureat Douglass C. North has argued[17], that all Arthurs self-reinforcing mechanisms that lead to increasing returns can be applied in the study of institutional emergence and change. North wanted to investigate the following question, why have underdeveloped countries maintained a less efficient developmental path?
Neoclassical competition theory and international trade theory could not answer why fairly rapid convergence did not happen and North could by inspiration from Arthur see, that a better answer could be to acknowledge, that established institutions generate powerful inducements that reinforce their own stability and hinder further development[18]
There are three main causes that may explain the persistence of a suboptimal economic pathway:[19]

First, that Transaction costs are high due to non-competitive markets.

Second, political factors obstruct the institutionalization of property rights in such a way that competitive markets cannot operate properly.

Third, The established institutions are locked-in through path dependent self-reinforcement.

It is interesting to notice, that North proposes a kind of a more open Path Dependence concept, when he suggests:"Path-dependence is a way to narrow conceptually the choice set and link decision making through time. It is not a story of inevitability in which the past predicts the future"[20].
In his Nobel Prize Lecture (1993) North is absorbed by the concept of time – time as it relates to economic and societal change is the dimension in which the learning process of human beings shapes the way institutions evolve. In his opinion it is culture that provides the key to Path Dependence and he sees this term used to describe a powerful influence of the past on the present and future.
It is obvious that these variants of New Institutional Economics gave way of path-breaking new research, but also rather critical reactions. Let's start by the latter.

[17] North (1990): Institutions, Institutional Change and Economic Performance, p. 95
[18] Pierson, P.: "Increasing Returns, Path Dependence, and the Study of Politics", p.255
[19] A summary from Ebbinghaus, Bernhard (2005): Can Path Dependence Explain Institutional Change? Two Approaches Applied to Welfare State Reform
[20] North (1990), p. 98-99.

4. A negative critique from neoclassical economics

The Qwerty-nomics story gave rise to substantial controversy over the meaning of and implications of Path Dependence. Especially Liebowitz and Margolis (1990, 1995) have been exponents of a sharp critique.

In “The Fable of the Keys” (1990) they have references to ergonomics literature and these new studies provide evidence that the advantages of the Dvorak system compared to the Qwerty-system are nearly next to nothing. So they conclude that the evidence of this kind is flawed and incomplete. They also claim, that David uses a sterile model of competition and in this respect it is not surprising, that accidents have considerable permanence[21]. Consumers are given very little discretion to avoid starts down wrong path, they say. But the question is; what is the big difference if the model used by Liebowitz and Margolis is a model with a single, global “best” outcome[22]?

Later in 1995 the two authors go further to identify three types of Path Dependence. It is done because they are worried about Path Dependence has been offered as an alternative perspective for economics, a revolutionary reformulation of the neoclassical paradigm[23]

For Liebowitz and Margolis it is important to stress, that not all phenomenons that have been described as Path Dependence imply market failure, these normative concerns have been a prominent part of the Path Dependence literature, such that we by historical accident were left with the wrong types of automobiles, video recorders, nuclear power plants and of course the famous typewriter keyboards.

What is important in their presentation of three distinct forms of Path Dependence is that the two first offer little in the way of an objection to the neoclassical paradigm. The last and strongest form

[21] By simplicity they mean, (1990, p. 22):”In that model, an exogenous set of goods is offered for sale at a price, take it or leave it. There is little or no role for entrepreneurs. There generally are no guarantees, no rental markets, no mergers, no loss-leader pricing, no advertising, no market research”.
[22] See Richard J. Sullivan (2003):”Review of Peter Lewin (editor), The Economics of QWERTY: History, Theory and Polcicy” on EH.Net
[23] They refer to Arthur (1990), who distinguishes between ”conventional economics”, which largely avoids increasing returns or parth dependence, and the ”new” “positive feedback economics”.

challenges the neoclassical paradigm but that requires important restrictions on prices, institutions and so on.

According to Liebowitz and Margolis Path Dependence of first-degree are instances in which sensitivity to starting points exist, but with no implied inefficiency. Here we have an optimal decision based on perfect forsight.

The second-degree of Path Dependence concerns a situation of imperfect knowledge, where efficient decisions may not always appear to be efficient in retrospect. This can imply outcomes that are highly regrettable and costly to change. One of Liebowitz and Margolis close follower Lewin (2002) characterizes David's historical examples as corresponding to second-degree Path Dependence[24]

If an efficiency outcome can be characterised as a third-degree Path Dependence the initial conditions leads to an outcome that is inefficient – but also "remediable", which according to Williamson (1993) describes the condition that feasible alternatives exist, and urges remediability as the appropriate standard for public policy discussion. This type of path in contrast to the two other weaker paths supposes the feasibility, in principle, of improvements in the path and conflicts with the neoclassical model of rational behaviour.

For Liebowitz and Margolis the special importance of Path Dependence is associated with third-degree claims – that is, inherited inefficiencies that purportedly are, or were, remediable. Communication, planning, property and other market institutions are absent from the models of David and Arthur and that implies a logic underlying Path Dependence that is seductive but incomplete. And as long as the story of Qwerty still remains the paradigmatic case for Path Dependence it surely indicates according to Liebowitz and Margolis, that the empirical content of this theory is thin.

[24] See Richard J. Sullivan (2003):"Review of Peter Lewin (editor), The Economics of QWERTY: History, Theory and Polcicy" on EH.Net

Puffert (2008)[25] summarizes this position in a way that purposeful, rational behaviour of forward-looking, profit-seeking economic agents can override the effects of events in the past – except where the costs of a remedy, including transactions costs, are greater than the potential benefits.

In a Kuhnian sense there is a lack of agreement on what the debate is about. Market failure has in Puffert's optic not been the primary concern of proponents of the importance of Path Dependence. – this is, however, the primary concern of Liebowitz and Margolis. David argues for the legitimacy of stochastic economic models with multiple equilibria (potential outcomes) and Liebowitz and Margolis forcefully and effectively argue that economic processes can move an economy out of clearly undesirable situations. And this is probably the main reason why the discussants failed to meet head on.

Puffert concludes, that Path Dependence arises, because there are increasing returns to the adoption of some technique or other practice and because there are costs in changing from an established practice to a different one. All though the theory of Path Dependence is not an alternative to neoclassical economics but rather a supplement to it, he says. The theory assumes, that people optimize on the basis of their own interests and the information at their disposal. The theory offers reason to believe that some – or perhaps many – economic processes have multiple possible paths of outcomes. Liebowitz and Margolis have said little about the allocation process, but David argues, that models that are path dependent might describe a process and can be useful in an effort to develop a theory of economic change, with history as a central element[26]

Another central point is, that in Puffert's opinion[27] it is not possible at the moment to assess the overall importance of Path Dependence, either in determining individual features of the economy or in determining larger patterns of economic activity. But what can be interesting is that empirical case studies can offer examples of how choices or events have led to establishment, and "lock in" of particular techniques, institutions, and other features of the economy.

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[25] Douglas Puffert (2008): Path Dependence. EH.Net Encyclopedia

[26] See Richard J. Sullivan (2003):"Review of Peter Lewin (editor), The Economics of QWERTY: History, Theory and Polcicy" on EH.Net

[27] Douglas Puffert (2008): Path Dependence. EH.Net Encyclopedia

5. A more positive interpretation from a Post Keynesian angel

For many years there has been a discussion in economics between the former introduced New Institutional Economics and Old Institutional Economics on the origins, nature and role of institutions in capitalism. The latter can be characterised by a historical, structural approach in contrast to a much more reductionist approach in New Institutional Economics.

By inspiration from North (1985) and Cornwall (1990) Setterfield tries to use the best from these two institutional approaches which excludes simple historicism and standard equilibrium metaphors[28]. The new approach is called Institutional Hysteresis and the central feature of institutions is that it is best treated as an evolving, non-optimal, Path Dependent phenomena.

According to Setterfield, the institutional structures of an economy may be best conceived in terms of a process of hysteresis. And it exists when the long-term value of a variable depends on the value of the variable in the past, by virtue of the influence of this pas value on the alleged exogenous variables that characterize the system that determines the variable. In other words, hysteresis will exist when current institutions influence the nature of current economic activity, which in turn influences subsequent institutional forms.

Long-term institutional changes are path dependent[29]. These changes can only be interpreted in terms of the sequential, short-term patterns of economic activity leading up to them – patterns of activity that themselves are influenced by previously existing institutions.

After 1993 Setterfield continues his work on developments in path dependent organizing concepts[30]. He identifies three important types of Path-dependence, which can facilitate the modelling of economic processes along historical lines. It is as already mentioned hysteresis, but also cumulative causation especially with inspiration from Kaldor and lock-in as presented above by inspiration from David and Arthur.

[28] Setterfield (1993): A Model of Institutional Hysteresis, p. 755
[29] Setterfield (1993), p. 761
[30] Setterfield (1995, 1997)

Still Setterfield has a reservation on these concepts because he is not sure, that any of these organizing concepts faithfully can replicate all nuances of the philosophical construction that historical time is. Off cause it is important to scrutinize concepts of Path Dependence he says, in order to establish their affinity (or lack thereof) with basic features of historical time such as fundamental uncertainty or irrevocability[31]. Setterfield hopes, that the different concepts of Path Dependence at least may be conceived as embodying what he calls "low-level" conceptualization of historical time[32].

The lesson from Institutional Hysteresis of short-term exogeneity/long-term endogeneity of institutions in a model, is used by Setterfield in an interpretation of Kregels famous article on Economic methodology in the Face of Uncertainty. What is at focus is Keynes' shifting equilibrium model. This is also by some called Keynes' complete dynamic model, where short-run expectations can be disappointed and the state of long-run expectations is treated as non constant and crucially short-run and long-run expectations are interdependent[33]. In short the results of this theoretical model show an actual path of an economy over time chasing an ever changing equilibrium, and that it never catches it. Second: Changes in animal spirits that ultimately produce path dependent changes within the model are not imposed on the model from without – rather, they are endogenous but indeterminate.

The general message from Setterfield is that not all of the path dependent organising concepts do a good job of imitating the properties of historical time[34]. He recommends that Post Keynesians must be judicious in their assessment, construction, and use of path dependent organizing concepts and also to develop models of economic processes to rival those of the neoclassical orthodoxy.

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[31] In a comment to these concepts of Path Dependence Setterfield (1997) states:"To claim that these concepts somehow "encompass" all facets of the contributions of authors such as Knight, Keynes, and Shackle would be a gross mistake indeed – not least because this claim is, quite frequently, demonstrably false".

[32] Setterfield (1998), p. 524: "low level, embodied in specific concepts of path dependency (such as cumulative causation) that can be used in practical modeling exercises". In his study of Kaldor Setterfield also became aware of, that the features of various different concepts of path dependency are, themselves, qualitatively different.

[33] Setterfield (1999):"Expectations, Path Dependence and effective demand: a madroeconomic model along Keynesian lines", p.484.

[34] Setterfield (1998):"Path dependency and animal spirits: a reply", p. 169. "Lock in" is fx not doing a good job

It is worth noting, that Tony Lawson (1997) saw David's work on Path Dependence as a way to remind people of the inevitable heavy weight of the past in the present[35]. On the other hand he warns against a simple interpretation of the case study of Qwerty, because it is not so, that once a technology or social structure is in place then it can be treated as locked-in for food – that the past is not only ever present but also all determining!

All though Lawson agrees with David, that it is a quite interesting project to link the present state of outcomes with some originating context, which means that some sequence of connecting events that allow the hand of the past to exert a continuing influence upon the shape of the present[36]. In this way Lawson sees Path Dependence literature as a useful contribution to economics – also from the angel of critical realism.

[35] Tony Lawson (1997): Economics and reality, p. 251
[36] David (1994), p. 206

6. A positive critique from other social sciences

The concept of Path Dependence has been exported to other social sciences – even if it is not well known to economists the concept has been adopted and developed in different directions. But the results from this process have apparently not been re-exported to economics.
No doubt it is Douglass North application to issues of institutional emergence and change that offset Path Dependence studies for students of politics[37]. What Arthur observed on factors behind increasing returns is possible for North to transform into the study of institutions. New institutions normally requires high start-up costs, they involve learning and coordination effects and adaptive expectations. Established institutions on the other hand reinforce their own stability.
According to Pierson[38] Politics differ from economics in many ways:

1) the central role of collective action,
2) the high density of institutions,
3) the possibilities for using political authority to enhance asymmetries of power and
4) its intrinsic complexity and opacity.

Each of these features makes increasing returns processes prevalent in politics.

Pierson (2000) establish the following features of political life, where Path Dependence is at work[39]:

1. Multiple equilibria. Under a set of initial conditions conducive to increasing returns, a number of outcomes – perhaps a wide range – are generally possible.
2. Contingency. Relatively small events, if they occur at the right moment, can have large and enduring consequences.
3. A critical role for timing and sequencing. In increasing returns processes, the moment when an event occurs may be crucial. Because earlier parts of a sequence matter much more than later parts, an event that happens "too late" may have no effect, although it might have been of great consequence if the timing had been different.

[37] Pierson (2000): Increasing returns, Path Dependence, and the Study of Politics, p. 255
[38] Pierson (2000), p. 257
[39] Pierson (2000), p. 263

4. Inertia. Once an increasing returns process is established, positive feedback may lead to a single equilibrium. This equilibrium will in turn be resistant to change.

In the later years Path Dependence has become a very important notion in diachronic approaches to understanding social and political processes. It is an appealing concept for understanding public policy development[40] - it encapsulates the insight that policy decisions accumulate over time; a process of accretion can occur in a policy area that restricts options for future policy-makers. Examples of analyses are numerous but to mention a few: Health care policy in US and the UK, the reform of housing benefit in the UK, the UK pension policy, the Common Agricultural Policy of the EU.

Path dependency encourages explicit attempts at dynamic analysis[41]. In this sense, dynamic means that time is an independent variable in the explanation of change. This contrasts with comparative static explanations of change and development where time simply is a dependent variable.

According to Pierson (2004) one of the crucial features of a historical process that generates Path Dependence is positive feedback or self-reinforcement. A successive step down a path increases the likelihood that a particular event or choice will be repeated[42]. Because of many kinds of potential complexity in policy studies, there can be several mechanisms,that lead to path dependency. One is already mentioned, namely increasing returns, but others can be negative feedback, reactive sequences or cyclical processes.

Another developmental path in the study of institutional change is a development of the concept of Path Dependence from a simple, deterministic concept to more open Path Dependence as a study of a wider range of long-term institutional evolutionary processes[43]. That gives a variety of forms in Path Dependence f.ex. path continuation, departure, switching or cessation. Taxonomy of this kind of changes is still being developed. Another example is path shaping and path depending[44]

------ these points will be developed further!!

[40] Adrian Kay (2005): A Critique of the Use of Path Dependency in Policy Studies, p.558
[41] Adrian Kay (2005), p. 559
[42] Bennet and Elman (2006): Complex Causal Relations and Case Study Methods: The Example of Path Dependence, p.256.
[43] B. Ebbinghaus (2005): Can Path Dependence Explain Institutional Change?, p. 24.
[44] Jacob Torfing (1999, 2001)

7. Concluding perspective: Possibilities and limits of Path Dependence

In it's most simple form Path Dependence is an expression of the idea that history matters. It is a way of bringing history into economics. That of cause is interesting in the sense of the classical Joan Robinson way of expressing the difference between the past and the future. Choices made in the past can possibly affect present decisions and have consequences in the future.

But Path Dependence is as such a universal term without social and historical content – and there is still no clear analytical framework for evaluating, integrating or developing the concept of Path Dependence. Although there are some interesting features that can be observed by the use of the concept in economics, but also by cross-fertilize this work with much of the work from other social sciences.

As the presentation above shows, Path Dependence has had different meanings the last 25 years. Starting from New Institutional Economics, where Qwerty-nomics describes a specific locked-in of technology developing to a case of increasing returns and institutional reproduction. In a more strict neoclassical sense the third degree of Path Dependence is a very special case. In the Post Keynesian case there is room for institutional hysteresis, cumulative causation and technological lock-in. In other social sciences the concept of Path Dependence is even more widened.

Why is that?

Path Dependence is a metaphor that leaves the user all over in the social science in a three-lemma because the concept is not an empirical notion alone; neither a methodological device on its own; nor solely a theoretical construction. It is at best a mixture of all these components and there are as described a lot of possible combinations.

As an analytical device Path dependence gives a possibility to freeze and analyse activities with an initial critical juncture and some kind of following path reproduction. Though the question is, what kind of explanatory power does it give? In some way Path Dependence refers to a string of related

events – it is causality in retrospect. Raadschelders (1998) states that the concept not even comes close to a mechanism that propel social change[45]. Two problems can be raised here. Will the notion of a path provide any fine-grained mechanisms that might provide necessary and sufficient conditions for the process observed. There is a risk that mechanisms operate at a lower level to that being explained, which implies that the concept cannot be used for current or future phenomena. Even if it is an ambition to gain some degree of generalizability another problem is, that history does not repeat itself in all cases.

The explanatory power is also related to the kind of explanations that are given. Explanations are functionalist[46]. When a contingent event initially selects a particular technology or institution the functionalist logic identifies predictable self-reinforcing processes. As a consequence the technology or institution that is ultimately adopted may be less functional in the long-run than alternatives that could have been developed – a functional explanation assumes an efficient historical process, even if the outcome is not optimal. Another way of dealing with this problem is to move a way from the systemic way of using Path Dependence by help from intentional models of explanation.

This will require a move forward of the study of social mechanisms of institutional change, but it is still at its beginning[47]. No doubt that it is a rather deterministic conception of Path Dependence that is delivered from New Institutional Economics. The Polya Urn model is a study of a closed system with non-change or a repetition of basic decision and where the outcome is a result of deterministic persistence through self-reinforcement. Ebbinghaus[48] maintains that:"In historical-institutionalist studies, the concept of Path Dependence has been used in a broader, non-deterministic sense; the concept "path" is not primarily used to describe the emergence and persistence of an (unchanged) institution by repeated uniform basic decisions of individual actors, but the long-term developmental pathway of an institution, or complex institutional arrangement, shaped by and then further adapted by collective actors". Economic history is only one of many disciplines in social sciences that have increasingly used the more open Path Dependence concept to describe institutional development.

[45] Adrian Kay (2005), p. 561
[46] James Mahoney (2000), p. 519
[47] Bernhard Ebbinghaus (2005), p. 24
[48] Ebbibnghaus (2005), p. 14

It can also be argued like Hall[49], that as we have sought to understand and explain complexity in social and political life our ontologies have outrun both our methodologies and standard views of explanation. This means that analysis based on Path Dependence are at odds with standard regression techniques and conventional comparative method to provide valid causal inferences. Causal complexities like tipping points, high-order interaction effects, strategic interaction, two-directional causality or feedback loops, equifinality and multifinality requires new forms of process tracing and systematic case studies to address issues of Path Dependence[50]. There have to be more room for Case study methods that elucidate how causal mechanisms operate in context, tracing rare events and "left out variables". This is one of the interesting features with Path Dependence, that it gives rise to studies of ever more sophisticated forms of complexity and bring economics nearer to historical time.

Finally Paul David (2005) has recently emphasized, that the whole point of Path Dependence is to restore the importance of causal, historical economic explanation involving sequential actions – most of all because Path Dependence should highlight the interactions between purposeful action and positive unforeseen feedbacks. This is a quit interesting path in the further development of Path Dependence.

[49] Bennet and Elamn (2006), p. 250
[50] Bennet and Elman (2006), p. 251

REFERENCES

(NOT COMPLETE)

Altman, Morris (2000): A behavioural model of path dependency: the economics of profitable inefficiency and market failure. The Journal of Socio-Economics, 29, 2000

Athanasiades, H. & Patramanis, A. (2002): Dis-embeddednes and de-classification: modernization politics and the Greek teacher unios in the 1990s. Sociological Review, 2002

Arthur, Brian (1990): Positive Feedbacks in the Economy. Scientific American, 262, 1990

Arthur, Brian (1994): Increasing Returns and Path Dependence in the Economy. University of Michigan Press

Arthur, Brian (1995): Complexity in Economic and Financial Markets. Complexity, vol. 1, April 1995

Arthur, Brian (1996): Increasing Returns and the New World of Business. Harward Business Review, July-Aug., 1996

Arthur, Brian, Steven Durlauf and David Lane (1997) ed.: The Economy as an Evolving Complex System II

Arthur, Brian (1999): Complexity and the Economy. Science, 2 April 1999, 284, 107-109

Arthur, Brian (1999): The End of Certainty in Economics. The Biology of Business – reprint

Arthur, Brian (2000): Cognition: The Black Box of Economics. From Colander: The Complexity Vision and the Teaching of Economics. Edward Elgar

Bateman, Bradley W. (1996): Keynes's Uncertain Revolution. The University of Michigan Press

Bengtsson, Bo (2004): Swedish Housing Corporation – A case of Path Dependence? Paper to be presented at the ENHR 2004 Conference

Bennett, A & Elman, C. (2006): Complex Causal Relations and Case Study Methods: The Examle of Path Dependence. Political Analysis 14:250-267

Carlyle, Thomas (2000) Review of Arthur, Brian (2000): Increasing Returns and Path Dependence in the Economy, www.bearcave.com

Cheiladaki-Liarokapi, Maria (2007): The Model of Path-Dependency and The Comparative Analysis of the EU Policy-Process. Political Perspectives 2007, vol. 1

Chick, V. (1998): On knowing one's place: The role of formalism in economics. The Economic Journal, 108, November

Chick, V. (2003): The Future is Open: On open-system theorising in economics. Paper presented at the Cambridge Journal of Economics Conference, Cambridge, 2003

Chick, V. (2003): Theory, method and mode of thought in Keynes's General Theory. Journal of Economic Methodology 10:3, September 2003

Chick, V. (2005): The meaning of open system. Journal of Economic Methodology, 12:3

Cornwall, W. & Cornwall, J (2006): a Future for Keynesian macroeconomics. In Essayns in Honour of Basil J. Moore. Edward Elgar

Crouch, C. & Farrell, H. (2004): Breaking the Path of Institutional Development? Alternatives to the New Determinism. Rationality and Society, vol. 16 (1)

Currie, Martin & Steedman, Ian (1990): Wrestling with time – problems in economic theory. Manchester University Press

David, Paul A. (1985) Clio and the Economics of QWERTY. American Economic Review (Papers and Procedings), 75:332-37

David, Paul A. (1997): Path Dependence and The Quest for Historical Economics: One More Chorus of the Ballad of QWERTY. Discussion Papers in Economic and Social History, Number 20, November 1997, University of Oxford

David, Paul A.(1999): "Myth"-informing the Public about Public Goods and Qwerty. http://eh.net

David, Paul A. (2007): Path Dependence: a foundational concept for historical social science. Cliometrica 1:91-114

Davis, Jonathan S. (2004): Conjuncture or Disjuncture? An Institutionalist Analysis of Local Regeneration Partnership in the UK. International Journal of Urban and Regional Research, vol 28.3 September 2004

Deeg, Richard (2001): Institutional Change and the uses and Limits of Path Dependency: The Case of German Finance. MPIfG Doscussion Paper 01/6, Cologne

Deprez, Johan (2001): Risk, Uncertainty, and Nonergodicity in the Determination of Investment-backed Expectations: A Post Keynesian Alternative to Posnerian Doctrine in the Analysis of Regulatory Takings. Loyola of Los Angeles Law Review, 34:122, April 2001

Dow, S. (2005): Axioms and Babylonian Thought: a reply. Journal of Post Keynesian Economics, vol 27, 2005

Dow. A. & Dow, S. (2007): History for Economics: Learning from the Past. Paper presented at HETSA Annual Conference, Brisbane, July, 2007

Ebbinghaus, Bernhard (2005) Can Path Dependence Explain Institutional Change? Two Approaches Allied to Welfare State Reform. MPIfG Discussion Paper 05/2, Cologne

Ebbinghaus, Bernhard (2006): From Path Dependence to Path Departure in Welfare Reform Analysis. European Politics And Society, vol. 5, no. 2

Fine, Ben (2004): Addressing the critical and the real in critical realism. In transforming economics, ed. By Paul Lewis

Fontane, Giuseppe (2004): Hicks on monetary theory and history: money as endogenous money. Cambridge Journal of Economics 2004, 28, 73-88

Fontana, Giuseppe (2006): The future of Post Keynesian economics. Banca Nazionale del Lavoro Quarterly Review, March 2006

Gartland, Myles P. (2005): Interdisciplinary views of sub-optimal outcomes: Path dependence in the social and management sciences. The Journal of Socio-Economics 34

Graefe, Peter (2004): Welfare Regimes and the Third Sector: Rendering Path Dependency Contingent? Paper, Toronto, july 14, 6th International Conference of the International Society for Third-Sector Research

Guy Peters, B. (?): Path Dependence and Public Sector Reform. Draft. University of Pittsburgh

Greener, Ian (2005): The Potential of Path Dependence in Political Studies. Politics, vol. 25(1), 2005

Greener, Ian (2007): Reply, Two Cheers for Path Dependence – Why it is Still Worth Trying to Work with Historical Institutionalism: A Reply to Ross. British Politics,2, 2007

Hall, P.A. & Taylor, C.R. (1996): Political Science and the Three New Institutionalisms. MPIfG Discussion Pater 96/6, Cologne

Hicks, John (1969): A Theory of Economic History. Oxford

Hmimda, Naqssef (2004): Escaping from the dominant paradigm in food mass distribution industry in France. Paper, DRUID Conference, Aalborg January 2004

Jespersen, Jesper (2002): Keynes' methodological novelty "Quaesitum" and its importance for Post Keynesian macroeconomics. Paper presented af INEM Conference, Stirling, 2002

Jespersen, Jesper (2002): Macroeconomic Methodology Matters, Paper partly presented in Leeds at a PKSG meeting

Jespersen, Jesper (2004): Keynes-inspireret makroøkonomisk teori, Research Paper no 11/04, Roskilde University

Jespersen, Jesper (2007): Makroøkonomisk metodologi – i et samfundsvidenskabeligt perspektiv. København

Jessop, Bob & Klaus Nielsen (2003): Institutions and Rules. Research Paper no. 11/03. Network Institutional Theory

Kay, Adrian (2005): A Critique of the Use of Path Dependence in Political Studies. Public Administration, vol. 83, no. 3, 2005

Keynes, J.M. (1930): Treatise on Money

Keynes, J.M (1936): The General Theory of Employment Interest and Money. Macmillan

Keynes, J.M.: Collected Writings, vol. XIV and XXIX

Koch, J, Eisend, M & Petermann, A (?): Complexity, Decisions-Making and Cognitive Path Dependency: An Experimental Study. Free University of Berlin

Krugman, Paul (1998): The Legend of Arthur.http:// Web.mit.edu/krugmann

Lawson, Tony (1997): Economics and Reality – Economics as Social Theory. Routledge

Libano, Gilberto A. (2004): Unit Roots in Macroeconomic Time Series: A Post Keynesian Interpretation.Texto Para Discussao no 233, UFMG, Cedeplar

Liebowitz, S. J. & Margolis, S.E. (1990): The Fable of the Keys. Journal of Law & Economics, vol. XXXIII, April 1990

Liebowitz, S. J. & Margolis, S. E. (1995?): Path Dependence, Lock-In, and History. www.utdallas.edu

Liebowitz, S. J. & Margolis, S.E. (1995): Policy and Path Dependence – from QWERTY to Windows 95. Regulation vol. 18, no. 3

Ma, Shu-Yun (2007): Political Science at the Edge of Chaos? The Paradigmatic Implications of Historical Institutionalism. International Political Science Review, vol. 28, no. 1

Mahoney, James (2000): Path Dependence in Historical Sociology. Theory and Society, vol 29, no. 4, Aug 2000, 507-548

Martin, Ron & Sunley, Peter (2006): Path dependence and regional economic evolution. Journal of Economic Geography, 2006 Page 1-43

North, Douglas (1993): Economic Performance through Time. Nobel Prize Lecture

Page, S.E. (2006): Pat Dependence – Essay. Quarterly Journal of Political Science, 2006, 1

Puffert, Douglas (2000): Path Dependence, Network Form, and Technological Change. Paper prepared for the conference in honor of Professor Paul A. David, Stanford June 2-3, 2000

Puffert, Douglas (2008): Path Dependence. EH.Net Encyclopedia

Pierson, Paul (2000): Increasing Returns, Path Dependence, and the Study of Politics. The American Political Science Review, vol. 94, no. 2
Rosser, J. Barkley (2005): Complex Dynamics and Post Keynesian Economics. From Complexity: Endogenous Money and Macroeconomics: Essays in Honour of Basil J Moore. London
Schmidt, R.H. & Spindler, G. (2002): Path Dependence, Corporate Governance and Complementarity. International Finance, 5:3, 2002
Setterfield, Mark (1993): a Model of Institutional Hysteresis. Journal of Economic Issues, vol. XXVII, no 3. September
Setterfield, Mark (1997): Should Economists dispense with the Notion of Equilibrium. Journal of Post Keynesian Economics, vol. 20 Issue l
Setterfield, Mark (1998): History versus equilibrium: Nicholas Kaldor on historical time and economic theory. Cambridge Journal of Economics, 22, 1998
Setterfield, Mark (1998): Path Dependency and animal spirits: a reply. Journal of Post Keynesian Economics, vol. 21, no. 1
Setterfield, Mark (1999): path dependency. Encyclopedia of Political Economy. Routledge
Setterfield, Mark (1999): Expectations, path dependence and effective demand: a macroeconomic model along Keynesian lines. Journal of Post Keynesian Economics, vol. 21, no. 3
Setterfield, Mark (2005): Evolution and Path Dependence in Economic Ideas: Past and Present. Eastern Economic Journal, January 2005
Sullivan, Richard J. (2003): Review of The Economics of Qwerty: History, Theory and Policy – Essays by Stan Liebowitz and Stephen Margolis
Torfing, Jacob (1999): Towards a Schumpeterian workfare postnational regime: path-shaping and path-dependency in Danish welfare state reform. Economy and Society, vol. 28 no. 2
Torfing, Jacob (2001): Path-Dependent Danish Welfare Reforms: The Contribution of the New Institutionalisms to Understanding Evolutionary Change. Scandinavian Political Studies, vol. 24, no. 4
Vickers, Douglas (1994): Economics and the Antagonism of Time – Time, Uncertainty, and Choice in Economic Theory. The University of Michigan Press
Yalcintas, Altug (2006): Stories of Error and Vice Matter: path Dependence, Paul David, and Efficiency and Optimality in Economics. MPRA Paper, no. 749, 2007, Munich