



Tidsaspekter i Keynesiansk teori

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TIDSAPEKTER I KEYNESIANSK TEORI Ph.D afhandling

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I

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ROSKILDE UNIVERSITY

The Doctoral School of Social Sciences and Business

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Forord

Mit akademiske arbejde startede lang tid før, fænomenet Ph.D.-afhandling blev introduceret og ligeledes lang tid før, at forskning blev påbegyndt i en skole og som en uddannelse.

Tvært imod har der været mulighed for at søge frit rundt i en slags kreativ mesterlære efter spændende og relevant viden. Ikke mindst de forskere, der var med til at etablere Aalborg Universitetscenter og med hang til videnskabsteori havde spændende ideer, som jeg søgte. Ingen nævnt, ingen glemt! Dette har stimuleret tvivlens nådegave og opsøgende nysgerrighed, som efter min opfattelse er meget fundamentale vilkår for åndsarbejdet på et universitet.

Der har i det nuværende institut og i tidligere institutter været opbakning og økonomisk støtte til også at dyrke min særlige interesse for tidsbegreber i den økonomiske tænkning, men også mange andre ting. Ligeledes har min tilknytning til Forskningsprojektet, MAMTEP, været til stor inspiration og været den endelige drivkraft i at få gjort denne afhandling færdig til drøftelse. Jeg er alle tak skyldig.

Afslutningsvis vil jeg rette en særlig og varm tak til min familie, som har udvist stor forståelse for at dette arbejde skulle lykkes – også i de tilfælde, hvor jeg har taget ophold på Ørslev Kloster for at kunne koncentrere mig hundrede procent om opgaven. Ind imellem har jeg sikkert været ret introvert, men i perioder også ganske svimmel af at tænke over – tid! Uden familiens opbakning var det ikke lykkedes.

Ligeledes er jeg taknemmelig for Institut for Samfundsvidenskab og Erhverv's interesse i at drøfte dette tema om tidsapekter i Keynesiansk teori.

Mogens Ove Madsen

Aalborg, maj 2019

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Resume

John Hicks retræte fra IS-LM tilgangen til makroøkonomi er det egentlige udgangspunkt for denne afhandling. Hicks (1975) opgør med IS-LM diagrammet er direkte relateret til tidsbegrebet, idet han siger, at det, der refererer til tid er likviditetspreferencen og kapitalens marginale effektivitet, hvor: "time and uncertainty are written all over it", medens teorien om produktion og multiplikatoren er uden for tid. Hicks opererer her med et begreb, hvor tid betragtes som irreversibel.

Herved blev der anslået et forskningstema, som er blevet en livslang følgesvend (se bilag 1). Og hvad har det så bestået af?

For det første blev jeg på et tidligt tidspunkt præsenteret for J.M.E. McTaggarts distinktion mellem A- og B-serier. A-serien relaterer til fundamentale aspekter af ændring og bevægelse, og begreberne – fortid, nutid og fremtid – konstituerer dette tidsbegreb. B-serien karakteriserer en statisk tidsrelation mellem begivenheder, som kan placeres langs med en tidslinie. B-serien rummer således en fiksering af begivenheder som henholdsvis før, simultant og efter.

For det andet har Den keynesianske revolution i mange år givet anledning til forskellige udlægninger. Mit udgangspunkt er dog fortsat, at den bedst kan karakteriseres som en revolution i Kuhnsk forstand.

Til gengæld er Keynes' analysemetode ofte blevet misforstået. Hans grundlæggende teoretiske antagelser er ofte blevet fortolket ved anvendelse af statisk

ligevægtstænkning på trods af det faktum, at det var en tilgang, han forsøgte at undslippe. Keynes havde nemlig også forpligtet sig selv til at udmejsle en ny metode i den økonomiske videnskab, som kunne legitimere de teoretiseringer omkring nye relationer i den økonomiske tænkning, han havde lagt frem.

Den grundlæggende problemstilling, jeg på denne baggrund har interesseret mig for kan formuleres på følgende måde: "Hvorledes bringes historie og teori sammen?" og "Hvad kan vi lære af den keynesianske kamp for en systematisk tids-analyse?"

Mine overvejelser i forlængelse af disse spørgsmål blev herefter præget af hvordan og i hvilken udstrækning økonomiske teorier/modeller når frem til at få kontakt med den økonomiske virkelighed. Der blev givet tre muligheder for at nærme sig virkeligheden: Enten 1) blot umiddelbart at berøre eller være en anledning til en teoretisk overvejelse eller 2) opfange en struktur eller nogle aktuelle institutionelle forhold eller 3) ikke kun at opfange en struktur men også at kunne håndtere historiske processer.

Derfor er det interessant at se, hvor og hvorledes arven fra Keynes bæres videre, det vil sige, hvilke aspekter af tidsbegrebet, der lægges vægt på. Her skal fremhæves tre økonomer, som kendte og udvekslede synspunkter med Keynes, nemlig GLS Shackle (1903-1992), Joan Robinson (1903-1983) og JR Hicks (1904-1989).

Keynes tre efterfølgere er således ikke i tvivl om tidsbegrebets betydning, når de tolker og udlægger Keynes' teoretiske arbejde. På denne baggrund er det næste oplagte skridt at kigge på disse forfatteres eksplicitte analyser af forholdet mellem tid og økonomi, hvilket de alle sammen har beskæftiget sig med. Dette indebærer følgende spørgsmål:

- 1. Hvilken tænkemåde ligger bag Maynard Keynes opfattelse af begrebet tid?
- 2. Hvorledes er det muligt at håndtere fortid, nutid og fremtid i Keynes' forstand?
- 3. Kan der udledes nogle generelle krav til eksplicit håndtering af tid i økonomi?

De 6 artikler:

Gennemgangen af Keynes egne arbejder har som metodologisk udgangspunkt at afklare noget af den tænkemåde, der ligger bag ved Keynes' teori. I artikel 1 synliggøres det, at nogle erkendelser kommer tidligt i en videnskabelig karriere – således forholder det sig også med Keynes og hans paper fra 1903 om tid. Det er ligeledes tydeligt, at Keynes i sit paper om tid forbinder tid med ændring – tid er således ikke absolut, men relativ. Keynes tror ikke på et homogent eller absolut tidsbegreb, hvilket også sidenhen kommer til at præge hans teoretiske arbejde.

I artikel 2 er det hensigten at klarlægge tidsbegrebets ydre form og indre opbygning – med andre ord dets anatomi. For også her at afklare Keynes' tænkemåde bliver der anlagt tre vinkler for at kunne bestemme tidsbegrebets anatomi. Det er Keynes' filosofiske baggrund, hans generelle opfattelse af samfundet samt hvorledes han behandler tid i de økonomiske analyser.

I artikel 3 er det Shackles forståelse af, hvorledes Keynes opererer med henholdsvis forventningsbaseret og mekanisk tid, der sættes fokus på, hvilket kommer til udtryk i overvejelserne omkring "outside and inside observer". Hertil kommer den interessante udlægning af Keynes' metode som Keynesian kaleidics. Selv om Shackle lægger meget

vægt på Keynes' usikkerhedsbegreb fører det dog ikke til nihilisme, men til at fremtiden kan skabes som en fantasi, som kan nedfældes via scenarie-skrivning.

Hicks har med stor ydmyghed og selvkritik analyseret og skrevet sig væk fra generel ligevægtsteori. Det interessante i artikel 4 er, hvorledes han selv efter mange års arbejde med steady-state økonomi til sidst tager et opgør med IS-LM diagrammet på grund af et manglende tidsbegreb. Han erkender, at tid er irreversibel og ikke kan indfanges med rumslig geometri. Hicks bliver efterhånden klar over, at naturvidenskabelige metoder ikke er til nogen hjælp i økonomi, hvilket også afspejles i hans sene skriverier.

En nyere tilgang til tidsbegrebet er ideen om Path Dependence. I Post-keynesiansk regi har Path Dependence forskellige fremtrædelsesformer, så som hysterisis, kumulative årsagssammenhænge og teknologisk lock-in. Det positive er, at der kan hentes inspiration fra andre samfundsvidenskaber, som er kommet længere med at anvende Path Dependence. Dette er en oplagt læringsmulighed for og kan omsættes til Generation II Path Dependence i økonomi. Her anbefales brug af case studier til sporing af processer. Dette kan yderligere kombineres med sekvensanalyser af begivenheder og egentlige narrative analyser.

Den sidste artikel 6 kan opfattes som en opsamlede artikel, idet den forsøger at svare på hvilke betingelser, der skal være opfyldt, hvis en økonomisk analyse i keynesiansk forstand reelt skal kunne håndtere tid. Der er fire hensyn, der skal tages, hvis tid skal integreres i den økonomiske tænkning. Det gælder valg af tidsenhed, da denne er helt afgørende for, hvad det er muligt at opfange, når det gælder studiet af adfærd i økonomi. Det drejer sig også om at kunne skelne mellem unik og repetitiv adfærd.

Sidstnævnte er let at modellere, men førstnævnte er afgørende i analysen af store ændringer i en økonomi. Det er også vigtigt at fastslå, hvornår en analyse er inden og udenfor tid. Sidstnævnte kan bidrage til mekaniske modelarbejder, medens førstnævnte rummer grundlaget for, hvordan studiet af adfærdsændringer kan føre til åbenbaring af nye udviklingsveje i en økonomi.

I det sammenfattende forskningsperspektiv gøres det klart, at studier af John Maynard Keynes selv og en række af hans efterfølgere ikke efteralder tvivl om, at tidsbegrebet indtager en central betydning i økonomiske analyser. Det er også uomtvisteligt, at det i McTaggarts forstand er A-serien med fortid, nutid og fremtid, som er fokus og ikke alene B-serien med før, nu og efter. Den keynesianske teori er således kendetegnet ved at tilføre den økonomiske tænkning et nyt aspekt omkring tid.

Forskningsperspektivet med baggrund i keynesianske tidsperspektiver er således at tage udgangspunkt i en sammensmeltning af det intentionale og det successive tidsbegreb. På denne måde bringes historien tilbage i den økonomiske analyse. Man kan gøre sig den forestilling, at analysetilgangen med et horisontalt, mekanisk bevægelsesmønster egentlig rejses på højkant, hvor det væsentlige er at klarlægge, de afhængige og uafhængige variable og især klarlægge de mulige adfærdsmønstre og forventninger, der kan påvirke en fremtidig udvikling. Herefter kan der opregnes en mangfoldighed af scenarier omkring den økonomiske udvikling.

English summary

John Hicks retreat from the IS-LM approach to macroeconomics is my real starting point for this study. Hicks (1975) showdown with the IS-LM diagram is directly related to the concept of time. As he says, time is related to the liquidity preference and the marginal efficiency of capital, where: "time and uncertainty are written all over it", while the theory of production and the multiplier is out of time. Hicks operates with a concept of time which is considered irreversible.

In this manner, there was provided a research topic, which has become a lifelong companion (see appendix 1). And what has it been like?

Firstly I got at a very early stage insight into J.M.E. MacTaggarts distinction between Aand B-series. A-series is related to fundamental aspects of change and movement, and the concepts - past, present and future – which constitute this concept of time. B-series is a static characteristic of time-relation between the events, which can be placed along a timeline. B-series thus represents a fixation of events as respectively before, simultaneously and after.

Secondly, the Keynesian revolution has given rise to different interpretations for many years. However, my starting point is that it is best characterized as a revolution in Kuhnsk's sense.

Keynes' analytical method has often been misunderstood. His basic theoretical assumptions are often interpreted by the use of static equilibrium thinking in spite of the fact that it was an approach, he tried to escape. Keynes had in fact also committed himself to carve out a new method of economic science that could legitimize the theories about new relations in economic thinking, that he had put forward.

The problem became for me the following questions: "How to bring history and theory together?" and "What can we learn from the Keynesian struggle for a systematic "in time" analysis?"

My considerations in continuation of these questions were characterized by how and to what extent economic theories/models reach to get in touch with economic reality. There were given three possibilities to approach reality: Either 1) only applicable to touch or be an occasion for a theoretical consideration or 2) capturing a structure or some current institutional conditions, or 3) not only to pick up a structure but also to handle historical processes.

Therefore, it is also interesting to see where and how the legacy is carried on, that is, what aspects of the time concept are emphasized. Here, I will highlight three economists who knew and exchanged views with Keynes, namely GLS Shackle (1903-1992), Joan Robinson (1903-1983) and JR Hicks (1904-1989).

Keynes three successors are in no doubt meaning of the importance of the concept of time when they interpret and expounds Keynes's theoretical work. Against this background, the next obvious step is to look at these authors explicit analyzes of the relationship between time and economics, and which they all have dealt with. This involves the following questions:

1. What is the mode of thinking behind Maynard Keynes concept of time?

2. How is it possible to deal with the past, present and future in Keynes' sense?

3. What can be inferred as general requirements for explicit handling of time in the economy?

The 6 articles:

The review of Keynes's own work has as methodological starting point to clarify some of the thinking that lies behind Keynes' theory. In Article 1 it is made visible that some of Keynes' insights come early in a scientific career - as is the case with Keynes and his paper in 1903 on time. It is also clear that Keynes in his paper on time is connecting time with change - time is not absolute but relative. Keynes does not believe in a homogeneous or absolute concept of time, which also later came to characterize his theoretical work.

Article 2 is intended to clarify the external shape and internal structure of the concept of time - in other words its anatomy. In order to clarify Keynes' thinking there will be brought three angles to determine the anatomy of the concept. It is Keynes' philosophical background, his general perception of society and the way he treats time in the economic analyzes.

In article 3 it is Shackle, who in his understanding of Keynes operates with respectively expectation based and mechanical time, which is reflected in the consideration of "outside and inside observer". An interesting interpretation of Keynes' method is

presented as Keynesian kaleidics. Although Shackle puts much emphasis on Keynes' concept of uncertainty it does not to lead to nihilism, but the future can instead be created as a fantasy that can be written down through scenario-writing.

Hicks has on the other hand and with great humility and self-criticism analyzed and written himself away from general equilibrium theory. What is interesting in article 4 is how he himself after many years of steady-state economy finally takes a showdown with the IS-LM diagram due to a lack of a concept of time. He acknowledges that time is irreversible and that time not can be captured by spatial geometry. Hicks gradually become aware that scientific methods are of no help in economics, which is also reflected in his late writings.

A newer approach to the term is Path Dependence. As described in article 5 it has different manifestations in Post-Keynesian Theory, such as hysteresis, cumulative causation and technological lock-in. It is positive that inspiration can be drawn from other social sciences, who have advanced in the use of Path Dependence. This is a golden learning opportunity and can be translated into Generation II Path Dependence of economics. Here is recommended a use of case studies in tracking different processes. This can be further combined with sequence analysis of events and actual narrative analyzes.

The last Article 6 may well be seen as a unifying article as it attempts to respond to the conditions that must be met if economics actually should be able to handle time. There are four considerations to be made if time must be integrated into economic thinking. This applies to the choice of time unit, as this is crucial for what it is possible to pick up when it comes to the study of behavior in economics. It is also about being able to

distinguish between unique and repetitive behaviors. The latter is easy to model, but the former is essential for studying major changes in an economy. It is also important to determine when an analysis is inside and outside time. The latter can facilitate mechanical model work while the former provides the basis for how the study of behavioral changes can lead to a shift of directions in an economy.

In the summary and research perspective it becomes clear that studies of John Maynard Keynes himself and a number of his successors leaves no doubt that the concept of time plays a central role in economic analyzes. It is also undeniable that in McTaggarts sense A-series of past, present and future is the focus and not only B-series of before, now and after. The Keynesian theory is thus characterized by applying economic thinking a new aspect of time.

The research perspective on the basis of Keynesian perspectives of time is to be based on a fusion of the intentional and the successive concept of time. In this way history is brought back into the economic analysis. One might imagine that an analysis with a horizontal, mechanical movement pattern actually can be raised up, in a way essentially to clarify the dependent and independent variables and particularly assess the possible behaviors and expectations that may affect future development. Then there can be listed a multitude of scenarios about economic development



Publicerede artikler - oversigt

- Keynes's early cognition of the concept of time. In Keynes's General Theory for Today Contemporary Perspectives, ed. Jesper Jespersen & Mogens Ove Madsen. Edward Elgar, Cheltenham & Northampton, 2012
- 2. An Anatomy of the Concept of Time in Maynard Keynes. Economics World, Volume 5, Number 2, Mar.-Apr. 2017 (Serial Number 21)
- 3. Shackle in Time Time in Shackle on Challenging the Art of Making Predictions. Journal of Business and Economics, June 2016, Volume7, No. 6
- 4. Hicks's progress from statics to historical time. Money, Method and Contemporary Post-Keynesian Economics, ed. by Sheila Dow, Jesper Jespersen & Geoff Tily. Edward Elgar, Cheltenham & Northampton, 2018
- Two generations of path dependence in economics? In Macroeconomics After the Financial Crisis: A Post-Keynesian perspective, ed. Mogens Ove Madsen & Finn Olesen. Routledge. Oxon & New York, 2016
- 6. On Time in Economics. Contribution to "Handbook of Macroeconomic Methodology", ed. By Victoria Chick & Jesper Jespersen for Routledge Publishing, 20??
- 7. Økonomi og Tid. I Peter Øhrstrøm (1994): Repræsentation af tid. Topics in Cognitive Science and HCI. Centre for Cognitive Informatics. Risø National Laboratory/Roskilde University

Metodologisk indledning

Dette kapitel rummer en række af de metodologiske overvejelser, der ligger bag ønsket om at udforske tidsbegrebet hos John Maynard Keynes og hvilke konsekvenser dette har for den efterfølgende økonomiske teori og metode.

Der indledes med et afsnit, som omhandler den oprindelige baggrund og motivation for at arbejde med et forskningsfelt, som ligger på grænsen mellem filosofi og økonomi. Her er det væsentligt at hæfte sig ved, at tidsfilosoffen J.M.E. McTaggerts tidsbestemmelse af henholdsvis A- og B-serier næsten fra starten har haft en meget afgørende indflydelse på at afdække tidsaspekterne hos Keynes.

I det næste afsnit fremlægges en del overvejelser, som ligger bag udformningen af de 6 artikler, som følger senere i afhandlingen. De handler selvfølgelig om Keynes egen opfattelse, men også om synsvinklerne hos nogle af han efterfølgere. Afsnittet afsluttes med et mere normativt indspil til, hvorledes tid bør håndteres, når der skal laves økonomiske analyser.

a. Baggrund og problemstillinger

Tidsbegrebet i Keynesiansk økonomi har for mig været et uimodståeligt tema i min forskning i mange år. I min monografi *Den offentlige sektor i Nationaløkonomisk teori*¹ tager en del af kritikken af Richard Musgraves multiple teori om den offentlige sektor udgangspunkt i John Hicks retræte fra IS-LM tilgangen til makroøkonomi. Hicks (1975)

¹ Mogens Ove Madsen (1984): Den offentlige sektor i nationaløkonomisk teori. Aalborg Universitetsforlag

opgør med IS-LM diagrammet er direkte relateret til tidsbegrebet, idet han siger, at det, der refererer til tid er likviditetspreferencen og kapitalens marignale effektivitet, hvor: "time and uncertainty are written all over it"², medens teorien om produktion og multiplikatoren er uden for tid. Hicks opererer her med et begreb, hvor tid betragtes som irreversibel.

Hermed blev der anslået et forskningstema, som er blevet en livslang følgesvend. Det gav sidenhen anledning til at jeg var medarrangør af en konference på Aalborg Universitet i 1989³, hvor det bl.a. lykkedes at få W.H. Newton-Smith, Oxford til at give en forelæsning. Det gav også mulighed for at følge Lennart Lundmarks præsentation af J.M.E. MacTaggarts distinktion mellem A- og B-serier⁴. A-serien relaterer til fundamentale aspekter af ændring og bevægelse, og begreberne – fortid, nutid og fremtid – konstituerer dette tidsbegreb. B-serien karakteriserer en statisk tidsrelation mellem begivenheder, som kan placeres langs med en tidslinie. B-serien rummer således en fiksering af begivenheder som henholdsvis før, simultant og efter. Lundmark har det synspunkt at historieforskning har gjort sig stadig mere uinteressant i humanog samfundsvidenskaberne ved at lægge et for ensidigt fokus på statiske B-serie sekvenser med tidløse relationer. Der er således ifølge ham interessant stof at hente i tidslogiske studier.

Der blev sidenhen lejlighed til at præsentere nogle af disse synspunkter på at repræsentere tid på flere måder⁵ (gengivet i Appendix I). Dette gav mulighed for at

² Hicks (1975), s. 140

³ Peter Ørhstrøm (1991): Time in Schience, Language, and History: An Interdisciplinary Tesearch Seminar. Department of Communication. University of Aalborg.

⁴ Øhrstrøm (1991), s. 31-37

⁵ Mogens Ove Madsen (1994): Økonomi og Tid. I Peter Øhrstrøm (1994): Repræsentation af tid. Topics in Cognitive Science and HCI. Centre for Cognitive Informatics. Risø National Laboratory/Roskilde University, p. 120-131.

klargøre henholdsvis Joan Robinsons sondring mellem logisk og historisk tid: "At any moment in logical time, the past is determined just as much as the future. In an historical model, causal relations have to be specified. Today is a break in time between an unknown future and an irrevocable past"⁶ og G.L.S. Shackle's skelnen mellem mekanisk og forventningsbaseret tid. Disse to tidsbegrebers epistemologi dikterer, at i forventningsbaseret tid, er man fanget i nu'et. I mekanisk tid kan man uhindret kontrollere en bevægelse både frem og tilbage i tid. Shackle (1965) indplacerer en række konkurrerende økonomiske teorier i et diagram, hvor de to tidsbegreber er placeret på hver sin akse. Denne opdeling af teoritilgange giver i forlængelse af Hicks kritik anledning til at forfølge et keynesiansk spor og fører sindenhen frem til en skitse for mig af et egentligt forskningsprogram⁷.

Appendiks I satte således en del overvejelser i gang. På den ene side handlede det om behovet for at få klargjort de forskellige tidsbegreber og deres konsekvenser for den økonomiske teori. Og på den anden side var der behovet for at får afklaret, hvorfor den keynesianske revolution havde svært ved at slå igennem, når det gælder metodologien. Der findes ret mange økonomiske retninger, der efter Keynes enten ikke har forstået eller har undladt at forholde sig til hans nybrud omkring tidsbegrebet.

⁶ Robinson (1953)

⁷ Mogens Ove Madsen (2004): Money as Time. Some Methodological Reflections on the Keynesian Revolution. *A Preliminary Research Proposal.* Working Paper 2004:8, Department of Economics, Politics and Public Administration. Aalborg University. Revideret udgave af tidligere oplæg. Der vil blive lagt vægt på dette i det følgende.

KORT EKSKURS OM KEYNES'S TÆNKEMÅDE:

Tilgangen til Keynes teori og hans anvendelse af tidsbegrebet har for mig altid fulgt følgende spor, hvilket er vigtigt eksplicit at have styr på:

Mit udgangspunkt er, at den bedste karakteristik gives i Kuhnsk forstand som bestående af fire elementer: en formålsrettet funktion, de grundlæggende teoretiske antagelser, de grundlæggende problemstillinger og endelig analysemetoder⁸.

Keynes ønskede, som han skrev i et brev til forfatteren George Bernard Shaw, at revolutionere den måde, verden tænker økonomiske problemer på. Han ændrede fokus i økonomien fra effektivitet og fleksibilitet til et grundlæggende quaesitum vedrørende fastlæggelse af den nationale indkomst og mængden af beskæftigelse. Med dette fokus blev det af vital betydning for Keynes at finde de faktorer, der både udøver bestemmende indflydelse på dette quaesitum og samtidig vælge de variable, der kan forvaltes af centrale myndigheder.

Keynes' grundlæggende teoretiske antagelser, tager udgangspunkt i de ultimativt uafhængige variable, der består af forbrugstilbøjelighed; likviditetspræferencen og kapitalens marginale effektivitet. Hertil kommer den forhandlingsproces, som fører til fastsættelsen af løn samt centralbankens manipulation af pengemængden.

Ved at etablere denne grundlæggende ordning kan Keynes kaste sin klassiske arv så som Says lov, Kvantitetsteorien, og teorien om prisfleksibilitet, og forestillingen om at opsparing altid finder vej til investering over bord.

⁸ Den Kuhn-inspirerede tilgang er blandt andet beskrevet af Stanfield (1974), Mehta (1977), Littleboy og Mehta (1983) og Pernecky (1992) og den Lakatos-inspirerede tilgange hos Blaug (1975) og Blaug (1991). Se også Olesen og Pedersen (2002) og Syll (2001)

Keynes 'analytiske skema giver selvfølgelig anledning til at rejse nye grundlæggende problemstillinger. Keynes brugte det til at analysere fx. konsekvenserne af ændringer i penge-lønninger og til at udvikle en ny teori om priser. Det har blandt andet resulteret i en lang række studier af forventningsdannelse, finans- og pengepolitikken og stabiliteten af pengeefterspørgselsfunktionen.

Til gengæld er Keynes 'analysemetode ofte blevet misforstået. Hans grundlæggende teoretiske antagelser er ofte blevet fortolket ved anvendelse af statisk ligevægtstænkning på trods af det faktum, at det var en tilgang, han forsøgte at undslippe⁹. Keynes havde nemlig også påtaget sig at udmejsle en ny metode til økonomisk videnskab, som kunne legitimere de teoretiseringer omkring nye relationer i den økonomiske tænkning, han havde lagt frem.

Begrundelsen for ovenstående påstand kan findes ved at henvise til Keynes' *Treatise on Probability* (1921). Her finder vi en del af et epistemologisk fundament for en ny og anderledes metode. I dette arbejde anerkendte Keynes, at der godt kan være ret forskellige sammenhænge for helheder af forskellige grader af kompleksitet, og love omkring forbindelse mellem komplekser, som ikke er de samme, som forbindelserne mellem enkelte dele. Et økonomisk system er således organisk og hver beslutningstagningsenhed er relateret til resten af systemet. En sådan indbyrdes afhængighed resulterer i beslutningstagning under usikkerhed, hvilket er et afgørende forhold i mange henseender i Keynes *General Theory* (1936).

⁹ I stedet for at tale om en den Keynesianske Revolution, kan det måske alternativt være på sin plads at tale om den Keynesianske Eksplosion. Dette skal forståes som en betegnelse for det virvar af efterfølgende forskellige fortolkninger af Keynes General Theory. Pernecky (1992) beskriver det således: "Interpretations of Keynes have been made by: the "Fiscalists", the "IS/LM Apparatus", the "Monetarists", the "Disequilibrium Approach", the "Rational Expectations" school, the New Keynesians and the Post-Keynesians". Kun sidstnævnte skole er loyal over for Keynes' tidsforståelse.

I *General Theory* har Keynes forsøgt at definere karakteren af den økonomiske tænkning som en velordnet metode til at gennemtænke bestemte forhold i en økonomi. Keynes foreslog et teoretisk system, hvor skiftende forventninger til fremtiden er i stand til at påvirke den nuværende situation. Penge bliver bindeled mellem nutid og fremtid og forestillingen om skiftende ligevægte skal derfor indlejres i monetær økonomi.

Keynes' tilgang er holistisk. Det er vigtigt at bemærke, at omdrejningspunktet for hans analyse er princippet om effektiv efterspørgsel. Dette koncept indebærer anvendelse af forskellige størrelser, som udgør de grundlæggende elementer i modellen.

Som nævnt tidligere, spiller empiriske vurderinger en vigtig rolle i formuleringen af modellen. Valget af aggregater eller beskrivelsen af de forskellige dagsordener er stærkt empirisk. Igennem *General Theory* forsøger Keynes at undersøge forskellige scener i økonomien, hvor der udspilles forskellige spil. Vi finder entreprenører og lønmodtagere, der handler på arbejdsmarkedet, investorer og spekulanter, der handler på børsen, forbrugere og entreprenører, der handler på varemarkedet og så videre. I slutningen af bogen bliver alle disse spil sat sammen og relateret til specifikke emner såsom ændringer i pengelønnen eller bestemmelse af den samlede beskæftigelse.

Det er vigtigt at bemærke, at når Keynes' taler om en ligevægt henviser det til en metode, og ikke til en tilstand, som en økonomi kan nå ved hjælp at stærke ligevægtsskabende faktorer. Endvidere er det vigtigt at erkende, at forskellige hændelser forekommer med forskellig hastighed. Forventninger spiller således en væsentlig rolle i bestemmelse af de retninger, der tages ved skiftende ligevægt. Keynes indså, at det er relativt uinteressant at følge en ændring i een bestemt variabel gennem

det økonomiske system. En sådan fremgangsmåde vil ikke give mulighed for reaktion fra andre dele af hele systemet, når det bevæger sig frem i tid.

Fremtidige hændelser er dog i Keynes' system ikke helt bestemt af fortidige hændelser. I det levende samfund findes beslutningstagende enheder, som har en grad af frihed til at skabe planer for fremtiden – også planer, der bryder med fortiden, Ikke mindst når der skal vælges en plan i lyset af en usikker fremtid.

Desværre giver begrebet usikkerhed os nogle problemer med hensyn til økonomiske analyser, især i forhold til forudsigelse. Keynes proklamerede, at formålet med en model er at adskille de semi-permanente eller relativt konstante faktorer fra dem, der er forbigående eller svingende, og dermed udvikle en logisk måde at forstå de økonomiske sammenhænge på. Keynes havde den grund-forudsætning, at det økonomiske univers hverken er homogent eller konstant over tid. Dette betyder, at den økonomiske analyse må være åben, og indebærer, at forudsigelse af en økonomisk fremtid ikke er så vigtigt som at fastlægge antagelser bag de faktorer og relationer, som forbliver relativt konstant over tid. Her er det igen vigtigt at understrege, at Keynes var klar over, at "alt andet lige analyse" ikke er tilstrækkeligt til studiet af et økonomisk system, fordi en sådan analyse er en mekanisk metode - blind manipulation - som forventes at give et ufejlbarlig svar.

Det er måske misvisende for Keynes at bruge udtrykket "skiftende ligevægt" til at karakterisere den økonomiske proces, især i det tilfælde, hvor de tre såkaldt psykologiske faktorer (forbrugstilbøjeligheden, likviditetspreferencen og kapitalens marginale effektivitet) ændrer sig så ofte, at en ny ligevægt aldrig kan nås. Penge får ifølge Keynes den centrale rolle, at være en subtil anordning til at forbinde forhold i

nutiden med forhold i fremtiden. Forventninger til fremtiden kan primært analyseres i monetære termer.

Hvad er det så, der gør penge til dette specielle fænomen? Hvordan kommer penge ind i det økonomiske system?

Penge har i Keynes forstand en ganske særlig egenskab, nemlig enten at have ingen eller en ubetydelig elasticitet, både hvad angår produktion og substitution. Hvis en given efterspørgslen alene angår penge, vil der ikke være noget arbejdskraftsforbrug i produktion af flere penge. Desuden vil pengeefterspørgslen pga de lave transaktionsomkostninger ved penge være et barometer for, i hvilken grad vi har tillid til vores egne beregninger og forventninger til fremtiden.

Der er dog en måde, hvorpå usikkerheden kan reduceres, især hvis der eksisterer løbende kontraktlige forpligtelser denomineret i monetære enheder. Her tænkes på institutioner, der kan håndhæve overholdelse af kontraktlige forpligtelser for fremtiden, såsom pengeløns-kontrakter, kontrakter for gæld eller levering af råvarer. Denne særegenhed ved penge giver dem en unik position som lagret værdi, forudsat at dets regnskabsmæssige omkostninger er lave, og transaktionsomkostninger ved konvertering fra den lagrede værdi til kontanter er ubetydelige. Da penge ud over lønenheder er en af Keynes' to grundlæggende måleenheder er det indlysende, at værdien af nationalindkomsten normalt vil være mere stabil i form af penge, end i form af en hvilken som helst anden vare.

EKSKURS SLUT

En konference på Roskilde Universitet i april 2008 gav anledning til at forsøge at indkredse dette projekts egentlige problemstilling i form af et oplæg med følgende tema: "On the search for economic theory in time – Keynes and 3 immediate successors".

Selve tematiseringen havde følgende formuleringer: "How to bring history and theory together?" og "What can we learn from the Keynesian struggle for a systematic "in time" analysis?"

Overvejelserne i forlængelse af dette spørgsmål var herefter præget af hvordan og i hvilken udstrækning økonomiske teorier/modeller når frem til at få kontakt med den økonomiske virkelighed. Der blev givet tre muligheder for at nærme sig virkeligheden: Enten 1) blot umiddelbart at berøre eller være en anledning til en teoretisk overvejelse eller 2) opfange en struktur eller nogle aktuelle institutionelle forhold eller 3) ikke kun at opfange en struktur men også at kunne håndtere historiske processer.

I undersøgelsen var indforskrevet J.M. Keynes, G.L.S. Shackle, Joan Robinson og John Hicks. Keynes var som udgangspunkt inspireret af tidsfilosoffen John E. McTaggart, hos hvem han gik til forelæsninger i sin studietid. Ligeledes var Keynes inspireret af Marshall og sagde bl.a. i *A Treatise on Money*: "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 ... 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 the new phase of economic science"¹⁰

Denne forståelse bringer Keynes videre i sin forberedelse af General Theory, idet han i Tilton-papirerne fremhæver: "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"¹¹. Der bliver for Keynes tale om et tilbagevendende tema, som eksempelvis "… the material of economics is shifting as well as complex"¹² og forskellen til naturvidenskabens måde at arbejde på bliver mere og mere tydelig: "… unlike the typical natural science, the material to which (economics) is applied is, in too many respects, not homogenous through time"¹³.

Økonomies genstandsfelt er således bestandig åben på grund af ændringer og skifter jævnligt karakter. For Keynes er dette med til at begrænse mulighederne for at bruge induktive og prediktive argumenter og mulighederne for at hente analogier i naturvidenskaben.

Derfor er det også interessant at se, hvor og hvorledes arven bæres videre. Her skal fremhæves tre økonomer, som kendte og udvekslede synspunkter med Keynes, nemlig GLS Shackle (1903-1992), Joan Robinson (1903-1983) og JR Hicks (1904-1989).

1) Den mest vidtgående udlægning finder vi hos Shackle, der klart fortolker Keynes i en retning, hvor tidsbegrebet er meget eksplicit: "Keynes emphasized that

¹⁰ A Treatise on Money II, p. 365

¹¹ Keynes (1933): CW XXIX, s. 222

¹² Keynes (1936): CW X, s. 127

¹³ Keynes (1938): CW XIV, s. 269

investment is largely a function of expectations and animal spirit and not the result of a pure logic of choice – the entrepreneur has to make them without perfect knowledge or even strong probability distribution"¹⁴ og hævder sidenhen: "My suggestion is that he (Keynes) wished the General Theory to be an outfit of tools, possessed indeed of its own unity and selfsufficiency, possessed of a dominant and central theme, but not constituting a rigid model of economic society. Keynes believed in the eclectic use of *general ideas*"¹⁵ Dette fører Shackle frem til at fortolke Keynes således: "He (Keynes) laid out on the bench the component parts of a *kaleidic* method. Some of the best such parts he discarded, some incompatible ones be included, the conception ad a whole he left incompletely and awkwardly assembled"¹⁶.

Shackle¹⁷ identificerer to tidsbegreber hos Keynes, nemlig et mekanisk tidsbegreb: "Is the locus of a precise and complete structure composed from without be the detached observer" og et forventningsbaseret tidbegreb: "is an aspect of a decision-makers effort to choose a course of action in fade of uncertainty about the outcome which would flow from this course of that"¹⁸. Hos Shackle har tidsbegrebet således en to-sidet karakter i form af mekanisk – og forventningsbaseret tid.

¹⁴ Shackle (1967): The Years of High Theory, kapitel 11

¹⁵ Shackle (1974): Keynesian Kaleidics, s. 49

¹⁶ Shackle, Ibid, s. 83

¹⁷ Shackle (1965): A scheme of Economic Theory, s. 190-191

¹⁸ Selv om det er snubledne nært her at tænke på McTaggarts A- og B-teori er det ikke hos Shackle muligt at finde en henvisning til denne tidsfilosof.

2) Joan Robinson er heller ikke i tvivl om, hvor det mest afgørende teoriudviklingsbidrag hos Keynes ligger: "The General Theory broke through the unnatural barrier and brought history and theory together again. But for theorists the decent into time has not been easy. After twenty years the awakened Princess is still dazed and groggy"¹⁹. Robinson klargør også, hvad der er Keynes' udgangspunkt: "The very essense of Keynes' problem was uncertainty. He started from a Marshallian short-period ... in which decisions are being taken on the basis of expectations about the future"²⁰ og understreger forskellen til det, som Keynes lægger afstand til : "Keynes was concerned with actual contemporary problems and put (his) arguments in terms of the structure and behavior of the economy in which (he was) living, while the neoclassical enunciated what purported to be universal laws, based on human nature greed, impatience and so forth"²¹. Dette fører Robinson frem til følgende standpunkt: "A model applicable to actual history has to be capable of getting out of equilibrium; indeed, it must normally not be in it ... it is a mortal certainty that any particular actual situation which we want to discuss is not in equilibrium"²².

Joan Robinson skelner således mellem logisk og historisk tid.

3) John Hicks fik eksplicit til opgave at lave en anmeldelse af General Theory til The Economic Journal, som blev redigeret af Keynes. Herom siger han sidenhen: "I recognized immediately, as soon as I read the General Theory, that my model

¹⁹ Robinson (1962): Economic Philosophy, s. 96

²⁰ Robinson (1973): Collected Writings, s. 96

²¹ Robinson (1980): Collected Economic Writings, s. 53

²² Robinson (1962): Essays in the Theory of Economic Growth, 2. 25-26

and Keynes' had some things in common. Both of us fixed our attention on the behavior of an economy *during a period* – a period that had a past, which nothing that was done during the period could alter, and a future, which during the period was unknown. Expectations of the future would nevertheless affect what happened during the period ... expectations, in our models, were strictly exogenous"²³.

Det interessante ved Hicks' arbejde er hans konsekvente bestræbelse på at flytte sig fra ligevægtsteori over imod brug af historisk tid i sit modelarbejde. Denne udviklingstendens kan følges fra hans udgivelse af "Value and Capital" i 1939 over "Capital and Growth" fra 1965 til "Capital and Time" i 1973 og ikke mindst "Causality in Economics", som blev udgivet i 1979. Noget som Hicks også selv reflekterer over: "But one can hardly get a plausible rule while confining attention to what happens within a single period. So it would seem that the proper place for such a proceeding is in sequential models, composed of succession of periods, in each of which the relevant parameters have to be determined; there is then room for linkages between the periods, and so for lags. I have myself made some attempts at the construction of such models (Capital and Growth, 1965 chp 7-10). I think they have their uses, but they are not much like IS-LM"²⁴.

I slutningen af 60'erne blev pengefænomenet og økonomisk historie de centrale omdrejningspunkter for Hicks forskning, hvilket betød, at han måtte lægge

²³ Hicks (1980): IS-LM: an explanation, s. 139

²⁴ Ibid. s. 147

distance til den reduktionisme og abstraktion, der tidligere havde karakteriseret hans arbejder. Gevinsten herved var til gengæld at Hicks udviklede ret eksplicitte metodologiske reflektioner over begreberne tid og kausalitet.

Keynes' tre efterfølgere er således ikke i tvivl om tidsbegrebets betydning, når de tolker og udlægger Keynes teoretiske arbejde. På denne baggrund er det næste oplagte skridt at kigge på disse forfatteres eksplicitte analyser af forholdet mellem tid og økonomi, hvilket de alle sammen har beskæftiget sig med:

 Shackle er som nævnt den umiddelbart mest eksplicitte i forhold til at gå videre med overvejelser omkring, hvorledes tid skal håndteres i forhold til økonomisk teori²⁵. Det er et ret intenst arbejde som kulminerer med publikationen Time in Economics, som første gang udgives i 1957²⁶.

Det centrale udgangspunkt for Shackle er det umiddelbare nu: "There is for us a *moment-in-being*, which is the locus of everyday actual sense-experience, every thought, feeling, decisions and action"²⁷. Denne kortvarige stund afløses af en anden: "The moment-in-being rolls, as it were, along the calenderaxis, and thus ever transport us willy-nilly to fresh temporal viewpoints. This I shall call dynamic movement in time"²⁸. Shackle refererer til en afgørende forskel i forhold til fysikken, hvor tid opfattes udelukkende som en matematisk variable: "This *timelessness* of the solutions of problems in classical physical dynamics makes an

²⁵ I artiklen "The Complex Nature of Time as a Concept in Economics", 1954 fra Economia Internazionale indleder han for alvor arbejdet med begrebet tid

²⁶ Time in Economics, Professor DR. F. De Vries Lectures, North-Holland Publishing Company, Amsterdam

²⁷ Ibid, s. 13

²⁸ Ibid, s. 15

extraordinary contrast with the problems of how events arise in economics. For it abolishes the distinction between past and future"²⁹.

Shackle giver to vinkler på, hvorledes tid kan defineres og hvordan økonomisk dynamik kan opfattes: "There is, on one hand, the objective aggregative mechanical predictive dynamics sought by the econometricians, and on the other the subjective private descriptive dynamics of an individual"³⁰. Dette leder direkte til et meget principielt spørgsmål om forholdet mellem fri vilje og determinisme. I Shackles forstand betyder dette, at gives der plads til den frie vilje og dermed kontinuert skabertrang resulterer det i uforudsigelighed. Han udelukker dog ikke muligheden for forudsigelser af makroøkonomiske størrelser på kort sigt, selv om individer besidder fri vilje.

Sammenfatningsvis giver Shackle to forskellige vinkler på tid, henholdsvis den oplevede tid i et moment-in-being og kalendertid eller for at bruge Shackles formulering at tiden enten kan anskues indefra eller udefra: "Time from the inside is the time *in* which we think, time from the outside is the time about which we think"³¹.

 Joan Robinson anlægger en ret bramfri stil i sin forelæsning i Oxford af en Cambridgeøkonom, når hun beskriver, hvorledes en tutor analyserer i et klassisk udbud-efterspørgselsdiagram (se diagram i Appendiks I): "He is using a metaphor

²⁹ Ibid, s. 23

³⁰ Ibid, s. 15

³¹ GLS Shackle (1959): Time and Thought, s. 15

based on space to explain a process which takes place in time"³² og hun siger videre: "Have you ever considered the difference between moving through space and moving through time? … In time, there is an exeptionally strict rule of one-way traffic"³³. Dette tema med tidens pil fasholder og udbygger hun: "For mechanical movements in space, there is no distinction between approaching equilibrium from an arbitrary initial position and a perturbation due to displacement from an equilibrium that has long established. In economic life, in which decisions are guided by expectations about the future, these two types of movements are totally different"³⁴.

I sin tilgang til økonomi lægger Robinson vægt på at der tænkes i historisk tid i stedet for i logisk tid: "To improve the status of economics it is necessary to get rid of logical contradictions, which involves eliminating the concept of static equilibrium; to guard against conception by ideological prejudice and to use the study of history, as it unfolds, to check up on the hypothesis that theory suggests"³⁵.

3) John Hicks lægger ikke skjul på, at han er inspireret af blandt andet Georgescu-Roegen (1971), når det gælder hans begreb om tid: "It is a very simple principle: the irreversibility of time. In space we can move either way, or any way; but time just goes on, never goes back. We represent time on our diagrams by spatial coordinate; but that representation is never a complete representation; it always

³² Robinson (1953): A lecture delivered at Oxford by a Cambridge economist, s. 255

³³ Ibid, s. 255-256

³⁴ Robinson (1974): History versus Equilibrium, s. 49

³⁵ Robinson (1980): Time in Economic Theory, s. 228-229

leaves something out. And it is not only in simple diagrams that we represent time by space; there are highly sophisticated models which, in effect, do the same thing. It is quite hard to get away, in any part of our thinking, from the spatial representation. We represent time by a "trend variable"; but that is again the same thing; it does not fully show time going on"³⁶.

Her er det ikke mindst en særlig distinction, som Hicks gør gældende: "One of the principal consequences of the irreversibility of time is that past and future are different. Not just different as front and back are different; you cannot turn past into future, or future into past, as by turning round you can turn back into front"³⁷.

Sammenfattende kan det siges om de tre arvtagere Shackle, Robinson og Hicks at de lægger vægt på tidsbegrebets betydning i økonomiske analyser. Ligeledes lægger de afstand til naturvidenskab som ideal for samfundsvidenskabelige forskning og er opmærksomme på, at spatiel repræsentation af tid giver anledning til problemer, når tid som grundegenskab er irreversibel.

Dette giver anledning til at få følgende problemstillinger undersøgt nærmere: Hvilken tænkemåde ligger bag Maynard Keynes opfattelse af begrebet tid? Hvorledes er det muligt at håndtere fortid, nutid og fremtid i Keynesk forstand? Kan der udledes nogle generelle krav til eksplicit håndtering af tid i økonomi?

³⁶ Hicks (1976): Time in economics, s. 283

³⁷ Ibid, s. 283

b. Introduktion til artikler

Med disse bemærkninger omkring baggrund og sammenfatning af problemstillinger er det nu hensigten at give en metodologisk redegørelse for, hvorledes de efterfølgende 6 artikler bidrager til at belyse problemstillingerne. Som afhandlingens titel afslører, er der tale om at en række aspekter af tidsbegrebet i keynesiansk teori vil blive afdækket. Der er således ikke mulighed for at præsentere et fuldt dækkende svar på alle forhold omkring tidsbegrebet i keynesiansk teori, men der er dog tale om en række bevidste valg. Dette hænger sammen med, at alle artikler er skrevet således, at de kan stå alene.

Indledningsvist er det hensigten at gå igennem Keynes' egne publikationer for at afkode, hvordan han håndterede begrebet tid. Dette gøres med de to første artikler, artikel 1: "Keynes's early cognition of the concept of time" og artikel 2: "An Anatomy of the Concept of Time in Maynard Keynes". Derefter er det tanken at lave en grundigere gennemgang af et par af Keynes' arvtagere, nemlig henholdsvis GLS Shackle, der har et stort focus på tid og usikkerhed, men i dette tilfælde er det mest aspekter omkring forudsigelse der tages op i artikel 3: "Shackle in Time — Time in Shackle on Challenging the Art of Making Predictions". Den anden arvtager er John Hicks, hvor det er hans livslange jagt på et troværdigt tidsbegreb og erkendelsen af at tid er irreversibel som gennemgås i artikel 4: "Hicks's progress from statics to historical time". Derefter tages Path Dependence op, som blandt andet er et Post-Keynesiansk orienteret forsøg på at fastlægge betydningen af fortid, som et aspekt af tidsbegrebet i artikel 5: "Two generations of path dependence in economics". Endelig afsluttes der med et mere

sammenfattende og normativt bud på, hvorledes tidsbegrebet bør håndteres i Keynesk forstand i artikel 6: "On time in Economics".

Gennemgangen af Keynes egne arbejder har som metodologisk udgangspunkt at afklare noget af den tænkemåde³⁸, der ligger bag ved Keynes' teori. I artikel 1 synliggøres det, at nogle erkendelser kommer tidligt i en videnskabelig karriere – således forholder det sig også med Keynes og hans paper fra 1903 om tid. I et ganske frugtbart akademisk miljø, som det fandtes i Cambridge omkring 1900-tallet var der mange muligheder for at søge inspiration og blive udfordret og påvirket. I sin studietid blev Keynes opslugt og udfordret af sine undervisere, Moore og McTaggart. Det er tydeligt³⁹ at påvirkningen fra McTaggart har været mere omfattende, end hvad der normalt antages⁴⁰. Det er en fejltagelse, hvis ikke McTaggart tillæges betydning. MacTaggart har påvirket Keynes, når det gælder metafysik og tidsbegrebet, medens Moore har påvirket Keynes, når det drejer sig om etik og politik. Der var iøvrigt ikke nogen uenighed mellem McTaggart og Moore, når talen falder på "the unreality of time", hvilket dokumenteres i artiklen.

³⁸ Tænkemåde er et vigtigt begreb og trækker på den indsigt, det er givet af både Sheila Dow og Victoria Chick. Der kan inkluderes 3 niveauer i forståelsen af dette, hvor tankemåde er den dybest liggende og metode og teori er placeret højere eller som Chick (2003) selv siger s. 307: "... no one has shown precisely what the relationships are between the identifiable aspects of Keynes's mode of thought and his method and theory ... I identify four key theoretical contributions and their corollaries, and show how they are related to the deeper levels of method and mode of thought". De fire teoriområder er likviditetspreferencen, investeringsteorien, princippet om effektiv efterspørgsel og investering-opsparings relationen.

³⁹ Artiklen dokumenterer hvilket omfattende arkivmateriale, der har været adgang til på King's College Archive i Cambridge – eksempelvis Lecture-notes fra Moore og McTaggart.

⁴⁰ Paul Davidson (2013) har i en anmeldelse i EH.Net (April 2013) af bogen, hvori min artikel er bragt sagt følgende: "Mogens Ove Madsen, like Carabelli, emphasizes complexity as the cause of uncertainty in the system (p.98). Madsen tries to tie Keynes to the philosopher McTaggart rather than to G.C. Moore, although Keynes in his published writings indicates Moore was the big influence on his thought. There is little here to explain the relevance of the *General Theory*".
Det er ligeledes tydeligt, at Keynes i sit paper om tid forbinder tid med ændring – tid er således ikke absolut, men relativ. Keynes tror ikke på et homogent eller absolut tidsbegreb, hvilket også sidenhen kommer til at præge hans teoretiske arbejde. Ligeledes får han via forelæsninger hos McTaggart den opfattelse, at der unægtelig er forskel på fortid og fremtid og at tid er progressiv. På denne måde kan man også sige, at han var under påvirkning af MacTaggarts dynamiske tilgang til tid (A-serien).

I artikel 2 er det hensigten at klarlægge tidsbegrebets ydre form og indre opbygning – med andre ord dets anatomi. I virkeligheden er det tanken at give en fortolkning af Keynes' brev til Harrod angående økonomi som videnskab, hvor Keynes angiver at det handler om at vælge modeller til at forstå den virkelige verden. Der fokuseres primært på Generel Theory – ikke mindst fordi nogle økonomer har ment, at det der egentlig karakteriserer den keynesianske revolution er den eksplicitte håndtering af tid.

For også her at afklare Keynes' tænkemåde bliver der anlagt tre vinkler for at kunne bestemme tidsbegrebets anatomi. Det er Keynes' filosofiske baggrund, hans generelle opfattelse af samfundet samt hvorledes han behandler tid i de økonomiske analyse. Der tages udgangspunkt i hans 1921-udgivelse "Treatise on Probability" og "Early Belief Essay" fra 1938, hvilket giver ham anledning til at arbejde med begrebet organisk helhed og at der er særskilte love for helheder afhængig af deres kompleksitet. Ligeledes giver det anledning til en væsentlig reservation. Det økonomiske materiale, der studeres, er ikke konstant over tid. Endelig gør han klart at økonomi er en moralvidenskab, idet den ikke på grund af den organiske helhed kan fungere på baggrund af induktion, men må beskæftige sig med motiver, forventninger og psykologiske usikkerheder. Hertil kan føjes, at han allerede i sit Arthur Spiethoff-papir

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fra 1933 har gjort klart, at tilgangen til at forstå den økonomiske verden går gennem en monetær produktionsteori, hvor penge både er noget i sig selv og derudover påvirker motiver og beslutninger.

Det er således ikke overraskende at Keynes i General Theory tager udgangspunkt i tre fundamentale psykologiske faktorer, nemlig forbrugstilbøjeligheden, attituden til penge og forventninger til det fremtidige afkast på kapital. Her introduceres det dynamiske tidsbegreb: fortiden er kendt, men udsigterne omkring fremtiden er usikker. Hvis forventningerne i disse antages at ligge fast på langt sigt er det muligt at tænke i en makroøkonomisk mekanisk tidsmodel, der kan afgøre, hvor meget en ændring i investeringerne kan påvirke beskæftigelsesudviklingen. Man skal dog ikke lade sig gribe af sidstnævnte enkle og tiltalende teknik. Der kan hurtigt opstå skift i de grundlæggende forventninger og General Theory skærper fokuseringen på de basale psykologiske faktorer i modellen og den fundamentale usikkerhed gøres helt klart i Quarterly Journal of Economics-artikel fra 1937.

Artikel 3 er første forsøg på at gengive arvtager Shackles udlægning af den fundamentale usikkerhed. Fører det til nihilisme eller kan det bruges konstruktivt? Noget af det interessante ved Shackle er, at han ofte skelner mellem dynamisk og mekanisk tid. Der er en klar parallel til McTaggarts A- og B-serie teori, men det er ikke muligt at finde en reference i Shackles omfattende forfatterskab til McTaggart. Dette indebærer dog, at han i sin forståelse af Keynes opererer med henholdsvis forventningsbaseret og mekanisk tid, hvilket kommer til udtryk i overvejelserne omkring "outside and inside observer". Hertil kommer den interessante udlægning af Keynes' metode som Keynesian kaleidics. Dette er en interessant nuancering af

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metoden og især påpegningen af, at Keynes interesserer sig mere for, hvad der sker mellem parablerne end på og med parablerne og er et yderligere bidrag til at knytte de to tidsbegreber sammen. Selv om Shackle lægger meget vægt på Keynes' usikkerhedsbegreb fører det dog ikke til nihilisme, men til at fremtiden kan skabes som en fantasi, som kan nedfældes via scenarie-skrivning.

I artikel 4 har det været hensigten at følge Hicks' lange vej fra ligevægtsteori mod teori, der i højere grad knytter teori og virkelighed sammen⁴¹. Hicks har med stor ydmyghed og selvkritik analyseret og skrevet sig væk fra generel ligevægtsteori. Som udgangspunkt lavede han to anmeldelser af *General Theory*. Den første på opfordring fra The Economic Journal, som kom til at handle om det revolutionerende i forventningsbegrebet og hvad dette begreb betyder for ændringsprocesser i en økonomi. Den anden anmeldelse blev skrevet til Econometric Society og indeholdt det sidenhen meget velkendte IS-LM diagram. Det interessante er, hvorledes han selv efter mange års arbejde med steady-state økonomi til sidst tager et opgør med sidstnævnte diagram på grund af et manglende tidsbegreb. Han erkender, at tid er irreversibel og ikke kan indfanges med rumslig geometri.

Hicks bliver efterhånden klar over, at naturvidenskabelige metoder ikke er til nogen hjælp i økonomi. De forhold der studeres i økonomi er ikke permanente og heller ikke nødvendigvis repetitive. Der kan ske store begivenheder, som kan ændre en økonomisk situation radikalt. Økonomer skal søge generelle mønstre i et virvar af mange detaljer og forsøge at skelne imellem hvad der er repetitivt og hvad der ikke er det. Og studiet

⁴¹ Hicks var hovedtaler ved en konference på Aalborg Universitet i 1987 – en konference der fejrede 50 året for IS-LM konstruktionen. Her havde jeg lejlighed til ved en samtale at få klargjort noget af hans vej fra neoklassisk tænkning i retning mod post-Keynesiansk teori.

af den eksisterende verden skal gå stærkt, idet han angiver en dynamisk synsvinkel, der hedder "fordi nutiden hurtig bliver til fortid".

Dette har også konsekvenser for teori, der må betragtes som analyseredskaber, men også en slags skyklapper. Det er en lidt anden udlægning end Keynes, som taler om kunsten at vælge modeller. Men det kan have de samme konsekvenser, hvor det er på samme måde, som med et gadelys: noget af teoriens mål bliver oplyst, medens andet ligger hen i mørke. Fordringen til valg af teori er således at den skal være velvalgt. For Hicks er det efterhånden klart, at økonomisk teori skal være mindre abstrakt, mere historisk korrekt, mindre teknisk og mere fokuseret på reale problemer, mindre reduktionistisk og åben over for input fra anden samfunds- og humanvidenskab. I denne forstand kommer han efterhånden tæt på den post-keynesianske måde at udlægge Keynes på.

En post-keynesiansk tilgang til arbejdet med tidsbegreber er søgt opsamlet i artikel 5. Som udgangspunkt var ideen - Path Dependence - ret rudimentær. Den beskriver, hvorledes en relativt lille teknologisk ændring på sigt kan sætte sig omfattende og varige spor. Til illustration bruges en skrivemaskinens tastatur og hvorledes dette låser en bestemt teknologi til et bestemt udviklingsmønster. Dette benævnes qwertynomics.

Denne mekanisme er blevet nuanceret og videreudviklet blandt andet i institutionel økonomi. I Post-keynesiansk regi har Path Dependence forskellige fremtrædelsesformer, så som hysterisis, kumulative årsagssammenhænge og teknologisk lock-in. Man kan være usikker på, hvor omfattende og troværdig gengivelse disse tilgange kan give af det, der sker i historisk tid. Og hvad der er endnu mere

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alvorligt, hvor meget vægt skal der lægges på den kausalitet, der ligger i tilgangene som uigenkaldeligt fastlagte historiske tendenser? Hvor meget rækker de ind i fremtiden? Og hvilke muligheder giver en usikker fremtid af muligheder for at etablere en anden udviklingsretning?

Det positive er, at der kan hentes inspiration fra andre samfundsvidenskaber, som er kommet længere med at anvende Path Dependence. Dette er en oplagt læringsmulighed og jeg benævner det derfor Generation II Path Dependence for økonomi⁴². Komplekse, kausale relationer kan være svære at forfølge ved hjælp af traditionelle statistiske metoder. Her anbefales i stedet brug af case studier til sporing af processer. Dette kan videre kombineres med sekvensanalyser af begivenheder og egentlige narrative analyser. Dette kan i høj grad være relevant at bruge i økonomisk historie og samfundsbeskrivelse. Men kan også være relevant for økonomisk modelarbejde.

Den sidste artikel 6 kan godt opfattes som en sammenfattende artikel, idet den forsøger at svare på hvilke betingelser, der skal være opfyldt, hvis økonomi reelt skal kunne håndtere tid. Ikke overraskende indledes der med mere filosofiske overvejelser, som under alle omstændigheder kan være en hjælp til at afklare, hvorledes tid skal begribes. Der trækkes i dette tilfælde også på McTaggarts A- og B-teori.

Det er Marshall, som bliver den første økonom, for hvem tidsbegrebet bliver taget alvorligt. Han får dog ikke færdiggjort sit arbejde, hvor han dybest set helst ville hente

⁴² Mail til mig fra Victoria Chick, 4. august 2016 15:57 bekræfter dette:

[&]quot;Very belated thanks for your latest book, given to me on the 11th. I am particularly grateful for your essay, as I have had the experience of talking about what I now know to call generation 2 path dependency only to be met with generation 1 understanding. Now all is clear". V, Victoria Chick, Emeritus, Professor of Economics, University College London

inspiration til tidshåndtering fra biologi og ikke fra naturvidenskab. Denne mangel har betydet, at det er blevet ligevægtsfortolkningen af Marshalls' Principles, der er kommet til at dominere den økonomiske videnskab. Her har mikroøkonomien fundet sit leje.

Til gengæld bliver Keynes, der med inspiration fra Marshall, kommer til at etablere grundlaget for makroøkonomi. Keynes har som beskrevet eksplicit fokus på tid. Han understreger, at usikkerhedsbegrebet er centralt og betoner derfor stærkt forventningsbegrebet i sin tilgang til analyse af de makroøkonomiske sammenhænge.

Erfaringerne fra disse økonomer og tidsfilosofi fører frem til, at der er fire hensyn, der skal tages, hvis tid skal integreres i den økonomiske tænkning. Det gælder valg af tidsenhed, da denne er helt afgørende for, hvad det er muligt at opfange, når det gælder studiet af adfærd i økonomi. Det drejer sig også om at kunne skelne mellem unik og repetitiv adfærd. Sidstnævnte er let at modellere, men førstnævnte er afgørende for store ændringer i en økonomi. Det er også vigtigt at fastsætte, hvornår en analyse er inden og udenfor tid. Sidstnævnte kan befordre mekaniske modelarbejder, medens førstnævnte rummer grundlaget for, hvordan studiet af adfærdsændringer kan føre til nye udviklingsveje i en økonomi. Endelig er der treenigheden fortid, nutid og fremtid, som for det første rummer ideen om tidens irreversibilitet. For det andet spørgsmålet om fortiden kan betragtes som Path Dependent. For det tredje nutidens udstrækning og for det fjerde mulighederne for prediktion, herunder scenarieskrivning.

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Dette er baggrunden og introduktionen til de væsentlige elementer i de seks følgende artikler. Der vil på baggrund af artiklerne blive afsluttet med en sammenfatning og et forskningsperspektiv.

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1. Keynes' early cognition of the concept of time

Introduction

John Maynard Keynes wanted to revolutionize the way world thinks about economic problems. In his ultimate masterpiece *The General Theory* he changed the focus in economics from efficiency to the fundamental quaesitum of determination of national income and the volume of employment. From this focus it became of vital importance for Keynes to find those factors that in practice exercised a dominant influence on this quaesitum and to select those variables which could be managed by central authority:

But as soon as we pass 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. *For the* *importance of money essentially flows from its being a link between the present and the future.* (Keynes, 1936, p. 293)

Keynes took it upon himself to hammer out a new methodology for economic science which could legitimize theorizing about new relations in economic thinking. Justification for this assertion can be noted by referring to Keynes's almost forgotten *"Treatise on Probability"* (1921, drafts 1907/1908). Here we find part of an epistemological foundation for a new and different methodology. In this work Keynes recognized that there might well be quite different laws for wholes of different degrees of complexity, and laws of connection between complexes which could not be stated in terms of laws connecting individual parts. Consequently, an economic system is organic and each decision-making unit is related to the rest of the system. Such interdependency requires decision-making under uncertainty – a crucial point in many respects in Keynes's *General Theory*⁴³

As Joan Robinson much later stated regarding Keynes' work with economics:

The General Theory broke through the unnatural barrier and brought history and theory together again. But for theorists the decent into time has not been

⁴³ See Chick (2004) for an interesting introduction to the concept of time and open systems

easy. After twenty years the awaked Princess is still dazed and groggy (Robinson, 1962, p. 75)

Robinson indicates a very crucial point. Time is of the essence in Keynes' work. Already in 1903, Keynes read a philosophical paper entitled "Time" for one of the countless undergraduate societies in Cambridge called *The Parrhesiasts Society*⁴⁴.

Keynes's first reflections on time

Of particular interest is that Keynes actually wrote this paper before having completed his participation in the lectures of two philosophers, both of whom were intrigued by notions of time, G.E. Moore and J.M.E. McTaggart, two outstanding representatives of the "Discussion Society". In addition to these great philosophers to whom he had direct access, Keynes was also inspired by articles on time that had been published in Mind, a scientific journal of the day.

⁴⁴ The paper is available at the King's College Archive in a handwritten form, Cambridge, UK: JMK/UA/17: Essay on Time. At a conference in Denmark, Roy Rotheim informed me of his transcription of Keynes' paper on time. I am very grateful to him for subsequently sending me a copy.

According to his notes, Keynes was primarily concerned with the essential relativity of all time measurement, especially the essential interconnection of the ideas of time and change.

It is important to remember that Keynes was studying mathematics at the time, not economics. Obviously, however, as soon as time is recognized as a methodological and substantive assumption in the theory of a scientific theory, it will have rather far-reaching consequences for making progress in knowledge and even progress in knowledge regarding economics. Time is often the forgotten or hidden dimension, for it is usually treated in such a way which violates its real nature⁴⁵. Winston explains this as follows:

Careless attention to time can mislead economic and social analysis when the temporal perspective of an analyst-observer is confused with that of the actor as the subject of analysis; careless attention to time can lead to the use of inappropriate methodology when difference between repetitive and unique

⁴⁵ Andrada (2009), p. 2, and he continues: "It is a fact of human affairs in general, and economic conduct in particular, that the passage of time pervades circumstances affecting agent's actions. This is an essential aspect of existence, for human beings do not exist outside time: history exists, and does not repeat itself".

behaviour is ignored; and careless attention to time will hide important economic relationships when too crude a time unit is used (Winston, 1988, p. 32)

Keynes' interest in the concept of time undoubtedly occurred in a very stimulating environment in Cambridge around the turn of the century. Keynes' own inclinations drew him towards philosophy, and numerous observers have noted how Keynes was especially inspired by Moore. This was to some extent true⁴⁶, but the question becomes whether Moore shadows for other important sources of inspiration from other philosophers, McTaggart in particular.

Especially the latter philosopher brings to Keynes a vital introduction to an ontological difference between two theories of time. The same fundamental difference is known from contemporary philosophical discussions:

⁴⁶ Davis (1991) raises interesting questions concerning the development of Keynes's Philosophical thinking. Keynes could not follow his Teacher Moore in all the latters views.

Firstly, there is the dynamical approach (the A-theory) according to which the essential notions are past, present and future. In this view, time is seen "from the inside". Secondly, there is the static view of time (the B-theory) according to which time is understood as a set of instants (or durations) ordered by the before-after relation. Here time is seen "from the outside"⁴⁷

This track will be pursued in the following. This cannot be done without demonstrating what is asserted about the relationship between Keynes and McTaggart, however, and it is also necessary to briefly digress back to the originally inspiring philosophical sources, their handling of the concept of time in particular, especially Kant and Hegel. Having done so, it is possibly to characterize more accurately the debate on time between Moore and McTaggart and the subsequent impact of this debate. Against this background, the main thrusts of Keynes' own paper are presented.

Keynes' relationship with McTaggart

Some observers have characterized Keynes' relationship to McTaggart as sporadic. Keynes first biographer, Roy Harrod, wrote in his major opus and tribute, *The Life of*

⁴⁷ Øhrstrøm (2011), p. 48

John Maynard Keynes (1951), that Maynard would have known of McTaggart's eminence from his father, John Neville Keynes. Furthermore, Keynes was invited to McTaggart's social arrangements, the *Wednesday Evenings*. Maynard was actually even encouraging his friends to attend McTaggart's lectures. In the description of the *Time* paper, Harrod points out that Keynes could not accept Kant's view of time and, furthermore, that the paper posed problems without claiming to solve them.

Later, in *Hopes Betrayed*, Skidelsky (1983) describes how McTaggart congratulated Keynes in 1903 for having become a member of the Apostles, and McTaggart further invited Keynes to join a society called Eranus in 1911. Skidelsky clarifies that McTaggart always said about philosophy that it was valuable for the comfort it provided, and he covered the metaphysical aspects of time in his lectures in relation to Keynes in particular. Skidelsky also describes how Moore was skeptical concerning McTaggart's Hegel-inspired idealism and McTaggart was later defeated, according to Skidlesky, but unrepentant and certain that Moore was wrong.

Felix (1999), in his book *Keynes's Philosophical Development*, stresses that McTaggart merely had a passing effect on Keynes, although McTaggart's exposure to philosophy

led to an extended metaphysical *jeu d'esprit* – the *Time* paper. Felix describes the essay as a game with other persons' ideas – characterized by dexterity rather than originality.

In *The Philosophy of Keynes' Economics*, Runde and Mizuhara (2003) proclaim that, in his early philosophical thinking, Keynes was largely influenced by the fundamental disagreement between Moore and Russel, on the one hand, and the Neo-Hegelians such as Bradley, Bosanquet, Green and McTaggart on the other. In the optic of Runde and Mizuhara, Keynes adopted Moore's way of philosophical thinking, for example in an Apostle paper from 1904, *Ethics in relation to conduct*.

Davidson (2007) estimates that Keynes' own home was a residence in which the most famous economists and philosophers of the day socialized and where moral science was a daily event. According to Davidson's assessment, Moore's *Principia Ethica* was to become The Manifesto of Modernism (Keynes, 1938), and Keynes made further use of Moore's method when revolutionizing economic thought.

Dostaler's 2007 book *Keynes and his Battles* makes clear that McTaggart's lectures challenged Keynes's intellect. Particularly at stake is Kant's vision of time. In contrast to Harrod, Dostaler claims that Keynes is closer to Kant than Hegel on the grounds that

Kant conceived of time as a formal a priori condition of phenomena – a category of understanding.

Against this background, the connection between Keynes and McTaggart is best characterized as sporadic and temporary. Closer scrutiny of Keynes' recognition and use of the concept of time will reveal whether this is indeed the case. At first, as already mentioned, it means that it is necessary to present two very classical philosophers, Kant and Hegel, who are frequently referred to in the philosophical debate that Keynes participated in as a student. Subsequently, the plan is to pursue two of their heirs: Moore and McTaggart.

Kant and Hegel

The mission of this section is solely to clarify how Kant and Hegel, respectively, dealt with the concept of time. Kant (1724-1804) was the founder of critical philosophy and defends the classical science to the skepticism that was made from empiricism and which claimed that recognition continues to be reliable only if established on proven experience. Hegel (1770-1831), in turn, is a more speculative philosopher and idealist -

Das Wahre ist das Ganze is Hegel's hallmark: It is first when we know the whole truth and the whole world that we have 'absolute knowledge'. Hegel was also responsible for putting the dialectic into system and suggested it as a driving force in both the logical and historical development.

Kant defeated the apodictic cognition as it existed in mathematics and physics. By means of the transcendental method, he believed to have found a way of explaining how synthetic judgments were possible in mathematics and science.

Kant distinguishes between the pages of our recognition that come from our selves (a priori), and the pages arising from our sensory experience (a posteori). He defines our concepts of space and time as a formal a priori condition of phenomena, and they are a precondition for any experience. Intuition is also introspection. This applies to the outer position that is available both in space and time, whereas the inner belief only exists in time. Kant recognizes a single reality which alone makes itself known in time, but not in space. Time thus constitutes the formal condition of all existence.

Modes of perception are transcendental conditions of our experience that go beyond the experience itself. They are not a part of the experience, but rather the order and structure

of our experience, without which it would simply be a confused mass of sensations. In other words, it is a necessary condition for the realization and notions of space and time that it is not derived from sense experience.

The form which Kant uses to argue the transcendental deduction is derived from his conception of time. He perceives time as something consecutive - he assumed that time could be comprehended as something uniform, something that could be set as a sequence. Space is three-dimensional, whereas time has only one dimension. The structure of the a priori condition for these categories is different, because the space is structured geometrically, while time is structured arithmetically, as in the difference between contours and numbers.

It is important to notice that events occur in time. Without this form of time, it would not be possible to recognize events in progress, and Kant saw temporal moments succeed one another. Event A comes before B, and time is a prerequisite for this sequence in structuring the appearance of nature.

But Kant's approach deemphasizes the difficulties concerning the dynamic aspect of time – the temporal becoming of the internal dynamism of these moments.

Hegel owed much to Kant but nevertheless refuted many of Kant's arguments using logic. Hegel believed that Kant studied knowledge through a purely subject-object relationship. Because time and space were part of humanity, he held that a full understanding of life and knowledge required the presence of both.

Hegel moves from an ontological way of thinking towards a more historically oriented thought. According to Hegel, the history of thought is identical to real history - real is the rational and the rational is real! He therefore agrees both on the principle of empiricism and idealism. The idea is central in both thinking and in real history.

The problem of history is that the reality of the past is not independent of the science of it. A distinction must therefore be drawn between the events as they occurred and the science which took place.

Hegel is concerned that the realization is equal to a commemorative. Knowledge can only be related to the past history, and the future is without form and therefore cannot be thematized. The present unifies the past and the future negatively – time is the contradiction in and ceaseless motion of finite beings. Time forms the boundary conditions of phenomena as the limit of the phenomenal world. In *Phänomenologie des Geistes*, Hegel presented this alternative concept of time - an irreversible historical concept of time as opposed to the mathematical, natural science concept of time.

Hegel's understanding of time is distinct from that of Kant, as described in the first part of his Kritik der reinen Vernuft. For Hegel, time and space are not subjective forms or conditions of sensory experience, but ontological. Time is the formative process of consciousness without which history is unthinkable. One could also argue that since all of the categories in Hegel's logic are ontological and not epistemological and time is one of them, then time is ontological and has its own reality outside the domain of thought. Temporality of consciousness draws a line of demarcation between human beings and the given objects. Consciousness, in this view, is temporality, and unlike a given object it is therefore not identical to itself. In other words, consciousness is what it is not, because it is incomplete and dynamic and in a state of constant flux, striving to fulfil itself. This movement of consciousness is also self-determined, as the 'other' is nothing more than the externalisation of consciousness. For this reason, there is no distinction between external and internal consciousness.

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This significant characteristic of consciousness provides the grounds for freedom and is essential for understanding the meaning of the 'True Infinite' category in dialectical logic.

Moore and McTaggart

According to the 1903 lecture notes (JMK/UA/1/), Keynes attended both Moore's lectures on ethics and McTaggart's lectures on metaphysics.

During Moore's lectures on ethics, Keynes read Kant's *Theory of Ethics* and Sidgwick's *Methods of Ethics*. This was certainly supplemented with *The Philosophical Notes of* John Neville Keynes (JMK/UA/2A), consisting of several volumes containing notes on modern ethics, metaphysics, Kant, Descartes, Locke and Hume.

According to Keynes' own notes, Moore's lectures introduced him to the fundamental question: What is good in itself? This was then highlighted, inter alia, through discussion of the distinction between ethics and politics and an examination of four schools of ethics: hedonism, intuitionism, evolutionary ethics and metaphysical ethics.

Moore was not a representative of the neo-Kantian school, which tended to emphasize scientific readings of Kant in the late 18th century, often downplaying the role of intuition in favor of conceptual clarity.

He was instead a founder and representative of the analytic program in philosophy in the early 20th century. In analytic philosophy, the search for conceptual clarity has been very important. One of the central points in analytic philosophy is that the problems of philosophy can be solved by showing the simple constituents of complex notions. Moore, and with him Bertrand Russell, began developing a new sort of conceptual analysis based on new developments in logic.

One of the most important parts of Moore's philosophical development was his break from a Hegelian-oriented idealism that dominated British philosophy. This becomes very clear in his *A Defence of Common Sense*. The main achievement in Moore's early period is his book, *Principia Ethica*. Published in 1903, it was the culmination of the reflections which Moore started in his 1897 dissertation on *The Metaphysical Basis of Ethics*, meaning that Keynes would be familiar with his philosophical leanings. In 1897, Moore also commented on the question, in what sense, if any, do past and future time exist? There is really not much doubt in his answer to this question of time:

I would say that neither Past, Present, nor Future exists, if by existence we are to mean the ascription of full Reality and not merely existence as Appearance. On the other hand I think we may say that there is more Reality in the Present than in Past and Future, because, though it is greatly inferior to them in extent of content, it has that coordinate element of immediacy which they entirely lack. Again, and lastly, I think we may distinguish in this respect between Past and Future. The Past seems to be more real than the Future, because its content is more fully constituent of the Present, whereas the Future could only claim a superiority over the Past, if it could be shown that in it Appearance would become more and more at one with Reality. (Moore, 1897)

In the words of Moore, this proves the unreality of time. The present is not real, because it can only be thought of as infinitely small; and past and future cannot be real, not only because they also must be thought of as infinitely divisible, but also because they wholly lack that immediacy, which according to the neo-Hegelian Bradley is a necessary constituent in reality. If neither present, past, nor future is real, however, there is nothing real left in time as such (Moore, 1897).

Just as Moore is not a real neo-Kantian, neither is McTaggart a full-blown representative of the neo-Hegelian school, although he is referred to as a dedicated interpreter and champion of Hegel; however, it is interesting that Moore and McTaggart share the same view on the unreality of time.

As a matter of fact, McTaggart's research and teaching of Hegel were also very important in the development of philosophers such as Moore and Russell. McTaggart himself was inspired by the already mentioned neo-Hegelian, F.H. Bradley.

McTaggart characterizes metaphysics as the systematic study of the ultimate nature of reality, and he argues that the empirical sciences, such as physics, cannot replace metaphysical inquiry. He claims that the rationality of using induction in general is questionable.

Early in his studies, McTaggart had the idea of the elimination of time. In *Studies in the Hegelian Dialectic* (1896), he introduced arguments for the unreality of time.

McTaggart describes his denial of the reality of time as Hegelian rather than Kantian, since although both thinkers denied the reality of time, only Hegel thought that there was an underlying reality to which the apparent reality of time corresponds.

Even if McTaggart thinks that time is unreal, temporal judgements can be made on how things are because temporal ordering captures real facts about the underlying reality that gives rise to the appearance of time.

In 1908, McTaggart summarized his arguments for why time is unreal, arguments unlike the arguments of Spinoza, Kant, Hegel or Schopenhauer:

Positions in time, as time appears to us *primâ facie*, are distinguished in two ways. Each position is Earlier than some, and Later than some, of the other positions. And each position is either Past, Present, or Future. The distinctions of the former class are permanent, while those of the latter are not. If M is ever earlier than N, it is always earlier. But an event, which is now present, was future and will be past. (McTaggart, 1908, p. 458)

The earlier/later distinction is called a B series and the past, present and future distinction is called an A series. McTaggart sees the A series as more essential to time than the B series, which is also why he regards time as unreal. Why so?

We perceive events in time as being present, and those are the only events which we perceive directly. And all other events in time which, by memory or inference, we believe to be real, are regarded as past or future – those earlier than the present being past, and those later than the present being future. Thus the events of time, as observed by us, form an A series as well as a B series. (McTaggart, 1908, p. 458)

But the two series are not equally fundamental: "The distinctions of the A series are ultimate. We cannot explain what is meant by past, present and future. We can to some extent, describe them, but they cannot be defined. We can only show their meaning be examples" (McTaggart, 1908, p. 463).

McTaggart states that the relations forming the A series must then be relations of events and moments to something not itself in the time series and which might be difficult to say something about: Past, present, and future are incompatible determinations. Every event must be one or the other, but no event can be more than one. This is essential to the meaning of the terms ... For time, as we have seen involves change, and the only change we can get is from future to present, and from present to past. (McTaggart, 1908, p. 468)

According to McTaggart, the characteristics are therefore incompatible. But every event has them all, and all of the three incompatible terms are predictable of each event, which is obviously inconsistent with their being incompatible and inconsistent with their producing change.

There can be no time without an A series, but the A series cannot exist due to this inconsistency; and therefore time cannot exist.

Keynes' essay on time

Keynes undoubtedly found metaphysics very difficult but also very stimulating. From his *Essay on Time*, he is inspired both by Kant and Hegel and, of course, the more recent interpreters thereof.⁴⁸ In one of his notes to the reading to the Parrhesiast's Society, he explains:

When I have attended Dr McTaggarts' lectures, I have felt the plunge from ordinary life into metaphysics a very violent one; it usually takes me an appreciable time to gather my wits for a sustained dialectical outlook upon the Universe, despite the lecturer's efforts to relieve the tension by the introduction of so unmetaphysical a thing as laughter - I mean therefore to approach the subject gently. (Keynes (1903), JMK/UA/17: Essay on Time)

The way he approached the subject of time was gentle by way of the mathematical aspects of time and especially of measurement. It is important to remember that Keynes had studied mathematics, not economics, which obviously characterizes his reflection.

He knows that he is introducing "one of the greatest stumbling blocks in every metaphysical system", but on the other hand he states that "[m]easure of time is no more than a measure of change" and it is his belief that it is "impossible to arrive at any

⁴⁸ Cited as references in Keynes' paper: Sidgwick (1894), Schiller (1895), McIntyre (1895), Hyslop (1898) and Calkins (1899).

conception of time which should be independent of the conception of change", because "[a] changeless state is, of necessity, a timeless state" (Keynes (1903), JMK/UA/17: Essay on Time)

It is important to note that Keynes wants to make a distinction between a consistent definition of time and then the familiar common-sense approaches:

... our perception of time means, therefore, simply our awareness of change, and it has no further raison d'être whatever this is, of course, entirely opposed to the common-sense view of time, and as our common sense views of time and space considerally colour our metaphysical views, it is important to get these conceptions of time and as consistent as is possible for us. (Keynes (1903), JMK/UA/17: Essay on Time)

He provides a few examples of common sense views of time such as time as a stream, the flight of time or as a line indefinitely stretched in both directions⁴⁹

⁴⁹ According to Calkins (1899, p. 218-219), however, even everyday experiences can be interesting: "Everyday reflexions has always, indeed, identified time with succession, and has sharply emphasized its opposition to duration or permanence; the "flight of time", "the elusiveness of the moment, the stream of time, are all expressions of our ordinary consciousness".

In Keynes' optic, one must regard the world either as working towards an end at a time – like the Christians – or as a perpetual cycle of continuality like others. So if we suppose that the purpose and end of the universe is already achieved, then all change is a delusion. By world or universe, Keynes meant the aggregation of everything, including God and the devil.

In the McTaggart lectures on metaphysics that Keynes attended while writing the essay on time, a lot of time in these lectures was clearly devoted to the question of the purpose of God and the devil in the universe (McTaggart lectures, notes, p. 41-65).

Not much is said in the McTaggart lecture notes about the concept of time, except

Perhaps time is a reality not so independent of the content as is generally supposed. That there is some difference between past and future is indispensible. Perhaps this difference has in the fact that time is progressive, that the whole is progressively and ever more perfectly manifested in time. (McTaggart lectures, notes, p. 62). For Keynes, this last sentence represents a problem of considerable difficulty. He circles back on it in his essay: "... the most important question that I have omitted all together is that of past, present and future", although he states: "Yet it is difficult to see in what sense if time exists, the past and future can exist". This is a statement not very unlike McTaggart's.

Two other topics remain unsolved in his essay – the subjects of free will and the possibility of progress. Somehow, all of the knowledge we seek and all of the generalizations we make, we suppose to be in some way permanent and out of time, he says. "Not only do we think of truth as out of time but we conceive our own personality to be existent independently of it" (JMK/UA/17, p. 20).

Keynes notes that there are different kinds of symptoms of belief in the timeless:

Whether, as Kant said, time is a form of perception, a *conditio cognoscendi*, whether it is an inexplicable delusion on our past, or whether it is an element of experience which in some higher state we shall be to comprehend as compatible with timeless perfection. (JMK/UA/17, p. 20)

Nevertheless, Keynes admits that philosophy cannot see its way to a doctrine of a timeless reality without some kind of experience.

In the final lecture that Keynes attended in metaphysics, the philosophical positions of the day were on the agenda. It was stated that Kant has an influence of a different kind – it is not his methods that have been accepted (McTaggart lectures, notes, p. 66). On the other hand, Hegel has not been amended and repealed – people do not believe in Hegel because they have lost their philosophic nerve (McTaggart lectures, notes p. 68). Few would accept every detail of the dialectic, but many would accept an idea of the absolute (McTaggart lectures, notes p. 68).

Keynes' final remark in his lecture notes is and might be a direct citation from McTaggart – that the attempt of the day is to steer the line between the Hegelian and Agnostic approaches.
Conclusion

Keynes' early reflection on metaphysics and time is primarily inspired by McTaggart, and his thoughts about ethics and politics stem from Moore. His paper on time increases his awareness to avoid common sense notions of time. On the other hand, the writing reflects the contemporary deeper philosophical considerations about the existence of time.

Kant perceives time as something consecutive - he assumed that time could be comprehended as something uniform, something that could be set as a sequence, but this approach deemphasizes like the B-theory the difficulties concerning the dynamic aspect of time. According to Hegel knowledge can only be related to the past history, and the future is without form and therefore cannot be thematized. The present unifies the past and the future negatively – time is the contradiction in and ceaseless motion of finite beings like it is in the A-theory.

Moore and McTaggart share the same view on the unreality of time. The present is not real, because it can only be thought of as infinitely small; and past and future cannot be

real, not only because they also must be thought of as infinitely divisible, but also because they wholly lack that immediacy, which is a necessary constituent in reality.

In Keynes' paper, time is about the awareness of change and change requires that at least one aspect differs with respect to what is happening, i.e. whether the event is future, present or past – in McTaggart's theory, it's A characteristics. On the contrary, B series alone cannot account for change, because 'earlier than' or 'later than' cannot differ in its characteristics - a changeless state is a timeless state.

In other words, static time interprets the indivisible aspect of being, so to speak, and dynamic time interprets the unreal aspect of becoming. That there is some difference between past and future is indispensible, as Keynes said.

In this way, his paper on time became a breaking point for Keynes, where the dynamic concept of time appeared. An important stone is being laid for the later Keynesian revolution in economics.

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2. An anatomy of the concept of time in Maynard Keynes

Abstract

One of the most striking changes in economic thinking which comes primarily with John Maynard Keynes is his explicit focus on time. For example, it appears early in a part of Keynes' writings that prediction is a very difficult matter. Due to the significant lack of prediction of future uncertainty is thus relatively early a central theme of Keynes' economic thinking. This fact about prediction also implies that Keynes' makes a clear distinction between short-term and long-term expectations. Theory was to be concerned mainly with the present and with short period situations and this explicit attention to the concept of time and subsequent alternative method of analysis has led to a number of innovations in economic thinking.

This paper will attack Keynes' handling of the concept of time from three angles: studying his philosophical background, his understanding of society and his development of economic theory.

Keywords: Time, Uncertainty, Prediction, Money, A-series, B-series

JEL Classifications: B41, E00, E12

"Economics is a science of thinking in terms of models joined to the Art of choosing models which are relevant to the contemporary world. It is compelled to be this, because, unlike the typical natural science, the material to which it is applied is, in too many respects, not homogeneous through time. The object of a model is to segregate the semi-permanent or relatively constant factors from those which are transitory or fluctuating so as to develop a logical way of thinking about the latter, and of understanding the time sequences to

Introduction⁵⁰

There has been said a lot about Keynes and his brilliant thinking. When you look at the amount you think if the limit is reached. Conversely, one can also ask whether all qualitative elements have been examined thoroughly and put into constructive use. In all modesty, it is planned on the following pages to pursue a particular track, which is about Keynes handling of the concept of time in his studies. Without further elaboration, one can safely state that there is an abysmal difference between Keynes great humility and caution about predicting and much of the economics work today totally unconcerned performed with long-term forecasts - even without petty distinction that it largely failed to predict the recent financial and economic crisis.

As just said one of the most striking changes in economic thinking which comes primarily with John Maynard Keynes is his explicit focus on time⁵¹. For example, it appears early in a part of Keynes' writings that prediction is a very difficult matter. He notes in an essay on Burke in 1904, that our power of prediction is so slight, that it is

⁵⁰ This article stems from a paper that was presented at the 1st Word Keynes Conference in Izmir in June 2013. Thanks for comments from Anna Carabelli, Heinrich Bortis and Finn Olesen. The final result is, however, solely my responsibility. ⁵¹ This is a well-known point, see e.g. Backhouse and Bateman (2006), p. 26:"In a series of books Shackle argued that the Keynesian revolution concerned time. The essence of time is that it is irreversible and that we can know nothing about the future ... The Keynesian revolution was about breaking with equilibrium, which can occur only in logical time, and creating a theory about how economics activity took place in historical time that was relevant to the real world" or Victoria Chick (1983), p. 11:"I shall argue that time is the key: that the *General Theory* is a static model of a dynamic process, the process of production. And it is as thoroughly monetary as the economy it attempts to explain"

seldom wise to sacrifice a present evil for a doubtful advantage in the future⁵². This later becomes a recurring theme in a number of key writings.

Due to the significant lack of prediction of future uncertainty is thus relatively early a central theme of Keynes' economic thinking. His later economic writings also convey a notion of fundamental uncertainty, sometimes with references to his earlier book on probability. And another realization of this book – Keynes notes that unlike the typical natural science, the material used in economics is, in too many respects, not homogenous through time.

This fact about prediction also implies that Keynes' often operates with a clear distinction between short-term and long-term expectations. Theory should thus primarily be concerned with the present and with short period situations and in his view, the economic models also aim to separate the semi-permanent or relatively constant factors from those who are transient.

Keynes' emphasized the historical time framework by making a clear distinction between past, present, and future conditions. The intention of this paper is to show how he came to focus on the analytical point of intersection of current short-period equilibrium situations and phenomena in historical times, in particular, on the factors determining the short-period equilibrium level of employment in The General Theory.

In summary, the article will accommodate Keynes' handling of the concept of time seen from three angles. The first will be based in Keynes' philosophical background. The other is his general conception of society. The third is how Keynes treats time in

⁵² Carabelli (1988), p. 129

economic analyzes. In other words, the claim here is that the only way to study the anatomy of Keynes's concept of time depends not only on philosophy, but on his conception of complexity of society, and not least his effort to develop a monetary theory of production.

Time – philosophy, society and theory

Keynes' early reflection on metaphysics and time is primarily inspired by J.M.E. McTaggart, and his thoughts about ethics and politics stem from G.E. Moore⁵³. Keynes' paper on time from 1903 increases his awareness to avoid common sense notions of time and the writing reflects the contemporary deeper philosophical considerations about the existence of time. This refers to the classical dichotomy which was introduced by McTaggart and still very central nowadays in philosophy about time logic, namely the A-series and the B-series. This is quite accurately collected by Peter Øhrstrøm (2011), who points out that there is the dynamical approach (the A-theory) according to which the essential notions are past, present and future. In this view, time is seen "from the inside". Secondly, there is the static view of time (the B-theory) according to which time is understood as a set of instants (or durations) ordered by a before-after relation. Here time is seen "from the outside". In the A-series time belongs to events and there is real change. In the B-series time is seen as outside to the observer and there is no change.

⁵³ I draw on an analysis I have made on Keynes' initial thinking about the concept of time in "Keynes's Early Recognition and Use of the Concept of Time" in Keynes's General Theory For Today – Contemporary Perspectives, Edward Elgar, 2012 ed. by Jesper Jespersen and Mogens Ove Madsen.

Keynes sought inspiration as a student in classical philosophy e.g. Immanuel Kant, who perceives time as something consecutive - he assumed that time could be comprehended as something uniform, something that could be set as a sequence, but this approach deemphasizes like the B-theory the difficulties concerning the dynamic aspect of time. According to another classical philosopher G. W. F. Hegel knowledge can only be related to the past history, and the future is without form and therefore cannot be thematized. The present unifies the past and the future negatively – time is the contradiction in and ceaseless motion of finite beings like it is in the A-theory.

It is quite interesting, that Moore and McTaggart share the same view on the unreality of time⁵⁴, which means that the present is not real, because it can only be thought of as infinitely small; and past and future cannot be real, not only because they also must be thought of as infinitely divisible, but also because they wholly lack that immediacy, which is a necessary constituent in reality.

In Keynes' paper from⁵⁵ 1903, time is about the awareness of change and change requires that at least one aspect differs with respect to what is happening, i.e. whether the event is future, present or past – in McTaggart's theory, it's A characteristics. On the

⁵⁴ G.E. Moore, 1897:"I would say that neither Past, Present, nor Future exists, if by existence we are to mean the ascription of full Reality and not merely existence as Appearance. On the other hand I think we may say that there is more Reality in the Present than in Past and Future, because, though it is greatly inferior to them in extent of content, it has that coordinate element of immediacy which they entirely lack. Again, and lastly, I think we may distinguish in this respect between Past and Future. The Past seems to be more real than the Future, because its content is more fully constituent of the Present, whereas the Future could only claim a superiority over the Past, if it could be shown that in it Appearance would become more and more at one with Reality".

⁵⁵ "Time", paper read at the Parrhesiasts Society in Cambridge, 1903

contrary, B series alone cannot account for change, because 'earlier than' or 'later than' cannot differ in its characteristics - a changeless state is a timeless state.

In other words, static time interprets the indivisible aspect of being, so to speak, and dynamic time interprets the unreal aspect of becoming. That there is some difference between past and future is indispensible, as Keynes said.

In this way, his 1903-paper on time became a breaking point for Keynes, where the dynamic concept of time appeared. It is important to note here that there is already established an essential element for the later Keynesian revolution in economics.

According to Davis⁵⁶ Keynes never clearly articulated his philosophical conversion, although there were changes in the views Keynes originally had. Except perhaps his essay from 1938 on his early beliefs, in which he describes how he became inspired by Moores Principia Ethica and became a forerunner in the escape from the Benthamite Calculus tradition. This underlines his deep interest in human nature and leads to a criticism of Moore⁵⁷:

"It seems to me that Moore's chapter on "The Ideal" left out altogether some whole categories of valuable emotion. The attribution of rationality to human nature, instead of enriching it, now seems to me to have impoverished it. It ignored certain powerful

⁵⁶ Davis (1994): Keynes's philosophical development, p. 146-7: "Intuition in the Moorean sense was replaced by individual expectations. The focus on probability became secondary to the focus on convention. Rational behavior as a principal concern in the analysis of individual judgment was supplanted by a preoccupation with the effects of interdependence and uncertainty. These paradigmatic changes and developments can be observed at work in *The General Theory*".

⁵⁷ The Collected Writings of John Maynard Keynes (2013), X, p. 448-9

and valuable springs of feeling. Some of the spontaneous, irrational outbursts of human nature can have a sort of value from which our schematism was cut off. Even some of the feelings associated with wickedness can have value. And in addition to the values arising out of spontaneous, volcanic and even wicked impulses, there are many objects of valuable contemplation and communion beyond those we knew of - those concerned with the order and pattern of life amongst communities and emotions which they can inspire".

Man is the story acting subject – alone or in communities? That's a quite interesting question because Keynes in this Early Belief Essay also saw himself as an advocate of a principle of organic unity through time. He got the inspiration from Moore, that the whole has an intrinsic value different from sum of its part. It is important to notice that Keynes in 1920 was inspired by this in his work on probability and he was well aware of the relation between individual parts and wholes⁵⁸:

"Yet there might well be quite different laws for wholes of different degrees of complexity, and laws of connection between complexes which could not be stated in terms of laws connecting individual parts. In this case natural law would be organic and not, as it is generally supposed, atomic. If every configuration of the universe were subject to a separate and independent law, or if very small differences between bodies – in their shape or size, for instance, led to their obeying quite different laws, prediction would be impossible and the inductive method useless. Yet nature might still be uniform, causation sovereign, and laws timeless and absolute".

⁵⁸ The Collected Writings of John Maynard Keynes (2013) , VIII, p. 277

If this is combined with Keynes' assessment of how difficult it would be to transform the conclusions from Darwin's The Origin of Species into a shape in which they would be seen to rest upon statistical frequency⁵⁹:

"Not only in the main argument, but in many of the subsidiary discussions, an elaborate combination of induction and analogy is superimposed upon a narrow and limited knowledge of statistical frequency. And this is equally the case in almost all everyday arguments of any degree of complexity. The class of judgments, which a theory of statistical frequency can comprehend, is too narrow to justify its claim to present a complete theory of probability".

This remains a central and recurring theme of Keynes. In a letter to Harrod in 1938, he wrote⁶⁰:

I also want to emphasise strongly the point about economics being a moral science. I mentioned before that it deals with motives, expectations, psychological uncertainties. One has to be constantly on guard against treating the material as constant and homogeneous".

This means, that intuition and values always plays a part in the art of forming an economic model – rather than induction. But not necessarily about the whole world, but by choice of certain features or aspects which is determined be the purpose of the analysis⁶¹. And behind this it is important to determine the relative constant

⁵⁹ The Collected Writings of John Maynard Keynes (2013), VIII, p. 118

⁶⁰The Collected Writings of John Maynard Keynes (2013) , XIV, p. 300

⁶¹ See Togati (1998), p. 34-5 for an elaboration on this point.

(psychological) factors to make limited generalizations about the behavior issuing from them⁶².

This is the basis for Keynes' fundamental economics thinking, as well as for his views on the general society to transcend the matter with great humility and realism – like he does in this passage in an article on foreign policy in 1937^{63} :

"I have said in another context that it is a disadvantage of 'the long run' that in the long run we are all dead. But I could have said equally well that it is a great advantage of 'the short run' that in the short run we are still alive. Life and history are made up of short runs".

Again we see that Keynes emphasizes the short term, as the wording on "in the long run we are all dead" originally comes from A Tract on Monetary Reform (1923)⁶⁴, where Keynes also points out, that this *long run* is a misleading guide to current affairs. He thinks that economists set themselves too easy, too useless a task if they only tell us that when the storm is long past the ocean is flat again. Actually it is a bit the same errand Keynes later is out with in A Treatise on Money (1930) when he gives a critique of Cassel's application of a theory to current events concerning money and foreign exchange, where an underlying assumption is that the terms of trade do not change.

⁶² Ted Winslow in Runde et. al (2003), p. 151. He states: "For such factors to be rationally taken as stable, we must have grounds in our direct knowledge of their organic embeddedness for reasonably believing that the factors will be preserved into, and hence continue to govern behavior in, the future we wish to forecast. Since such givenness is always strictly limited, rational forecasting of this kind will be restricted to a relatively short period into the future" ⁶³ The Collected Writings of John Maynard Keynes (2013), XXVIII, p.62

⁶⁴ The Collected Writings of John Maynard Keynes (2013), XXVIII, p.6

Keynes does not agree and mentioned that there can be big variations in the rate of foreign investments and he added⁶⁵:

"Moreover, students of theory of the credit cycle, and indeed, of all those parts of economic theory which deal with short-period phenomena, have sometimes, by overlooking the temporary divergences between price levels which in the long run are likely to move together, assumed away the very facts which is the task of such a theory to investigate"

Like in a lot of other examples Keynes is obsessed with the study of change – but in addition to his work on philosophy and society view, there is also a latent and parallel need for development of an economic theory more explicit handling time compared to the classical theory that Keynes was brought up with. This is made abundantly clear in his contribution to *Festschrift für Arthur Spiethoff* in 1933⁶⁶, where he finds, that the reason why the problem of crisis is unresolved, or why the theory is so unsatisfactory, is to be found in the lack of what might be termed a monetary theory of production. The previous theory that Keynes refers to as s real-exchange economy he will replace with a monetary theory of production and this has clear implications:

"The theory which I desiderate would deal, in contradistinction to this (a real-exchange economy), with an economy in which money plays a part of its own and affects motives and decisions and is, in short one of the operative factors in the situation, so that the course of events cannot be predicted, either in the long period or in the short, without a knowledge of the behaviour of money between the first state and the last".

⁶⁵ The Collected Writings of John Maynard Keynes (2013) , V, p. 66-7

⁶⁶ The Collected Writings of John Maynard Keynes (2013), XIII, p.408

How this ends is the subject of the next section, but it is important to emphasize that many of Keynes fundamental understandings of time and society actually is done early in his academic life. This applies not least to the phenomenon of time – both understood from inside and outside. This also applies to his understanding of how economic science is a moral science and to make use of intuition and, as also required much creativity when economic models must be formulated.

The General Theory and after

The basic question, as Keynes wanted to answer with the release of General Theory was to pass the problem of what determines income and employment as a whole. If this is possible one can require the complete theory of a monetary economy⁶⁷.

In relation to the monetary aspect, the important thing is that the concept of time is closely related to the phenomenon of money⁶⁸:

"Money in its significant attributes is, above all, a subtle device for linking the present to the future; and we cannot even begin to discuss the effects of changing expectations on current activities except in monetary terms. We cannot get rid of money even by abolishing gold and silver and legal tender instruments. So long as there exists any durable asset, it is capable of possessing monetary attributes and, therefore, of giving rise to the characteristic problems of a monetary economy"

What is meant by "effects of changing expectations on current activities"? Here the idea is to choose the option in light of Chapter 18 of Keynes' General Theory of a short move from a number of invariable basic assumptions through the economic model towards the

⁶⁷ The Collected Writings of John Maynard Keynes (2013), VII, p. 293

⁶⁸ The Collected Writings of John Maynard Keynes (2013), VII, p. 294

determination of the fundamental quaesitum, which is the dependent variables of income and employment measured in wage-units.

Several factors are taken as given. It is the skill and quantity of available labor and equipment, the existing technique, the degree of competition, the tastes and habits of the consumer, the social structure and so on.

Now, the independent variables are the propensity to consume, the schedule of the marginal efficiency of capital, and the rate of interest. Keynes describes the ultimate independent variables as consisting of 69 :

"(1) the three fundamental psychological factors, namely the psychological propensity to consume, the psychological attitude to liquidity and the psychological expectation of future yield from capital assets, (2) the wage-unit as determined by bargains reached between employers and employed, and (3) the quantity of money as determined be the action of the central bank"

Keynes is well aware, that the division of determinants of given factors and independent variables is arbitrary from any absolute standpoint, but the object is to discover those factors in which the changes are found in practice to exercise a dominant influence on the quaesitum. He highlights in particular the importance of investment⁷⁰:

"Finally, if we assume (as a first approximation) that the employment multiplier is equal to the investment multiplier, we can, be applying the multiplier to the increment (or

⁶⁹ The Collected Writings of John Maynard Keynes (2013), VII, p. 246-7

⁷⁰ The Collected Writings of John Maynard Keynes (2013) , VII, p. 248

decrement) in the rate of investment brought about by the factors first described, infer the increment of employment".

What moves Keynes's system in the General Theory is interplay between changes in psychological factors and mechanical factors as the multiplier. In the analysis in chapter 8 of the propensity to consume he gives a more general description of the psychological factors⁷¹:

"The subjective factors, which we shall consider in more detail in the next chapter, include those psychological characteristics of human nature and those social practices and institutions which, through not unalterable, are unlikely to undergo a material change over a short period of time except in abnormal or revolutionary circumstances".

A central point here is the abnormal situation, where the propensity to consume may be sharply affected by the development of extreme uncertainty concerning the future⁷². The same applies for the explanation of the existence of the liquidity preference, that uncertainty to the future course of the rate of interest is the sole intelligible explanation⁷³. And it is also evident of future yield of capital assets⁷⁴:

"The schedule of the marginal efficiency of capital is of fundamental importance because it is mainly through this factor (much more than through the rate of interest) that the expectation of the future influences the present. The mistake of regarding the marginal efficiency of capital primarily in terms of the current yield of capital

⁷¹ The Collected Writings of John Maynard Keynes (2013), VII, p. 92

⁷² The Collected Writings of John Maynard Keynes (2013), VII, p. 94

⁷³ The Collected Writings of John Maynard Keynes (2013), VII, p. 201

⁷⁴ The Collected Writings of John Maynard Keynes (2013), VII, p. 145

equipment, which would be correct only in the static state where there is no changing future to influence the present, has had the result of breaking the theoretical link between to-day and to-morrow".

So, if we break taking account of uncertainty stemming from influence of the future events, this implies a static state analysis in which is imported a large element of unreality. On the other hand it is possible to sum up the state of psychological expectation which according to Keynes covers the state of long-term expectations. And we have to be guided to a considerable degree by the facts about which we feel somewhat confident⁷⁵, even if some of the knowledge can be vague and scanty. The state of confidence depends on how highly the likelihood of our best forecast turning out quite wrong⁷⁶, but:

"There is, however, not much to be said about the state of confidence a priori. Our conclusions must mainly depend upon the actual observations of markets and business psychology".

But if the state of confidence is given, a change in investment will give a change in employment. This kind of thought is carried on by help from a definite ratio established between income and investment and between the total employment and the employment directly employed on investment - the so called multiplier⁷⁷. Keynes sees this further step as an integral part of the theory of employment. It allows determine an investment's impact on employment.

⁷⁵ The Collected Writings of John Maynard Keynes (2013), VII, p. 148

⁷⁶ The Collected Writings of John Maynard Keynes (2013), VII, p. 149

⁷⁷ The Collected Writings of John Maynard Keynes (2013) , VII, p. 113

This means, that we have interplay between changes in psychological factors and mechanical factors as the multiplier – it also means that both the A-series and the B-series of time logic is represented in Keynes' analysis in The General Theory. It provides the opportunity to pursue how the pattern of the marginal propensity to consume, the marginal efficiency of capital and the liquidity preference specified in the beginning of a production period will unfold in the form of a mechanical law of motion that determines income and employment.

Life and history are made up of short periods⁷⁸, as Keynes said – that might be the reason why he did not study how the value of the multiplier did not change in historical time and in stead concentrated on an instantaneous multiplier⁷⁹. After the release of The General Theory he continued in this track which deals with the economics models finiteness:⁸⁰

"a practical theory of the future ... has certain marked characteristics ... based on so flimsy a foundation, it is subject to suddent and violent changes. The practice of calmness and immobility, of certainty and security, suddenly breaks down. New hopes will, without warning, take charge of human conduct. The forces of disillusion may suddenly impose a new conventional basis of valuation. All these pretty, polite techniques, made for a well-paneled Board Room and a nicely regulated market, are liable to collapse. At all times the vague panic fears and equally vague and reasoned hopes are not really lulled, and lie but a little way below the surface"

⁷⁸ The Collected Writings of John Maynard Keynes (2013), XXVIII, p. 62

⁷⁹ Termini (1981), p. 18: "Keynes pretends to synthesise by means of the multiplier a whole process in being"

⁸⁰ Keynes, J.M. (1937), Quarterly Journal of Economics, p. 214-15

He also assumes later an even more radical approach to the concept of uncertainty⁸¹

"By "uncertain" knowledge ... I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty; nor is the prospect of a Victory bond being drawn. Or, again, the expectation of life is only slightly uncertain. Even the weather is moderately uncertain. The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest ... About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know".

This is sometimes referred to as a true or nihilistic uncertainty. In fact, it should perhaps be seen more in the light of an imminent outbreak of new world war – but basically does it not change the model in The general Theory, but sharpens attention to the basic psychological factors in the model.

And Keynes follows quite consistently his particular mode of analysis despite several bids for alternative handling of the concept of time from various economists before and after the release of the General Theory⁸².

Conclusion

One of the most striking changes in economics thinking which comes primarily with J.M. Keynes is his explicit focus on time. An anatomy of Keynes concept of time can best be understood by both studying his philosophical background, his understanding of

⁸¹ Keynes, J.M. (1937), Quarterly Journal of Economics, p. 213-14

⁸² This is particularly the disputing parties with Lindahl, Robertson, Ohlin, Harrod, Tinbergen and Myrdal

society and his development of economic theory. This implies that it is possible to view his handling of the concept of time as both related to the A-series and B-series of the time logic. This dichotomy can be found in the General Theory, which both used a dynamic concept of time, that relate to a number of basic psychological mechanisms and a static concept of time, related to the well known multiplier. Despite numerous challenges in his perception of time Keynes did not change his position, but he was rather sharper in his view – not least when it comes to the concept of uncertainty.

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3. Shackle in time – time in Shackle

On challenging the art of making predictions

Abstract

GLS Shackle got much and the crucial inspiration from John Maynard Keynes. But that's not all. He took a number of further consequences of Keynes' thoughts. This implies for example ideal claims to economists - having to deal with both mechanical time and expectational time. In consequence the idea in this paper is to introduce Keynesian Kaleidics as an illustration of how complicated it is to analyze economic contexts. Finally it is discussed how the potential opportunities is to make alternatives to deterministic predictions on the basis of Shackles approach to economic analysis and especially the idea of scenario writing.

Keywords: Time, Prediction, unkowledge, Keynesian kaleidics, scenario writing, moment-in-being, expectational time.

JEL Classification: B31, B41, D 80

Introduction

The art of making predictions is a recurrent problem in economics. The recent financial and economic crisis is no exception and was not really anticipated and so it has been with crises many times before⁸³.

⁸³ Bezemer (2010) has presented a paper where he gives evidence that stock-flow consistent macroeconomic models helped anticipating the credit crisis and economic recession. The ubiquitous general equilibrium models in mainstream policy and research did not do it.

It is very clearly expressed by Paul Krugman⁸⁴:"Few economists saw our current crisis coming, but this predictive failure was the least of the field's problems. More important was the profession's blindness to the very possibility of catastrophic failures in a market economy" or Ben Bernanke⁸⁵:"Most fundamentally, and perhaps most challenging for researchers, the crisis should motivate economists to think further about their modeling of human behavior. Most economic researchers continue to work within the classical paradigm that assumes rational, self-interested behavior and the maximation of "expected utility"".

These economists describe a number of problems for economics: Insufficient insight into human behavior and undetected system failures, problems with the prevailing paradigm and modeling effort. All of this creates a poor basis for prediction.

This is the occasion to reconsider how the issues have been previously addressed. And therefore it is no coincidence that GLS Shackle (1909-1992) should be involved in this regard. His approach was more realistic and acts contrary to the mentioned approaches where economic agents often are faced with fundamental uncertainty. In these cases there are good reasons why it is difficult to make simple predictions.

The aim of this paper is first to introduce the inspiration that Shackle got from Keynes and secondly to specify Shackles further development of this about the concept of time. Subsequently the idea is to introduce Keynesian Kaleidics to illustrate how complicated it is to analyze economic contexts. In view of this the paper finally discusses the potential opportunities to make alternatives to deterministic predictions on the basis of Shackles approach to economic analysis.

⁸⁴ Krugman (2009), p. 1

⁸⁵ Bernanke (2010), p. 5

Shackles leit motif

It is well known that G.L.S. Shackle in his economic thinking is Keynesian - even in someone's eyes a tirelessly fundamentalist one of this kind⁸⁶. This categorization has probably done more harm than good. Against this background, it is much more interesting to identify the contributions Shackle had to Keynesian economics⁸⁷.

One of his acquaintances - JL Ford - has framed Shackle's main focus:

"The overwhelming majority of Shackle's academic writings have been concerned with the many implications of the presence of uncertainty in the economic milieu; in effect, his *leit motif* has been, "time, expectations and uncertainty"⁸⁸

Shackle admired Keynes's untrammeled daring – his willingness to look into the abyss, to accept the fact that we must act without foreknowledge⁸⁹. Shackle is even more explicit in one of his judgements:

"The greatest innovation in Keynes's great trilogy of the *Treatise*, the *General Theory*, and the epilogue in the *QJE*, is his theory of the rate of interest. It is presented in fullest freshness and liveliest colors, and almost in its completed form, in the *Treatise*"⁹⁰

Shackle generally lays much emphasis on chapter 12 in The General Theory and Keynes' famous article in Quarterly Journal of Economics in 1937, which substantially relate to uncertainty and expectations. In this context, the study of Keynes' opinions in these writings about fundamental uncertainty has led to a profound study by Shackle

⁸⁶ Coddington (1983)

⁸⁷ Latsis (2015), p. 1163 where he argues:" ... that reading Shackle as an economics process theorist allows us to see some of the standard criticism of his work in a new light". And Pheby (1987), p. 35:"... Shackle's "fundamentalist" interpretation of Keynes, when viewed through a more methodological perspective, takes on far greater credibility"
⁸⁸ J. L. Ford (1993) p. 688.

⁸⁹ See Hill (2008), p. 63, where he also says, that Shackle maintains, that after the 1930s economists are coping with scarcity and uncertainty and that it was Keynes who in the 1930s drew all lines of force together as by a giant magnet. ⁹⁰ Shackle (1974), p. 54

about the concept of time⁹¹. It is in fact, an extension of and not in contrast to Keynes⁹². Similarly, as Keynes had a showdown with Tinbergen, Shackle also makes reflections on how far you can get with formal models in economics and especially when it comes to the problem of making predictions⁹³: "In Time in Economics (1958), Shackle, had not only cast doubt upon the validity of the formal, mechanical time dynamics models, but his observations, if correct, excluded any type of forward-looking economic model, except for the next period. Prediction could be made for one period ahead given the state of current expectations and intentions, should these be known and should their interdependence in shaping the macroeconomy be also known".

Any theory which omits consideration of time is according to Shackle devoid of value⁹⁴. It is obvious, that Shackles writings developed into a special dialectic between the concept of time and economic thinking. Shackle is in his thinking in real time and he works explicitly from a definition of time.

Thus, the question is why is it so difficult to make prediction? What are the consequences of Shackles definition of time? Are there alternative ways of development of economics? In the following sections there will be searched for answers to these questions.

⁹¹ See Shackle (1958), Shackle (1965) and Shackle (1972)

⁹² See Mogens Ove Madsen (2014)

⁹³ Ford (1993), p. 691. See Ford for a more comprehensive interpretation of this view.

⁹⁴ Ibid, p. 691. Shackle had nothing left over for a Walras-Pareto type of general static equilibrium, because special characteristics derived from the lack of time: "Time and everything that belongs to time: expectation and uncertainty; change and growth; ambition, hope and fear; discovery, invention and innovation, novelty and news" TE, p. 93.

The Keynesian roots

Shackle has at some point given a very vivid description of his participation in a seminar in 1935 in Cambridge, where Joan Robinson presented the main ideas to be published in The General theory:

"... no other discourse has ever released upon my mind so staggering and thrilling a flood of light. At last I understood. I was released from the torments of my thesis, which struggled to explain unemployment in terms of a model of inflation. I tore it up. I began again"⁹⁵

Shackle discarded his Hayekian thesis in order to begin again! The revised thesis appeared as a book in 1938 with the title: Expectations, Investment and Income. This book's analysis was focused on uncertainty and expectations, but also inspired by the Swedish macroeconomic school with among others Myrdal's time concepts of ex ante and ex post.

Later on Shackle describes the anatomy of Keynes's General Theory⁹⁶. What is very basic and expressly set out in Chapter 12 of Keynes General Theory is uncertainty about the future, which blows the whole edifice of traditional economy down. The latter rested, implicitly on a concept of timeless equilibrium models performances which implied full access to the knowledge of all actors.

In this way "Shackle regards the General Theory as being very different from the deterministic, mechanistic and self-contained models that were spawned by that work"⁹⁷.

⁹⁵ Shackle (1966), p. 53.

⁹⁶ Shackle (1967), chp. 12.

⁹⁷ Pheby (1987)

But inspiration comes as indicated before not only from the General Theory, but also from the Treatise on Money and Keynes Quarterly Journal article from 1937. There is something very peculiar to the General Theory: "My suggestion is that he (Keynes) wished the General Theory to be an outfit of tools, possessed indeed of its own unity and selfsufficiency, possessed of a dominant and central theme, but not constituting a rigid model of economic society. Keynes believed in the eclectic use of general ideas"⁹⁸.

In the following this inspiration from Keynes⁹⁹ will be followed by a more profound reading of Shackle.

Time in economics

One of the interesting aspects of Keynesian economics is the issue of dealing with the concept of time not only in a theoretical sense, but time as a reality constitutive element.

Not least Shackle well-known "de Wries Lectures", which were published under the title Time in Economics in 1958 marks a very significant breakthrough for thinking about time in a more complete Keynesian way. In Shackles opinion Keynes' General Theory was, throughout, in two minds. It turns instinctively towards stable functions, uninterrupted movement along curves, underemployment 'equilibrium', secular stagnation, step-by-step declension. But in reality it is not really the shape of the curves, but their broad bodily shifts and deformations, which contains the meaning of Keynes'

⁹⁸ Shackle (1974), p. 49

⁹⁹ It is worth noting and what might have inspired Shackle that Keynes (1937), p. 222 also said: "The hypothesis of a calculable future leads to a wrong interpretation of the principles of behavior which the need for action compels to adopt".

arguments. *The General Theory* had a different message¹⁰⁰ than what is immediately communicated through the mathematical language suit¹⁰¹.

In contrast to the historian and mathematician an economist is according to Shackle in a different challenging situation. The former treats time as space or as one dimension of space, like an outside observer. Shackle wants to contrast this with an inside view, which he calls the solitary present or the moment-in-being¹⁰²:

"The mathematician treats time as a space, or as one dimension of a space, in which all points have an equal status, or importance or validity together, within one and the same prospect of the world ... a simultaneous validity ... a differential equation to express, say, the motion of the "particle" of classical dynamics.... Consider the historian who is thinking, say, about the constitutional changes produced in England ... All this long process presents itself to him in one panorama, as a unity, every part of it as real as every other part; he is an outside observer, not himself part of what he describes... I want to contrast the inside view which each of us has in the very act of living, the time in which we sense-perceive, feel, think, imagine, and decide ... It is what I would like to call the solitary present of the moment-in-being"¹⁰³

If economics is treated like an outside observer would do, it will in the sense of Shackle be a kind of exterior dynamics that is mechanical in a determinate behavior of a machine

¹⁰⁰ Pheby (1987), p. 26, points out, that "Shackle regards the *General Theory* as being very different from the deterministic, mechanistic and self-contained models that were spawned by that work. However, he recognizes that *The General Theory* is a paradoxical work. For Shackle, this is due to the important distinction he draws between the method and meaning of Keynes's work".

¹⁰¹ See by the way Shackle (1973), p. 517-18:"A book which concludes, by difficult and entangled steps, that stable curves and functions are *allergic* to the real human economic Scheme of Things, proceeded to state this idea in terms of stable curves or functions. No wonder the critics have worn the Keynesian garment inside-out".

¹⁰² See Shackle (1958), P. 13: "There is for us a moment-in-being, which is the locus of every actual sense-experience, every thought, feeling, decisions and action"

¹⁰³ Shackle (1959)

of limited design – and it will claim to be predictive. But theories which tell us what will happen are claiming too much, at least if it is an econometrician:

"In constructing his predictive macro-dynamics the econometrician naturally and properly treats the economy as a machine whose future behavior, in the absence of shocks from outside itself, is fully determined by its history over some stretch of the past, so that this future behavior is in principle predictable"¹⁰⁴.

It is important to note that according to Shackle, the inside view affects, however, also very much the Economist:

"In contrast with such a theory we have one which purports only to describe the events of a single moment inside a single persons's mind. Into that moment may be packed thoughts, feelings, imaginations and decisions; but amongst these, something which has not arisen as necessary consequence of the events of preceding moments but has been newly inspired or created in this moment. If the moment can be thus essentially novel there can be no predictive inference from one moment to another but only description of the kind of brief system of events that can happen in the individual's mind in each separate moment. So this second kind of dynamics is descriptive and not predictive"¹⁰⁵

Time from the inside is the time in which we think, time from the outside is the time about which we think, as Shackle said¹⁰⁶.

¹⁰⁴ Shackle (1954), p.8

¹⁰⁵ Ibid, p. 8-9

¹⁰⁶ The difference and interconnectedness between the two concepts are well explained in Atmanspacher and Dalenoort (1994), p. 293:"When we think of time, we always think of time in time. We seem to be no appropriate observers to observe time from outside. The self-referential nature of consciousness is related to the permanent change between subject and object of consciousness. In the domain of the mental, we may have a chance to discover a dynamics whose representation by a *temporal succession of states* is insufficient. There are essentially two ways of knowledge about temporal succession: mental and physical time. The former is based on inner experience, the latter on external events. However, the major difference between both concepts of time turns to be the status of the Now. It may be the Now which is the window to a dynamics beyond temporal succession".

Shackle (1965) ended up by making a four-way classification of Time: Mechanical time, evolutionary time, timeless models and expectational time¹⁰⁷. What is of particular interest here is the dynamic movement in time: Translation of the moment-in-being along the calendar axis (outside) and from one moment in to another (inside):

"... the theoretician is confronted with a stark choice. He can reject rationality or time ... Instead of accepting the incompatibility of time and reason, and electing to base our theories on one or the other, we can denature "time" and make it an artefact, a space whose distinct points are co-valid like those of physical space"¹⁰⁸.

This is the ideal claim to economists - having to deal with both mechanical time and expectational time. This is pivotal for the following sections.

Keynesian kaleidics

Shackle has on several occasions rounded the concept of kaleidics¹⁰⁹ as an alternative to the ordinary Marshallian equilibrium analysis. As mentioned before there is an arresting contrast between the method and the meaning of Keynes General Theory. The method of the book is an analysis of equilibrium, but the meaning of the book is, that this kind of

¹⁰⁷ Shackle (1965) especially the chapter "A Scheme of Economic Theory", where he defines the four concepts of time. See also Carvalho (1983-84) for an interpretation of the definitions of these time concepts, where mechanical time is the time of the external observer, who knows everything, future as well as the past. Evolutionary time, where the observer is no longer omniscient – it is a segment of real history. Timeless models, in which time does not flow – like in General Equilibrium models. Expectational time, where agents know that the past is immutable and the future is to be created. ¹⁰⁸ Shackle (1972), Epistemics and Economics, p. xvi

¹⁰⁹ The analogy of the kaleidoscope has also been used by Keynes himself (1930), p. 81:"Nevertheless we must not argue for these reasons that an expansion of the currency influence relative prices in the same way as the translation of the earth through space affects the relative position of the objects on its surface. The effect of moving a *kaleidoscope* on the coloured pieces of glass within is almost a better metaphor for the influence of monetary changes on price levels. For the way of thinking which I have criticized overlooks, or undervalues, the importance of two other factors, neither of which is conveniently included in 'economic friction'". Shackle (1974) was astonished, when he found this sentence many years later, because the analogy coincided with the one he used himself.
rationality is in the nature of things impossible and baseless, because men confront an unknown and unknowable future¹¹⁰, and it is subsequently in the famous QJE article that Keynes discovers the soul of his own work¹¹¹, and refers to the concept of fundamental uncertainty or radical uncertainty and hammered out in the sentence "we simply do not know".

This contradiction in Keynes's theory causes Shackle to look for an alternative that can overcome equilibrium thinking. "There is a toy called the kaleidoscope, in which three mirrors face inwards in a tall pyramid and repeat in symmetrical reflections the random mosaic of colour formed by loose pieces of stained glass on the floor of the instrument. This toy seems strangely apt as an analogue of Keynes's method"¹¹²

This comparison with a kaleidoscope led Shackle to name Keynes's method at Kaleidostatics, since Keynes explained each temporary pattern as a natural result of certain circumstances¹¹³: "The method implicit in the General Theory is to regard the economy as subject to sudden landslides of re-adjustment to a new, precarious and ephemeral, pseudo-equilibrium, in which variables based on expectations, speculative hope and conjecture are delicately stacked in a card-house of momentary immobility, waiting for 'the news' to upset everything again and start a new dis-equilibrium phase". But their abrupt transitions one into another, Keynes left unexplained¹¹⁴.

¹¹² Shackle (965), p. 47

¹¹⁰ Shackle (1965), p. 44.

¹¹¹ Ibid, p. 45.

¹¹³ It is further elaborated in Shackle (1972), p. 433.

¹¹⁴ Shackle (1965), p. 48

In Shackles interpretation, Keynes unfortunately went from a good method to a bad one between Treatise on Money and The General Theory¹¹⁵:

"(Keynes) laid out on the bench the component parts of a Kaleidic method. Some of the best such parts he discarded, some incompatible ones be included, the conception as a whole he left incompletely and awkwardly assembled. But he showed what economics can be in the hands of a man who combined in some degree the insights, the felicities and the inspired audacities of the mathematician, the historian and almost the poet"¹¹⁶

In Shackle's approach Keynes' work can be reduced to two concepts, namely uncertainty and the liquidity preference. Investment, Shackle argues, is determined by the expectations of entrepreneurs which is vulnerable to unpredictable streams of "bad news" causing them to withdraw from the field and leaving resources unemployed. This is made possible by uncertainty. Liquidity preference can also explain the existence of money and the need to hold onto it in the face of uncertainty¹¹⁷.

Here we are in accordance with Shackle (1974) at the core: "Uncertainty is the kaleidic factor" and where there is uncertainty money is needed and every need for it can be said to arise from the lack or impossibility of knowledge¹¹⁸

Keynes (1937) posed in this respect a wonderful question: Why would anyone outside a lunatic asylum wish to use money as a store of wealth? He gave a clear answer by saying, that money was hoard as a hedge against incertitude – because the future can be very uncertain:

¹¹⁵ It is worth noting, that Shackle (1974, p. 80) states, that "The two books are the same book. They express the same vision, the same distillation of experience, the same construction of thought. Yet their formal method and assignment of importance are vastly different". Differences are also found in the case of certain elements of theory ¹¹⁶ Shackle (1974): Keynesian Kaleidics, p. 83

¹¹⁷ See amongst others J.F. Muellers (April 8, 2008) review of Keynesian Kaleidics on Amazone.

¹¹⁸ Ibid, p. 61

"Because, partly on reasonable and partly on instinctive grounds, our desire to hold money as a store of wealth is a barometer of the degree of our distrust of our own calculations and conventions concerning the future"¹¹⁹

This relationship is very important in the keynesian monetary theory of production. More generally, Shackle following description of the sudden shift an economy:"The economy is in the particular posture which prevails, because particular expectations, or rather, particular agreed formulas about the future, are for the moment widely accepted. These can change as swiftly, as completely and on as slight a provocation as the loose ephemeral mosaic of the kaleidoscope"¹²⁰

In another passage some years later, Shackle describes Kaleidic changes in the following way:

"The meaning of these situations is that of momentary, ephemera glimpses at selected an rare points of a mainly un-adjusted, groping and speculative process, involving vast numbers of variables subject in many cases to an inherent restlessness and precariousness"¹²¹

For Shackle the general consequence is, however, clear enough: Economists can study the past, observe the present and imagine the future¹²².

To recap the previous distinction between exterior and interior dynamics, this approach to the time aspect also gives the following issue:

¹¹⁹ Keynes (1937)

¹²⁰ Shackle (1965), p. 44

¹²¹ Shackle (1974), p. 72. Restlessness are also described by Lachmann (1976), p. 61:"Restless asset markets, redistributing wealth every day by engendering capital gains and losses, are just one instance, though in a market economy an important one, of the forces of change thwarting the equilibrating forces. Equilibrium of the economics system as a whole will thus never be reached".

¹²² See also Bausor (1983), p. 2: "The epistemic asymmetry of past and future also generates asymmetry between cause and effect. Constructing the future is an act of fantasy".

"There is on one hand, the objective aggregative mechanical predictive dynamics sought by the econometricians, and on the other the subjective private descriptive dynamics of an individual ... a study of human conduct, is faced with the question of free will or determinism"¹²³

The possible contradiction between determinism and free will is generally a very central theme for Shackle, when we are dealing with a human society. It is also essential to how we can talk about and deal with the art of prediction.

From prediction to scenario-writing in economics

Shackles concept on time and thought on Keynesian Kaleidics means, that traditional deterministic and linear projection is not possible:

"We can attack the thesis of the predictability of the economic world at three levels, claiming either, first, that prediction is impossible in practice; or secondly, that it leads to logical contradictions; or thirdly, that it denies the humanity of man¹²⁴.

Shackle sees little scope then for prediction in economics. On the other hand explanation is a less demanding task than is prediction:

"Prediction is at an unfair disadvantage. The symmetry of prediction and explanation is true only in an abstract world, where the data on which reason is to work are complete and certain for both purposes. This symmetry assumes at the selection of data has

¹²³ Shackle (1954): The Complex Nature of Time as a Concept in Economics

¹²⁴ Shackle (1958), p. 103

already been performed, is a manner which is guaranteed (whence and be whom?) to be correct"¹²⁵

Symmetry is not possible, but what is left? Shackle opens a loophole, which is interesting to look at. Expectational time gives a freedom or power of the mind to create images and associate them with future moments¹²⁶. There is a texture in the world which prescribes, not what will happen but what can happen¹²⁷:

"Each agent is deciding in a world of *subjectively bounded uncertainty*. For Shackle, this means that for each action open to the agent, s/he discerns a great range of possible ultimate consequences, but a range which, within any finite horizon, is bounded. All this may give the sequence of states seen by our detached observer a sort of continuity of texture which will enable him/her to make short-range guesses about the future"¹²⁸.

Vahabi states that the author/scientist of inertial dynamics then is moving away from the role of prophet towards the task of scientific description. There will be set a different agenda for the work to create a performance on an economy's future development: From being single-line predictors to scenario planners.

"However, an inability to specify or define stimuli in advance does not necessarily mean that the economist cannot draw up scenarios concerning how particular systems may fare, and which policy measures might usefully change their fortunes. The economist should at least be able to classify and order environments in terms of key characteristics – for example, stability/turbulence, static technology/dynamic technology – before

¹²⁵ Shackle (1972), p. 349

¹²⁶ Shackle (1954, p. 4

¹²⁷ Shackle (1966), p. 760

¹²⁸ Vahabi (1998), pp. 557-558

considering ways in which the decisions makers might seek to cope with different patterns"¹²⁹.

From a Shackelian perspective it will be rejected that economists should make deterministic predictions¹³⁰, but it will not be denied, that it is possible to provide insights on a range of things that could happen¹³¹. This means that it should be possible to highlight areas of uncertainty and delimit the bounds of unknowledge, but also to propose improvements to the design of a system and to discover ways of modifying or eliminating incidence of surprises in the environment¹³².

Loasby¹³³ notes, that too few economists have realized, but many in business have long known, that the purpose of a planning process is to change behavior and he mentions Shell as an example of a firm, where they gradually came to use scenarios as a way of giving greater freedom to its managers and that they "should explore alternative actions and their various possible consequences, and should do so liberating their imaginations from the constraints that are built into forecasting models, and from other sources of rigidity"¹³⁴

Uncertainty as the driving force seen from a kaleidic perspective is not a threat to economic analysis and even to the possibility of rational behaviour¹³⁵, but provides room for imagination, and the hope of discovering new knowledge¹³⁶.

¹²⁹ Earl and Kay (1985), p. 38

¹³⁰ Shackle (1958), p. 105, has characterized these kinds of predictions in the following way: "predicted man is less than human, predicting man is more than human".

¹³¹ Earl and Kay (1985), p. 35

¹³² Shackle (1953): The Logic of Surprise, Economica, New Series, vol. 20, no. 78, pp. 112-117.

¹³³ Loasby (1994), p.519

¹³⁴ Ibid, p. 519.

¹³⁵ Ibid,. P. 520

¹³⁶ According to a letter from Shackle to Jefferson in 1981 this is interestingly also recognized by Shackle: "I was extremely exited to read the lecture by Mr. Richard Seidl to the conference on Corporate Finance, in which he had explained Shells

Conclusion

The financial and economic crisis has not been easy to predict for economic science. It provides a challenge especially if prediction shall be a unique hallmark in economics. Shackles very early realization of the concept of time plays a special role in the understanding of economic events and leads him to two complementary concepts, expectational and mechanical time. It gives him the opportunity to give a different interpretation of Keynes real purpose in the General Theory, but equally also opportunities for a different approach to the problem of prediction. This has, as shown the consequence, that Shackles universe involves the creation of an alternative analytical approach, called Keynesian kaleidics. This does not provide opportunities for prediction as in traditional deterministic models, but instead it will be the answer to the prediction challenge, where it paves the way for the scenario writing.

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disavowal of the attempt to predict, as an unique path of history, the course of affairs for coming years, and Shells adoption of a new philosophy, calling for multiple scenarios differing widely from each other, and insisting on special attention to extreme members. This sheaf of diverse scenarios seeks to answer the question, not what will happen but what could or can happen. Since this is the attitude to our irremediable unknowledge of the future which I have been urging for very many years".

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4. Hicks's progress from statics to historical time

Introduction

Rereading parts of John R. Hicks' massive oeuvre is a rather liberating experience; both because it is very insightful and also a very self-critical work¹³⁷. A centrally positioned theme of special interest in Hicks's¹³⁸ work is the concept of "time." Although this theme has been quite understated in the overall picture of Hicks' achievements, it certainly deserves attention.

Early on in his analytical work, Hicks was compared to economists such as Menger and Lindahl, one of the central aspects of their work being to bring theory as close to the economic reality as possible. Their inspiration marked Hicks throughout his research:

"I must, however, admit that I myself have spent much time on steady state economics ... I felt that I had to learn them, and the best way to learn them is to write out one's own version. But in the successive versions which I have produced, I have always been making some effort to get away" (Hicks, 1976).

¹³⁷ The original idea for this writing is based on conversation with John Hicks at the conference "Fifty Years After IS-LM" in Aalborg, September 1987. First presented at the First Seminar in Post Keynesian and Heterodox Economics FACULTAD DE CIENCIAS ECONÓMICAS Research Group in Macroeconomics and Economic Policy MACRÓPOLIS, Bogota, Colombia, 9 to 13 August, 2010. Thanks to Victoria Chick and the editors for comments on the latest version of the paper.

¹³⁸ Throughout the article, Hicks will be the name in order not to create confusion about false accrual of Hicks's work (Leijonhufvud (1984), Pasinetti and Mariutti (2008) and Collard (1993)).

The main theme in the following pages is the question as to what makes Hicks move from general equilibrium theory to the study of economics in historical time. Obviously, Hicks wanted to bring economic theory close to reality for a very specific purpose, although he first formulated this ambition late in his career:

"It is because I want to make economics more humane that I want to make it more time-conscious, and since I am approaching the task from that end I am content with a more earthy way of going about it" (Hicks, 1976).

In his homage to Georgescu-Roegen, Hicks stated that the concept of time has always been present in much of his own work. And the vital and interesting principle in the concept of time is as follows:

"It is a very simple principle; the irreversibility of time. In space we move either way, or any way, but time just goes on, never goes back. We represent time on our diagrams by a spatial coordinate, but that representation is never a complete representation, it always leaves something out ... It is quite hard to get away, in any part of our thinking, from the spatial representation"¹³⁹.

Hicks (1936) acknowledged very early in his first review, that the method in Keynes' General Theory was the reintroduction of determinateness into a process of change, and, from the standpoint of pure theory, the use of the method of expectations was in

¹³⁹ Hicks (1982) from the article Time in Economics, p. 283.

Hicks' optic the most revolutionary thing about the General Theory. His second review is the very famous IS-LM interpretation of the General Theory, where it is difficult for Hicks (1937) to escape from equilibrium assumptions.

In his later work, it becomes clear that Hicks is deeply dissatisfied with the Temporary Equilibrium method. He becomes increasingly concerned with economic problems as problems of change, of growth and retrogression, and of fluctuation, and the extent to which these problems can be reduced into scientific terms is rather limited—as economics pushes on beyond statics, it becomes less like science and more like history, as Hicks said.

In the subsequent writing, the intention is to follow the historical development of Hicks thinking about time and reality.

The LSE-based Hicks

Hicks began his academic career at the London School of Economics in 1926 and became part of the (Lionel) Robbins Circle, as it appeared in 1929. About this group, Hicks comments:¹⁴⁰

¹⁴⁰ Hicks (1982) *Money, Interest and Wages*, p. 3.

"We seemed, at the start, to share a common viewpoint, or even, one might say, a common faith. Some of us, especially Hayek, have in later years maintained that faith; others, such as Kaldor, Abba Lerner, George Shackle and myself, have departed from it, to a greater extent or less ... The faith in question was a belief in the free market".

In Hicks' case, it was also a movement away from equilibrium theory, but this transition was contradictory. On the one hand, Hicks, in a lecture to The Economic Club in 1934 (later published in article form: A Suggestion for Simplifying the Theory of Money) declared his independence in relation to the LSE. On the other hand, he also worked on a larger epic, which was first finished after his stay in Cambridge, namely *Value and Capital*, published in 1939 (1946). Hicks was not "enrolled" in the narrow sense in circles around Keynes,¹⁴¹ but he had some individual contacts, particularly with Robertson and Pigou. Nevertheless he was asked to carry out a review of *The General Theory of Employment, Interest and Money* for *The Economic Journal*¹⁴².

Hicks withdrew from the Robbins Circle and never joined any other circles. Conversely, he had many important professional acquaintances, but Hicks primarily let his own intellect and open-mindedness have a decisive influence on where new cognitive achievements were to be found, but continued to maintain an active participation in and discussion of contemporary theories.

¹⁴¹ See Pasinetti and Mariutti, p. 6: "Therefore, the exclusion from the Keynesian group did not particularly hit him (Hicks). His timid and introverted character and his independent mind did not suffer particularly from what occurred."

¹⁴² Maes (1986), p.413

He continued to Manchester, where he delivered his main contribution to New Welfare Economics in the years 1938-46, which together with the monograph *Value and Capital* subsequently earned him the Nobel Prize in economics.

From Manchester he returned in 1946 to his educational center and final residence, Oxford. At the same time, this meant that his interests spread out over Value and *Capital* and theoretical considerations regarding welfare, interests centering around growth, fluctuations, and international economics.

From SI-LL to IS-LM

As previously cited, Economic Journal asked Hicks in 1936 to carry out a review of *General Theory*¹⁴³ Hicks highlights the following with respect to Keynes' methodology:

"The point of the method is that it reintroduces determinateness into a process of change. The output of goods and the employment of labour, together with the whole price-system are determined over any short period, once the stock of goods existing at the beginning of the period, is given, and once people's expectations of future market conditions are given too."¹⁴⁴

Hicks has no doubts about what he should herald as the most significant contribution in

¹⁴³ The notification is titled: "Mr. Keynes' Theory of Employment" and was published in *The Economic Journal* in June 1936.

¹⁴⁴ After Hicks (1982), p. 87.

General Theory—an area that he had already started working with:

"From the standpoint of pure theory, the use of the method of expectations is perhaps the most revolutionary thing about this book."¹⁴⁵

Hicks completes his review by noting that the dissertation technique is more conservative than the technique applied in Keynes' *A Treatise on Money*. He explains that *General Theory* represents a reversion to a Marshallian technique used in areas that not even Marshall himself analyzed.

Following this review, Hicks (1937) wrote an interpretation of *General Theory* for mathematicians and econometricians in *The Econometric Society* in 1936, which contains the SI-LL diagram, which eventually gave rise to a myriad of deductions in the familiar IS-LM typology. About his interpretation, Hicks comments:¹⁴⁶

"I recognized immediately, as soon as I read The General Theory, and that my model and Keynes' had something in common. Both of us fixed our attention on the behaviour of an economy during a period—a period that had a past, which nothing that was done during the period could alter, and a future, which during the period was unknown. Expectations of the future would nevertheless affect what happened during the period ... expectations, in our models, were strictly exogenous."

¹⁴⁵ Ibid., p. 86.

¹⁴⁶ Hicks (1980): "IS-LM: an explanation," p. 139.

In contrast, there were also obvious differences, since Hicks was operating with a flexible pricing model, while money wages were exogenously given with Keynes. A second and more fundamental difference was the length of the time period studied:

"Keynes (he said) was a 'short period,' a term with connotations derived from Marshall, we shall not go far wrong if we think of it as a year. Mine was an 'ultra-short period,' I called it a week. Much more can happen in a year than in a week ... and this, as we shall see, is a very real trouble in Keynes."¹⁴⁷

Among other things, Hicks discusses what can happen in one session: "Now it would be quite hard to say, in terms of such a model, that effective demand would determine employment ... it is a question of the relation between current demand and current input, both in the current period."¹⁴⁸

The question is how it may be possible to establish a rule describing the extent to which demand in a given period will affect the amount of manpower available in the self-same period. For Hicks, it is difficult to find justification for such a rule, but he provides instructions:

"But one can hardly get a plausible rule while confining attention to what happens within a single period. So it would seem that the proper place for such a proceeding is in sequential models, composed of succession of periods, in each of which the relevant

¹⁴⁷ Ibid., p. 141.

¹⁴⁸ Ibid., p. 146-47.

parameters have to be determined, there is then room for linkages between the periods, and so for lags. I have myself made some attempts to the construction of such models (*Capital and Growth* 1965 chp. 7-10). I think they have their uses, but they are not much like IS-LM."¹⁴⁹

According to Hicks, if the IS-LM model is to have any relevance, the period of analysis should be longer than one week, proposing instead a year, and the economy should be in equilibrium¹⁵⁰. Although Hicks is quite uncertain: "For how, after all, can this equilibrium assumption be justified? I do not think it can be justified for all purposes, maybe not for the most important purposes."

Another part of Hicks' self-criticism concerns the IS-LM structure itself: "The relation which is expressed in the IS curve is a flow relation, which must refer to a period, such as the year we have been discussing. But the relation expressed in the LM curve is, or should be, a stock-relation, a balance-sheet (as Keynes so rightly insisted). It must therefore refer to a point of time, not to that period. How are the two to be fitted together?"¹⁵¹

In Keynes' sense there is no need for liquidity if there are no uncertain expectations. On the other hand, Hicks finds that "[a] state of equilibrium is a state in which there are no surprises," implying that the LM curve can only survive if there is no use of uncertain

¹⁴⁹ Ibid., p. 147.

¹⁵⁰ Chick, V. (1983) p. 247: "There has been much criticism of IS-LM in recent years ... it is perfectly possible, for example to include long-term expectations, which, when they alter, merely shift the LM-curve ... but it still leaves out the all-important aspect of producers' output decisions and the short-run expectations on which they are based".

¹⁵¹ Ibid., p. 152.

expectations, but only calculable expectations: "What happens (during the period) falls sufficiently within the range of what is expected for no revision of expectations to be necessary."¹⁵²

Hicks later abandoned using the IS-LM diagram, as Post-Keynesians did¹⁵³, and it is not to be found in the 1974 book *The Crisis in Keynesian Economics*. Although Hicks indicates that the IS-LM is not really in time, since the LM curve has a foot in time, whereas the IS-curve is in equilibrium¹⁵⁴.

In other words, it is a very peculiar paradox that the money market LM curve is studied at a historic point in time and the commodity market IS curve multiplier is releasing its part in logical time.

Economists have since referred to the IS-LM paradox as a "leitmotiv" for the contradiction between stability and change. Although the cash problem remains unresolved in the Hicks case and, secondly, it is far from the only area for the Hicks case where this very fundamental problem concerning the usability the concepts of equilibrium features as more than a joke—it is really a consistent travel companion throughout Hicks' writings. We will now turn to this.

¹⁵² Ibid., p. 152.

¹⁵³ Kriesler, Peter and John Nevile (2016) p. 78: "Traditionally, post-Keynesian economists have rejected the IS–LM framework as being neither a valid simplification of the arguments in the General Theory nor a reliable model for analysing macroeconomic issues"

¹⁵⁴ As stated by Dow (1985) p. 35-36: "... the scope for universal laws in economics is restricted by the capacity of the economic system to evolve over time; the majority of general statements must be conditional on the environment in which they are formulated. In particular, as Hicks (1979) points out, the time element in statements of cause and effect becomes important if structural change can occur during that time period".

From Value and Capital to Capital and Time

As becomes apparent from the titles alone, there is a shift in emphasis from *Value and Capital* (1939/1946) to *Capital and Growth* (1965) and *Capital and Time* (1973). That is not to say that the concept of time does not play a central role in the theory formation throughout these works. Instead, the question becomes, what kind of conceptualization of time and methods did Hicks use?

According to Hicks, the "dynamic part" of *Value and Capital* was written after the publication of Keynes' *General Theory*. With respect to his method of analysis, he says, inter alia, the following:¹⁵⁵

"I call Economic Statics those parts of economic theory where we do not trouble about dating; Economic Dynamics those parts where every quantity must be dated ... and we even pay special attention to the way changes in these dates affect the relations between factors and products."

But also a more surprising statement:

"The economic system has now to be conceived of, not merely as a network of interdependent markets, but as a process in time ... Nevertheless we shall find, as we

¹⁵⁵ *Value and Capital* (1939/46) p. 115.

proceed, that there is a way of reducing the dynamic problem into terms where it becomes formally identical with that of statics."¹⁵⁶

This should be seen as an indication of how a process can be deconstructed into individual periods. A period length is the famed "one week," which Hicks was operating with, where prices are set in competitive markets on a Monday. The plans of households and firms are also formulated and revised on that Monday.

Equilibrium over several periods—intertemporal equilibrium—assumes that the plans of households and firms are met. Alternatively, different kinds of imbalances can emerge that can be created by inconsistent expectations or plans or unexpected changes in preferences.

In the subsequent 1950 book *Trade Cycle*, Hicks employs fluctuations inspired by Harrod and uses an accelerator-multiplier model. Furthermore, he also introduces autonomous investment and time lags. In a later review, the book is criticized for not operating with expectations¹⁵⁷.

The book also lacked a theory of markets and growth, and the steady state analysis was out of historical time. Like Walras, according to Hicks' later reflections, it is important to build on a market structure. It was therefore one of the crucial issues for Hicks' later methods for studying trading in organized markets.

¹⁵⁶ Ibid., p. 116.

¹⁵⁷ Kaldor (1951)

A crucial theoretical and methodological turning point for Hicks—not known outside of a relatively small circle of economists – came in his 1956 contribution to a Festschrift for Erik Lindahl¹⁵⁸. The key to clarifying some of the confusion Hicks and many others suffered from in the 1940s was found in a simple classification of models. Hicks decided to distinguish between *ex post* and *ex ante* models and stock-flow models, which can be either flex-price or fixed-price models. Until that clarification, hybrids of these types of models had confused the picture, including Keynes' model in *General Theory*.

In 1956, Hicks established a clear purpose with his models:

"I shall take it to be the theoretical analysis of the process of economic change. So defined, the subject includes the study of fluctuations as well as that of growth, it includes the study of change in particular markets as well as in the whole economy; and no commitment is made in advance about the method by which the subject is to be examined."¹⁵⁹

One can ask, how is economic history normally written? According to Hicks, it is usually via a comparatively static approach, where the state of the economy is first considered, and it becomes a dynamic story when the developments in the history are told. For example, accounting theory has clearly contributed to economic thinking in a

¹⁵⁸ "Methods of Dynamic Analysis", 1956.

¹⁵⁹ Hicks (1982), p. 220.

constructive manner and rendered it possible to analyse a process of change.¹⁶⁰

"Once this approach is accepted, the general dynamic problem falls into two parts. There is, in the first place, what we may call single-period theory, theory which is concerned with the determination of what happens in a single period in the above sense; and secondly what we may call continuation theory, which is concerned with the effect of the events of a first period upon the expectations and plans themselves which determine the events of its successors."¹⁶¹

In this context, Hicks admits that he failed to pursue the trail of "continuation theory" very far in *Value and Capital*. On the whole, he sees the model in *Value and Capital* as very unrealistic—not only because of its assumption concerning perfect competition,¹⁶² but "[t]he trouble with the *Value and Capital* model is that it is not sufficiently realistic."

Hicks sees Keynes' model in *General Theory* as a sharp, brilliant, but simplistic stockflow model. Keynes established a hybrid model in which the approach to the bond market is a flexible-price approach, while all other markets are considered fixed-price markets:

"Thus he (Keynes) boiled down the whole economy into the one-Q-market and one P-

¹⁶⁰ This deepens the analytical possibilities in relation to historical time. Hicks (1982), p. 222: "Parallel to the real events, which have one course in hours, are constantly changing series of planned or expected events, with similar but distinct courses. The comparison of what does happen with what is expected to happen becomes a key-point of dynamic analysis" ¹⁶¹ Hicks (1982), p. 223.

¹⁶² According to Hicks (1982), p. 238 was "Value and Capital pure catallactics from start to finish."

market, linked by a single price-link—the effect of the rate of interest on (otherwise autonomous) investment."¹⁶³

Hicks regards this simplification as brilliant and an appropriate use of assumptions in relation to the real economy, where 1930s and 1940s depression and regulation largely suspended the price mechanism. This was not the situation in the 1950s, and Hicks thus found Keynes to be operating with a single-period analysis and never approached the issue of multi-period analysis or continuation theory.¹⁶⁴

Like the former book on capital, the 1965 book *Capital and Growth* does not operate with one method. On the contrary, it is said on the method used in *Value and Capital*:

"The fundamental weakness of the Temporary Equilibrium method is the assumption, which it is obliged to make, that the market is in equilibrium—actual demand equals desired demand, actual supply equals desired supply—even in the very short period, which is what its single period must be taken to be. This assumption comes down from Marshall, but even in a very competitive economy, such very short-run equilibration is hard to swallow."¹⁶⁵

¹⁶³ Ibid., p. 230.

¹⁶⁴ Hicks links this comment to the missing continuation theory: "this is the origin of the difficulties about the marginal efficiency of capital and marginal productivity of capital which he left to others to clearing up", Hicks (1982), p. 230, note 9.

¹⁶⁵ *Capital and Growth* (1965), p. 76. Immediately before the passage, Hicks states on page 69: "It is generally true of the Temporary Equilibrium method, as so far expounded, that it has serious defects, in at least three distinguishable directions. Some of these defects may be mendable to some extent, but their combined force is such that they make it impossible for us to rest content with the Temporary Equilibrium method as our only dynamic method."

As something new, Part II of the book *Capital and Growth* operates with a special analysis of the growth process, Traverse, where the key question is how an economy can move from one growth cycle to another:

"We do not greatly diminish the generality of our study of disequilibrium if we regard it in this way, as a Traverse from one path to another. And there is some advantage to be gained from greater specification of the initial position from which the Traverse takes off."¹⁶⁶

The analysis is still of a neoclassical nature and runs its course in logical time, and the world is assumed to be "ergodic."¹⁶⁷

And with the next book in 1969, *A Theory of Economic History*, Mercator Gloriosus is presented and clarifies the identity of the auctioneer.

W. Parker¹⁶⁸ characterizes Hicks' theory of economic history, remarking that Hicks "has produced not a theory of economic history, but a theorist's economic history—a different, but more humane and interesting thing."

¹⁶⁶ Ibid., p. 184.

¹⁶⁷ See this point developed in Richardson (2001).

¹⁶⁸ *The American Historical Review* (1972), 77, p. 1087–88.

According to Hicks,¹⁶⁹ the relationship between *A Theory of Economic History* (1969) and the third and last book on capital, *Capital and Time* (1973), is very intimate because they are both of them fruits of a historical approach.

The first draft of some content in his book *Capital and Time* appears in an article from 1970, "A Neo-Austrian Growth Theory," which signals the inspiration from which the book is retrieved. *Capital and Time* represents Hicks' second traverse analysis. It comprises an historical disequilibrium adjustment path that is sparked by a technical innovation promising higher yields to those entrepreneurs who choose to adopt it.¹⁷⁰ Richardson (2001) notes¹⁷¹ that when Hicks published *Methods of Dynamic Economics* in 1985, he finally disowned his First Traverse Analysis in *Capital and Growth*.

Hicks (1969) subsequently introduces market organization as an evolutionary process, that is, that markets evolve in historical time, and that institutions are a necessity for the functioning of markets. This approach is tangential views in more evolutionary and institutional approaches to economics.

Time and Reality

Initially, it was determined that Hicks himself has stressed how much time he spent

¹⁶⁹ Hicks (1975): "Revival of Political Economy."

¹⁷⁰ Richardson (2001), p. 20.

¹⁷¹ Ibid., p. 21.

working to move away from Steady State. Although Hicks received the Nobel Prize for making a fundamental contribution to the renewal of the general equilibrium theory and his work with welfare theory and introduction of new welfare concepts in microeconomics, he did not let himself rest on his laurels.

A part of this is his growing dissatisfaction with the lack of realism characterizing the early models. Furthermore, there were a number of theoretical problems that could not be resolved using the equilibrium models, which led Hicks towards increased preoccupation with economic history and a different way to work with theories, which will be elaborated in this section.

In *Causality in Economics* from 1979, Hicks returns to more theoretical considerations about time and development. He again highlights one of the essential differences between science and economics, where the former can be characterized as static, at least in situations in which there are experimental options and the latter may require a more pluralist approach:

"The more characteristic economic problems are problems of change, of growth and retrogression, and of fluctuation. The extent to which these can be reduced into scientific terms is rather limited; for at every stage in an economic process new things are happening, things which have not happened before—at the most they are rather like what has happened before ... As economics pushes on beyond 'statics' it becomes less like science, and more like history."¹⁷²

¹⁷² Causality in Economics (1979), p. xi.

On the basis of Hume, Hicks' book operates with three types of causalities: sequential (in which cause precedes effect), contemporaneous (in which both relate to the same time period) and static (in which both are permanencies)¹⁷³.

Static theory falls in the group of static causality—specifically, Hicks mentions classical steady state and the neoclassical production function. The simultaneous causality corresponds with the formal Keynesian theory and Marshallian micro context; although this form of causality is prominent in what modern economics offers.

"It is nevertheless not surprising that economists, even the most 'Keynesian' ones, have become dissatisfied with it; for there are so many questions to which we desire to have two answers with which it cannot cope"¹⁷⁴.

According to Hicks, it is not possible to compare economics with science in terms of scientific development or even scientific revolutions—it is not even possible to talk about scientific progress. Hicks explains this in the following:¹⁷⁵

"This is not the fault of Economists. It is a consequence of the nature of the facts which we study. Our facts are not permanent. Or repeatable, like the facts of the natural sciences, they change incessantly, and change without repetition".

¹⁷³ Ibid., p. 26.

¹⁷⁴ Ibid., p. 101.

¹⁷⁵ Wealth and Welfare (1981) p. 232 from the article "The Scope and Status of Welfare Economics."

On the one hand, this is obviously a major objection against the proposal to create a theory of development involving the use of sequential causality, but there need not be any contradiction. On the other hand, he may simply be expressing that it is important to avoid being overly optimistic about what the theories, and the models based thereon, are capable of:

"Our theories, regarded as tools of analysis, are blinkers in this sense. Or it may be politer to say that they are rays of light, which illuminate a part of the target, leaving the rest in darkness. As we use them, we avert our eyes from things which may be relevant, in order that we should see more clearly what we do see ... There is, there can be, no economic theory which will do for us everything we want all the time."¹⁷⁶

Yet in 1982 Hicks¹⁷⁷ is able to map out a new development of direction:

"... not the need to abolish economic theory altogether, but the need to find a different way to carry it on – less abstract, more history-friendly, less technical, more concerned with real economic phenomena, less reductionist and more open to taking advantage of the contributions coming from other social and moral Sciences."

¹⁷⁶ Hicks (1976, p. 208

¹⁷⁷ Hicks (1984): "Is Economics a Science?"

It should be noted that this statement is based on a very long development process, which Hicks himself had gone through.

From controversies to convergence

Coddington (1979) once said that "... Hicks was, from the late 1930s onward, a wholehearted Keynesian. The one important exception to this categorization is on the question of liquidity preference versus loanable funds theories of interest." We have already dealt with the troubles concerning liquidity. Another very significant postulate comes from Hahn (1990): "... in order to understand future developments in Economics, one must understand Hicks."

As we have already seen, Hicks was an early interpreter of Keynes' *General Theory* together with others such as Robinson, Kaldor and Shackle. The latter representing the so-called Post-Keynesian interpretation of Keynes. In terms of Coddington, these two types of interpretation can be categorized as "hydraulic Keynesianism" and "fundamentalist Keynesianism."

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Since the publication of *General Theory*, there have been at least these two and in reality many more interpretations of this book. This has naturally led to numerous controversies between these "schools."

Regarding Hicks, it is quite interesting that Coddington's typology will not hold. Hicks had, as described above, shifted away from the hydraulic interpretation of Keynes and converged at the more fundamental interpretation of Keynes. But he has not merely done that. In some way and regarding some topics, it would rather appear to be an actual takeover of Keynes' original theory.

The following case is exemplary in this very special discipline of Hicks, namely in forming future developments in economics.

From the proclamation of Continuation Theory in 1956 to the concept of sequential causality in *Causality* in 1979, there is some way to go. But in Hicks' optic it has been a very deliberate work in progress on uncertainty, time and money. For a younger Post-Keynesian, the importance is indisputable:

"The dynamic analysis put forward by Hicks is therefore a particular sequential theory. The study of the process of economic change split into the study of what happens within a single period (or accounting period) and the study of linkages between single periods. In the former, what is under investigation is the process of economic change

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on the assumption of unchanging expectations. By contrast, in the case of an analysis of linkages between periods, the so-called continuation theory, the analysis allows for the effects on the economic process of changing expectations. From this perspective, the single period becomes the minimum effective unit of time for dynamic economic analyses"¹⁷⁸

This has some obvious consequences, because, according to Fontana, continuation analysis is little known and used in modern economics. In his work, however, this method is at the core of the analysis:

"The main objective is to show that the most prominent and often controversial features of the endogenous money theory, namely the debit-credit nature of modern money, the role of the banking system in the production and accumulation process and the origin of recent financial innovations, can be rendered intelligible in Hicks's method of analysis"¹⁷⁹

¹⁷⁸ Fontana, 2009, p. 79.

¹⁷⁹ Fontana, 2009, p. 80.

Using Hicks's ideas on money and time, continuation analysis can be used to solve some of the controversial issues concerning the horizontalist and structuralist approaches to endogenous money¹⁸⁰.

Summary

It is a lifelong effort for Hicks to introduce an element of humanity to, and to bring economic theory close to the economic reality. This implies that static theories have a very limited purpose. It is interesting to note how much weight Hicks assigns to expectation formation in his first review of the *General Theory* and he notes relatively early in his studies, that time should be regarded as irreversible. Hicks' continuing interest of time thus becomes a central key to understand how he moves closer to Keynes' way of thinking about economics, thus moving closer to the post-Keynesian interpretation of The General Theory.

It is also worth emphasizing that he, in his long writing career, is aware of the limitations inherent in steady-state theory, and the unresolved problems it leaves. Hicks has through his humility and self-criticism been able to continuously work on that lead to bring economic theory closer to economic reality. He has left a number of questions to his descendants, but also ideas for further development including the use of the concept of sequential causality.

¹⁸⁰ Fontana, 2009, p. 81.

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5. Two Generations of Path Dependence in Economics?¹⁸¹

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 coming 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 paths 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 by the way been different and well known studies of Path Dependence concerning technological "lock-in" (Qwertynomics), dynamic increasing returns, institutional hysteresis and as regional economic evolution.

Also Keynes' General Theory is seen by some interpreters¹⁸² as if it is created as a path-dependent system because in this treatise Keynes operates with uncertainty, expectations and historical time.

¹⁸¹ A version of this paper was presented at The Ricardian-Post Keynesian Joint International Seminar at the Nishogakusha & Meiji Universities, Tokyo, 5-6 September 2009. An earlier edition was presented at the 11th SCEME Workshop on "Methodology after Keynes" in September 2008. I am much indebted to Jan Toporowski, Victoria Chick, Jesper Jespersen, Brian Loasby, Takashi Yagi, Alberto Cruz, Heinz Kurz, <u>Enrico Bellino</u> and Finn Olesen for valuable comments. The responsibility for the content is solely mine.

¹⁸² See Chick (1998, 2003), Setterfield (1999), Jespersen (2002, 2004, 2007), Fontana & Gerrard (2004)

It is a so called a non-ergodic view which has the implication for the analysis, that Keynes is much more occupied with a concept of tendencies rather 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:

One can say first, is Path Dependence more than a metaphor and of what kind are the organizing concepts of Path Dependence?

Secondly, 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.

Thirdly, it is also a known critique that Path Dependence in some versions implies a very deterministic way of looking at history: Is there really any difference between the mechanisms of, respectively, a path dependent process and a simple income multiplier - especially when we view the time aspect? It leaves us with questions like: can there be different kind of types, degrees and causes of path-dependence?

Fourth and very important, in recent years there has been a lively discussion of path dependence outside economics e.i. in other parts of social science. The use of path dependence in other scientific areas shows that it has considerable potential for providing the basis of substantial theoretical and also empirical studies, where complex causal relations are difficult to study with traditional statistical and qualitative methods. Other scientific fields now make it possible to talk about path stabilization, path departure and path switching.

At the end of this chapter it will therefore be discussed if it is possible to introduce a second generation of Path Dependence in economics and to cross-fertilize economics with new potential concepts from other parts of social science.

2. It is all about Time

"The future never resembles the past – as we well know", Keynes once said¹⁸³. 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"¹⁸⁴

In his heritage from Marshall, Keynes states in Treatise on Money, that he is working on a theory of a moving system¹⁸⁵ - 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"¹⁸⁶

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"¹⁸⁷.

¹⁸³ Collected Writings XIV, p. 124

¹⁸⁴ Collected Writings, XIV, p. 269

¹⁸⁵ 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"

¹⁸⁶ A treatise on Money II, p. 365

¹⁸⁷ Tilton-papers (1933) CW XXIX, p. 222

And finally in the General Theory:" ... as soon as we pass 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"¹⁸⁸

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 Steedman¹⁸⁹:"... 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 as economists like Shackle (1957), Kaldor (1972), Hicks (1976), Robinson (1980) and Davidson (1982/83) have recognized it is a difficult but necessary task to deal with. Anyway, the primary concern in this chapter is to look further into the importance of the "immutable past"!

3. New Institutional Economics and the raise of Qwerty-nomics

How could the concept of Path Dependence occur and how could a typewriter come to play a central role in this context? This is the focal point in the next section.

In the 1980/90s the two Stanford colleagues Paul A. David and Brian Arthur published several papers that now are seen as the foundation of Path Dependence with a focus on how 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

¹⁸⁸ The General Theory (1936), p. 293.

¹⁸⁹ Currie, M. and Steedman, I. (1990): Wrestling with Time, p. 241

known from New Institutional Economics.

In 1985 David¹⁹⁰ presented the story of Qwerty or how a standard of a typewriter's keyboard was 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"¹⁹¹

David described how James Densmore in 1873 in an effort to reduce the frequency of type bar 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.

Why was that? David gives three reasons: Technical interrelatedness, which means that the overall user cost of the system would decrease as it gains in acceptance relative to other systems and

¹⁹⁰ Paul A. David (1985): "Clio and the Economics of QWERTY"

¹⁹¹ Ibid, p. 332

second economies of scale, where the intersystem competition leads 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 – as a formal theory this is known as the so-called "Polya urn scheme"¹⁹² 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. These are 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!¹⁹³

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 reality¹⁹⁴. Diminishing returns imply a single equilibrium point for the economy, but positive feedback 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

¹⁹² 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 colours is sampled with replacement, and every drawing of a ball of a specified colour results in a second ball of the same colour being returned to the urn. The probabilities that balls of specified colours will be added are therefore increasing functions of the proportions in which the respective colours 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 colours in the urn and in contrast to Polya Arthur also allows for a more general and nonlinear function.

¹⁹³ For David this is no surprise and he gives an example from Veblen (1915), where he talks about Britain's undersized railway wagons compared to Central Europe

¹⁹⁴ See Arthur (1990): Positive Feedbacks in the Economy

deterministic, predictable and mechanistic, but instead as process dependent, organic and always evolving.

In later works Arthur (1996) develops on mechanisms of increasing returns that exist alongside those of diminishing returns. He¹⁹⁵ 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 market 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 instead of Digital Research's CP/M¹⁹⁶. Users became familiar with VHS and DOS and establish a market lock in.

Mircrosoft.

¹⁹⁵ Arthur (1996): "Increasing Returns and Two Worlds of Business"

¹⁹⁶ Arthurs theory has also provided some of the intellectual underpinnings of the US Justice Department's case against

The story of Qwerty-nomics is an illustration of a path dependent process that in stochastic terms possesses an asymptotic distribution that evolves as a consequence or a function of the process's own history – it is a non-ergodic stochastic process. Furthermore 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 intervention¹⁹⁷

The economic historian and Nobel Laureate Douglass C. North has argued¹⁹⁸, that all Arthur's 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"?

According to North neoclassical competition theory and international trade theory could not answer why fairly rapid convergence did not happen and he 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 development¹⁹⁹.

There are three main causes that may explain the persistence of a suboptimal economic pathway²⁰⁰

First, that Transaction costs are high due to non-competitive markets – the adaptive mechanisms of prizes do not work properly.

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

 ¹⁹⁷ Ian Kaplan (2000): A Review of Arthur's "Increasing Returns and Path Dependence in the Economy"
 ¹⁹⁸ North (1990): Institutions, Institutional Change and Economic Performance, p. 95

¹⁹⁹ Pierson, P.: "Increasing Returns, Path Dependence, and the Study of Politics", p.255

²⁰⁰ A summary from Ebbinghaus, Bernhard (2005): Can Path Dependence Explain Institutional Change? Two

Approaches Applied to Welfare State Reform, p. 14

Third, The once 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"²⁰¹.

In his Nobel Prize Lecture (1993) North is occupied 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 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. On the other hand he warns against a simple interpretation of the case study of Qwerty, because it is not the case, that once a technology or social structure is in place then it can be treated as locked-in for good – that the past is not only ever present but also all determining!

Although 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. In this way Lawson sees Path Dependence literature as a useful contribution to economics – also from the angle of critical realism.

It is obvious that these variants of New Institutional Economics gave way of path-breaking new research regarding efficiency of technologies og institutions in achiving public or private goods, but also rather critical reactions. Let's start by the latter.

²⁰¹ North (1990), p. 98-99.

4. Path Dependence – more than a Fable of the Keys?

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 permanence²⁰². 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" outcome²⁰³?

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 paradigm²⁰⁴.

For Liebowitz and Margolis it is important to stress, that not all phenomena 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

no loss-leader pricing, no advertising, no market research".

Polcicy" on EH.Net

returns or path dependence, and the "new" "positive feedback economics".

²⁰² 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,

²⁰³ See Richard J. Sullivan (2003):"Review of Peter Lewin (editor), The Economics of QWERTY: History, Theory and

²⁰⁴ They refer to Arthur (1990), who distinguishes between "conventional economics", which largely avoids increasing

typewriter keyboards.

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

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 followers Lewin (2002) characterizes David's historical examples as corresponding to second-degree Path Dependence²⁰⁵.

If an efficiency outcome can be characterised as a third-degree Path Dependence the initial conditions lead 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

²⁰⁵ See Richard J. Sullivan (2003):"Review of Peter Lewin (editor), The Economics of QWERTY: History, Theory and Polcicy" on EH.Net

David and Arthur and this imply 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.

Puffert $(2008)^{206}$ 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 element²⁰⁷

²⁰⁶ Douglas Puffert (2008): Path Dependence. EH.Net Encyclopedia

²⁰⁷ See Richard J. Sullivan (2003):"Review of Peter Lewin (editor), The Economics of QWERTY: History, Theory and

Polcicy" on EH.Net

Another central point is, that in Puffert's opinion²⁰⁸ 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.

4. Institutional Hysteresis as Path Dependence

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 metaphors²⁰⁹. This 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 past 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.

²⁰⁸ Douglas Puffert (2008): Path Dependence. EH.Net Encyclopaedia

²⁰⁹ Setterfield (1993): A Model of Institutional Hysteresis, p. 755

Long-term institutional changes are path dependent²¹⁰. 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 concepts²¹¹. 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.

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 irrevocability²¹². Setterfield hopes, that the different concepts of Path Dependence at least may be conceived as embodying what he calls "low-level" conceptualization of historical time²¹³.

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 Kregel's 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

²¹⁰ Setterfield (1993), p. 761

²¹¹ Setterfield (1995, 1997)

²¹² 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"

²¹³ Setterfield (1998), p. 524: "low level, embodied in specific concepts of path dependency (such as cumulative

causation) that can be used in practical modelling 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.

and long run expectations are interdependent²¹⁴. 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 time²¹⁵. 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.

5. The innovative critique from other social sciences

The concept of Path Dependence has also 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.

In this section we will deal with two neighbour sciences – policy-studies and sociology. This does not mean, that it could not be interesting also to focus on other types of social sciences, but the experience from policy-studies and sociology are so well documented, that it in itself is quite illustrative for the point developed in this writing.

The first neighbour-science to be looked at is **policy-studies**. No doubt it is Douglass North's application to issues of institutional emergence and change that offset Path Dependence studies for students of politics²¹⁶. What Arthur observed on factors behind increasing returns is possible for North

lines", p.484.

²¹⁴ Setterfield (1999):"Expectations, Path Dependence and effective demand: a macroeconomic model along Keynesian

²¹⁵ Setterfield (1998):"Path dependency and animal spirits: a reply", p. 169. "Lock in" is fx not doing a good job

²¹⁶ Pierson (2000): Increasing returns, Path Dependence, and the Study of Politics, p. 255

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 Pierson²¹⁷ 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. Especially because of the weakness of efficiency-enhancing mechanisms of competition and learning, a short time horizon of politicians and a strong status quo bias generally built into political institutions.

Pierson (2000) states, that it is the role of Path Dependence in explaining patterns of institutional emergence, persistence, and change that may be of greatest significance for political science and establish the following features of political life, where Path Dependence is at work²¹⁸:

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

²¹⁷ Pierson (2000), p. 257

²¹⁸ Pierson (2000), p. 263

that happens "too late" may have no effect, although it might have been of great consequence if the timing had been different.

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.

This way of using Path Dependence in political science is normally done by people who refer to themselves as Historical Institutionalists. They are, according to Scokpol²¹⁹, more likely to trace sequences of outcomes over time, showing how earlier outcomes change the parameters for subsequent developments. They are also interested in conjunctures of separately located processes or conflicts, contrary to rational choice theorists too often presume that actors must be individuals rather than looking for groups or organizations that in some ways act together. And she clearly states, that rational choicers avoid messy historical changes and real life political processes.

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 development²²⁰ - 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. Gartland²²¹ notes, that political science by its nature, predominately tends to study cases within a regulatory paradigm and at an organizational or societal level but with a behavioural rather than a technical approach. As we saw in economics the starting point for Path Dependence was based on Technological change while, in political science, the regulative paradigm tends to be based on behavioural change.

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.

²¹⁹ Theda Skockpol (1995): Why I am an Historical Institutionalist, Polity, p. 106

²²⁰ Adrian Kay (2005): A Critique of the Use of Path Dependency in Policy Studies, p.558

²²¹ M.P. Gartland (2005), p. 693.

Path dependency encourages explicit attempts at dynamic analysis²²². 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. A successive step down a path increases the likelihood that a particular event or choice will be repeated²²³. Because of many kinds of potential complexity in policy studies, there can be several mechanisms that lead to path dependency. One I 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 processes²²⁴. That gives a variety of forms in Path Dependence e.g. path continuation, departure, switching or cessation. Taxonomy of this kind of changes is still being developed. Another example is path shaping and path depending²²⁵.

A quite interesting study²²⁶ reviews how process tracing and systematic case comparisons can address path-dependent explanations. As a comment to Arthur's (1994) the economist view, that the world is "messy, organic, and complicated" Pierson (2004) is quoted: "... specific patterns of timing and sequence matter; starting from similar conditions a range of social outcomes is often possible, large consequences may result from relatively "small" or contingent events; particular courses of actions, once introduced, can be virtually impossible to reverse; and, consequently, political development is often punctuated by critical moments or junctures that shape the basic contours of social life".

²²² Adrian Kay (2005), p. 559

²²³ Bennet and Elman (2006): Complex Causal Relations and Case Study Methods: The Example of Path Dependence, p.256.

²²⁴ B. Ebbinghaus (2005): Can Path Dependence Explain Institutional Change?, p. 24.

²²⁵ Jacob Torfing (1999, 2001)

²²⁶ A. Bennet & C. Elman (2006): Complex Causal Relations and Case Study Methods, The Examples of Path Dependence. Advance Access publication, June

According to Bennet and Elman²²⁷ Path Dependence invokes causal possibility, contingency, closure, and constraint, and that is why case study methods are well suited to analyze these kinds of arguments. As a matter of fact, case studies offer four advantages for the analyses of Path Dependencies and interactions: they allow for detailed and holistic analyses of sequences in historical cases, they are suited to the study of rare events, they can facilitate the search for omitted variables that might lie behind contingent events, and they allow for the study of interaction effects within one or a few cases. In this way we have come to the edge of empirical studies. By help from investigating the empirical content of Path Dependent political and social processes we can recognise, that complex causal relations are difficult to study with traditional statistical and qualitative methods. It is work in progress, but it is obvious, that process tracing and detailed comparisons of a small number of cases, especially when used together, can help to unravel these kinds of complexity.

The second neighbour-science to be looked at is **sociology**. Like the studies of Politics it is evident, that Historical sociology enriches the path dependence debate²²⁸. As Mahony states²²⁹, path-dependent analysis represents one potentially important strand in the overall project of historical-sociological investigation. They are doing so by studying critical junctures and self reinforcing sequences and otherwise by identifying additional mechanisms that can underpin reproductive processes; including functional, power and legitimating mechanisms²³⁰.

In this way historical sociologist follows Stinchcombe's model of historicist explanation²³¹. It means that two types of causes are identified. First we are looking for how a tradition or an institution was started and second we are trying to identify the general process by which social patterns or institutional patterns reproduce themselves. Compared to economics, where the models start with individuals or firms, the sociological perspective begin with society²³².

²²⁷ Ibid, p. 259

²²⁸ Gartland (2005), p. 694

²²⁹ Mahony (2000), p. 509

²³⁰ Gartland (2005), p. 694

²³¹ Mahony (2000), p. 512

²³² Thelen (1999), p. 386

Historical sociologists are very keen about how to escape from the simple expression of Path Dependence as how the past influences the future. This understanding is related to their ongoing and sophisticated efforts to assess how process, sequence, and temporality can best be incorporated into social explanations²³³.

Mahony (2000) suggests, that all path-dependent analysis as a minimum have three defining features. First he maintains, like Pierson on Politics, that an analysis shall involve the study of causal processes that are highly sensitive to events that take place in the early stages of an overall historical sequence. Second, the early historical events are contingent occurrences that cannot be explained on the basis of prior events or initial conditions. Third, after a contingent event has taken place, a process is set into motion and begins tracking a particular outcome. If it is a self-reinforcing mechanism, the inertia will reproduce a particular institutional pattern over time. If, on the contrary, it is reactive sequences, inertia involves reaction and counter reaction, where one event "naturally" leads to another event²³⁴.

These latest observations are quite interesting. The work by historical sociologists implies, that a particular outcome can be examined by a broad range of theoretical frameworks employed in sociology. In the context of Randall Collins institutional reproduction it can be categorized in terms of utilitarian, functional, power, and legitimation explanations – each one resulting in different mechanisms of institutional reproduction. As we have seen from the genesis of Path Dependence in economic history a utilitarian theoretical framework is used to explain self-reinforcing processes. North has generalized the utilitarian logic of institutional reproduction in terms of the benefits of learning effects, coordination effects, and adaptive expectations. Primarily, it is economic historians, and not historical sociologists that have advanced on a rational choice logic and a utilitarian explanation.

A functional explanation as known from New Institutional Economics will in its weakest form simply explain the reproduction of an institution in terms of its consequences. It is often assumed, that the initial origins of an institution can be explained teleologically by the beneficial effects the institution

²³³ Ibid., p. 510

²³⁴ Ibid., p. 511

brings to a system after it is created²³⁵. The functional self-reinforcing processes replace so to speak the idea of efficiency in utilitarian accounts as the mechanism of institutional reproduction.

A power explanation will, in contrast to the utilitarian mode of explanation, build on institutions, that distribute costs and benefits unevenly – actors with different endowments of resources will have conflicting interests. An institution can persist even when most individuals/groups prefer to change it and according to Mahony²³⁶:"provided that an elite that benefits from the existing arrangement has sufficient strength to promote its reproduction". Power-based explanations imply, that institutional reproduction is a conflictual process and potential changes are built into institutions.

A legitimation explanation is grounded in actors' subjective orientation and beliefs about what is appropriate or morally correct and an institution will be reinforced through processes of increasing legitimation. Compared to utilitarian rationality, system functionality, or elite power a legitimation explanation assumes, that decisions of actors to reproduce an institution derives from their self-understandings about what is the right thing to do^{237} .

Recursive sequences have another inner logic compared to self-reinforcing mechanisms. In Mahony's own words²³⁸ :"Whereas self-reinforcing sequences are characterized by processes of reproduction that reinforce early events, reactive sequences are marked by backlash processes that transform and perhaps reverse early events". In other words a counter reactive process is not just reproducing a given pattern – it is setting in motion a chain of reactions and counter reactions. This also implies, that analysts may have much more problems in both predicting and explaining a final outcome of a sequence, but by help from fine-grained analysis of causal mechanisms and a temporal ordering among events in a sequence and probably by using narrative analysis it is possible to improve the analysis.

Finally, the innovative critique from other social sciences on Qwerty-nomics first of all focuses on temporality or a meticulous tracing of sequences in a Path Dependent process. Second – it is a nuanced

²³⁵ Mahony (2000), p. 519

²³⁶ Ibid. p. 521

²³⁷ Mahony (2000), p. 523.

²³⁸ Ibid. P. 526

development of different kinds of path. Finally, the focus is changed from the original technological sub optimality to behavioural sub optimality. Focus has also been changed from a theory exclusively based on rational choice to other kinds of theories, which also implies, that the kind of explanations must vary.

6. Concluding perspective: Possibilities and limits of Path Dependence in economics

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 course 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-fertilizing this work with much of the work done in 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 lock-in of a technological development to a case of increasing returns and institutional reproduction. In a more strict neoclassical sense, the third degree of Path Dependence is a special, but very interesting and relevant 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, as shown, much more nuanced in focus and tracing sequences.

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 propels social change²³⁹. 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.

In figure 1, we have made a collection of the results from comparing the simple Qwerty-nomics example of Path Dependence (Generation I) with a heuristic summary of the results from developing Path Dependence especially in neighbour-sciences (Generation II)

²³⁹ Adrian Kay (2005), p. 561

Fig. 1: Two generations of Path Dependence in social science

Generation	Ι	II
Model	Polya Urn	Decision Tree
Path	Trodden path	Branching pathways
Mechanism	Self-reinforcing	Recursive sequences
Starting point	Small chance events	Starting point
Change	Technological change	Behavioral change
Inner logic	Process of reproduction	Backlash process
Form	Deterministic	Key breakpoints
Type of explanation	Functional	Intentional

The explanatory power of these two generations of Path Dependence is related to the kind of explanations that are given. In Generation I explanations are functionalist²⁴⁰. 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 away from the systemic way of using Path Dependence by help from Generation II model of Path Dependence and intentional models of explanation.

²⁴⁰ James Mahoney (2000), p. 519

This will require a move forward of the study of social mechanisms of institutional change, but it is still at its beginning²⁴¹. 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. Ebbinghaus²⁴² 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". In this context Economic history onwards should be one of many disciplines in social sciences that use the more open Path Dependence concept to describe institutional development.

It can also be argued like Hall²⁴³, 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. It is also appropriate to refer to Setterfield (1997) again, that concepts like hysteresis, cumulative causation and lock-in do not encompass all facets of the contributions of authors such as Knight, Keynes, and Shackle and would be a gross mistake indeed – not least because this claim is, quite frequently and demonstrably false.

Causal complexities like tipping points, high-order interaction effects, strategic interaction, two directional causality or feedback loops, equifinality and multifinality require new forms of process tracing and systematic case studies to address issues of Path Dependence²⁴⁴. 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 used in

²⁴¹ Bernhard Ebbinghaus (2005), p. 24

²⁴² Ebbibnghaus (2005), p. 14

²⁴³ Bennet and Elamn (2006), p. 250

²⁴⁴ Bennet and Elman (2006), p. 251

policy-studies, that it gives rise to studies of ever more sophisticated forms of complexity and used in the same way it could also bring economics closer to historical time.

In conclusion it is worth noting some wise words from Paul David (2005). He has 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 quite interesting path in the further development of Path Dependence – especially as part of a Generation II of Path Dependence in economics!

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6. On time in economics

1. Introduction

Time - what is it? Let us start by going to the philosophers and asking. Most philosophers agree that time exists, but disagree on what it is. Not surprisingly, the ancient Greek philosophers were preoccupied with the question: A moving image of eternity, says Plato. No, it is the movement's numbers in terms of before and after, says Aristotle. Nonsense, says Philon, time expresses only something about a number of days and nights, or, more divine, as in Cicero: Time is the god who put into place the years and days.

Just this small selection of statements about time illustrates that time is not easy to define or handle at all - it is not possible to refer to a more basic concept. We have knowledge of this basic concept, but not more than that. Therefore, it becomes more a matter of properties of time and studies of temporal argumentations.

The famous time-philosopher Augustin (354-430 C.E) has a subjective perception of time, arguing that time is not something real, but exists only in the mind of man, but Augustin is also known for his work in creating a bridge between Aristotle's physics and the religious approach to time.

The societal attitude to time has had major implications for the development of art and science. If you have assumed a theologically oriented vision of the concept of time, there has been a tendency to downplay the measurement of time.

However, secularization of the social relations, which for centuries had been governed by religious considerations, took hold in Europe in the 14th century. It happened with the Renaissance and then in the Enlightenment, which saw a shift in the development of mechanical methods for measuring time. Science actively uses time measurement options to create new discoveries. In science, it was essential for the new understanding of astronomy and also for experiments when controlling the motion of physical objects.

Different perceptions of time have also had an impact on the economic thinking - not only in a specific, but in several ways²⁴⁵. The approach to time and sometimes the lack of it is essential to the analytical results. As stated by Currie and Steedman (1990), "It is extremely healthy that 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"²⁴⁶.

Before a more specific handling of the concept of time in economics, it would be appropriate to find inspiration for a firmer grasp of specific proportions of time. This implies a short introduction into temporal logic, which is a system of rules and symbolism for representing and reasoning about propositions qualified in terms of time. It will be followed by a presentation of the first serious attempt to find relevant time logic for the study of economic development. This was done by Alfred Marshall, but not fully developed. The awareness of time is of central importance, and was further developed in JM Keynes' macroeconomic theory. This also establishes an agenda for what the basic conditions are that must be met to conduct economic analysis, taking due account of time. That might be the choice of a time unit and whether events that are studied are repetitive or unique, but also with regard to how the analyst places himself in and out of time and, not least, to what extent the approach applies to the concepts of past, present and future.

2. The properties of time

Time is, as described above, a fundamental concept. Therefore, we must make a few philosophical considerations about the concept. Can a concept of time from an older

²⁴⁵ See f.ex. Vickers (1994): Economics and the Antagonism of Time

²⁴⁶ Currie and Steedman (1990), p. 241.

and more mature natural science readily be used in social science? Inspiration could be found in the study of mechanics and time, but this also provides some limitations for social sciences. This is related to the difference in objects that natural sciences and social sciences investigate: "A huge difference between social and natural sciences lies in the object of knowledge. While the laws in natural sciences rule the world independent of the research results of scientists, this is not true for social sciences. The members of society are deeply influenced by theoretical models of the social sciences"²⁴⁷

Initially it may be appropriate to look at time symbols. It is characteristic that those refer either to a static or to a dynamic picture of time.

A fixed line or an arrow of time is a classic representation of a static time. The timeline is a compact, continuous series of instants – like a row of numbers. The arrow of time, together with a single direction, adds the ability to determine before and after (or linearity). The arrow also introduces the concept of irreversibility.

Time is considered rather as a time river, or Kronos, in the dynamic concept of time. Events subsumed as conditions during endless change - time river washes over everything and the total, devouring, Kronos is eating his children. Events are constantly changing and can be arranged respectively as past, present and future.

This distinction can also be found in an approach using time logic and more precisely by an introduction of McTaggart's linear ordering of events in a dynamic *A*- and a static *B*-series²⁴⁸. The main point in McTaggart's position²⁴⁹ is that, without the *A*-series, there would be no change, and consequently the *B*-series by itself is not sufficient for time, since time involves change:

"The A and *B-series* are equally essential to time, which must be distinguished as past, present and future, and must likewise be distinguished as earlier and later. But the two series are not equally fundamental. The distinctions of the *A-series* are ultimate. We

²⁴⁷ Boutellier et al (2011), p. 5

iiiMcTaggart (1908):: The Unreality of Time. Mind, 17, No. 68

²⁴⁹ MacTaggart (1908) is very famous for his reflections on the unreality of time, but it is not the article's central focus and it is therefore not dealt with here

cannot explain what is meant by past, present and future. We can, to some extent, describe them, but they cannot be defined. We can only show their meaning by examples"²⁵⁰

There are two different approaches to the description of a temporal relationship. *A*-*series* is based on time, if any one is itself subject - the time from the inside, so to speak. *B*-*series* is time seen from a perspective external to the progression of time – time from the outside.

This McTaggart division of life's temporal relation has since manifested itself in two schools - the dynamic conception of time based on the *A-series* and its tensed theory of time, and the static conception of time based on the *B-series* and a tenseless theory of time. If a used language has tenses it is the same as positions in McTaggarts *A-series*. *B-series* give a different analysis without tensed facts.

We use tense to locate events in the past, present or future. Even if this is possible, philosophers do not agree on the ontological questions that follow: whether past, present and future are real? However, it is possible to identify at least three approaches to this problem, namely presentism, growing-past theory and eternalism. Ontologically, the three directions only have present as a common starting point and do not necessarily agree on what kind of time it is, except that the now is so vivid to everybody.

As the word presentism suggests, it is a view that it is the present that is in scope and that neither past nor future exists. Only present objects exist. Augustine suggested that the moment could be compared to a knife-edge between past and future, which of course raises the interesting question of whether the present has no extent, but some philosophers propose that conscious experience is extended in time. If it is so then McTaggart's *A-series* is fundamental because presentism requires tense to have a temporal discourse.

²⁵⁰ McTaggart (1908): The Unreality of Time. Mind, 17, No. 68, p. 463

Growing-past theory argues that in addition to the present the past also is real, but the future is not real. If past is real, it is growing bigger when the now is moving forward but the future is indeterminate or merely potential. Eternalists state that there are no ontological differences between past, present and future - all points in time are equally "real". In this context, it is not possible to pinpoint any moment in the dimension of time as a more real now. Objects from the past and future have equal ontological status and each spacetime moment exists in and of itself.

The fact that our perception of time is that we move from a known past toward an unknown future is, as already indicated, often called the arrow of time. We can remember the past and do not attempt to change an already known past. Causality is also associated with the arrow of time. Cause precedes effect. If you crack the shell of an egg and beat out the yolk, there is no turning back. This phenomenon has a counterpart in physics, namely the second law of thermodynamics. The arrow of time is a uniform and unique direction for the apparently inevitable "flow of time" toward future.

These key concepts can help structure the use of the concept of time and can be a baseline from which to assess how economic science should act to take due account of time. Further studies reveal, however, that economic thinking has made excellent attempts to define time. As an example, Shackle (1965) has done so especially in the chapter "A Scheme of Economic Theory", where he defines four concepts of time. See also Carvalho (1983-84) for an interpretation of these fours definitions of time, where mechanical time is the time of the external observer, who knows everything, future as well as the past. Evolutionary time is where the observer no longer is omniscient – it is a segment of real history. Timeless models are a special situation in which time does not flow – like in General Equilibrium models. Expectational time is where agents know that the past is immutable and the future is yet to be created.

Let us start with an approach that draws on older doctrines in economics.

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3. The first serious element of time in micro-economics

It is not the intention to unravel the appearance of economics but it is far from coincidental to begin with Alfred Marshall. In memory of Marshall, Keynes²⁵¹ once wrote:

"The explicit introduction of the element of Time as a factor in economic analysis is mainly due to Marshall".

Keynes underlines this by emphasizing that the division between short and long periods in economic analyses can be attributed to Marshall. On the basis of this division, the meaning of "normal" value was made precise. Also, the doctrine of normal profit has evolved in this context. But there remains a lot to be done and Keynes takes a famous quote from the Preface to Marshall's Principles, presented here in an extended form²⁵²:

"For the element of Time, which is the centre of the chief difficulty of almost every economic problem is itself absolutely continuous: Nature knows no absolute partition of time into long periods and short; but the two shade into one another by imperceptible gradations, and what is a short period for one problem, is a long period for another."

Gradation is dependent on the changing conditions of the supply function. In the shortrun, supply is limited. In the longer-run, supply will be dependent on the costs of producing a commodity and in the very long run, it will depend on producing labour and materials for production. This implies that the phenomenon of irreversibility emerges in this context, because the long-term supply curve cannot possibly return to its original starting point²⁵³.

It also implies for Marshall the following consideration of the analytical method:

²⁵¹ J.M. Keynes: Alfred Marshall, 1842-1924 in Pigou (1925,1956), p. 43

²⁵² Marshall (1920), p. vii

²⁵³ Marshall (1920), Appendix H, where he also desribes at situation of irreversible processes – the law of increaing returns.

"The element of time is a chief cause of those difficulties in economic investigations which make it necessary for man with his limited powers to go step by step; breaking up a complex question, studying one bit at a time, and at last combining his partial solutions into a more or less complete solution of the whole riddle. In breaking it up, he segregates those disturbing causes, whose wanderings happen to be inconvenient, for the time in a pound called Ceteris Paribus....The more the issue is thus narrowed, the more exactly can it be handled: but also the less closely does it correspond to real life."²⁵⁴

This is not the optimal analytical method to handle the concept of time for Marshall²⁵⁵. He had already in 1898 developed some ideas of where real inspiration for handling dynamics should come from. It should be inspired by biology, and not by classical physics:

"The balance, or equilibrium, of demand and supply obtains ever more of this biological tone in the more advanced stages of economics. The Mecca of the economist is economic biology rather than economic dynamics."²⁵⁶

This must be understood in the sense that Marshall viewed immature economics as similar to physical mechanics and foresaw mature economics as like biology²⁵⁷. Unfortunately, it must be noted, despite several attempts, Marshall never succeeded in completing Volume 2 of Principles. This version was to build upon economic biology and accommodate dynamic thinking.

Contrarily, it was primarily an equilibrium mind-set from physics which then came to dominate economic science. One of the central players in the development of mainstream economic analysis, Paul Samuelson, worked hard to get Marshall's methodological approach out of the way²⁵⁸. Neil Hart²⁵⁹ describes it like this:

²⁵⁴ Marshall (1920), p. 314

²⁵⁵ Hammond (1991), p. 99:"O'Brien (1981) credits Marshall with being the first economist to make explicit use of *ceteris paribus*. *Ceteris Paribus* is a way of dealing with the complex nature of reality, where every event is the result of a number of causes".

²⁵⁶ Marshall (1898): Mechanical and biological analogies in economics. See Pigou (1956,1925), p. 318

²⁵⁷ Hammond (1991), p. 99

²⁵⁸ Hart (2003), p. 1139

"The neglect and misinterpretation of Marshall's treatment of time led many of his followers and critics to overlook the significance of the qualifications and criticisms of equilibrium analysis in his Principles. This misinterpretation arises from a failure to fully understand the purpose and method of Marshall's analysis. Marshall's methodological struggles in Principles did not arise from an attempt to preserve the concept of competitive equilibrium in a world where increasing returns are pervasive. Rather, they emanated from an attempt at providing analytical tools capable of contributing to an understanding of the process of economic development that is continuous in time".

Hodgson (1993) has characterized this relationship between Marshall and biological inspiration for economic methodology as something that has only been resumed much later: "It was not until the 1980s that evolutionary ideas gathered wider attention amongst economists, particularly after the publication of Nelson and Winter's (1982) pioneering work".

4. Keynesian economics and awareness of time in macroeconomics

It is well known from the Keynes' biographies that he was, especially in the early Cambridge years, a student of G.E. Moore and Alfred Marshall. This is evident in his attempts to break away from the Victorian social norms and conventions, and his firm contact with the Bloomsbury group for many years. But with regard to a number of more abstract philosophical issues, Keynes might have been influenced more than usually acknowledged by ideas put forward by J.M.E. McTaggart²⁶⁰.

Particularly, the latter philosopher brought to Keynes a vital introduction to an ontological difference between the two earlier mentioned theories of time. The same fundamental difference, from the above-mentioned philosophical discussions, is known and demonstrated in the work of Keynes, who presented the dynamic approach – according to which the essential notions are past, present and future. In this view, time

²⁵⁹ Hart (1996), p. 285. See the Abstract

²⁶⁰ Madsen (2012): Keynes early cognition of time

is seen "from the inside". Secondly, there is also the static view of time according to which time is understood as a set of instants (or durations) ordered by the before-after relation.

In Keynes' (1903) paper, time is about the awareness of change and change requires that at least one aspect differs with respect to what is happening – i.e. whether the event is future, present, or past – in McTaggarts theory, its A-characteristics. On the contrary, *B-series* alone cannot account for change, because "earlier than" or "later than" cannot be used to differentiate characteristics – a changeless state is a timeless state.

Keynes is explicit in his focus on time. For example, it appears early in a part of Keynes' writings that prediction is a very difficult matter. He notes, in an essay on Burke in 1904, that our power of prediction is so slight, that it is seldom wise to sacrifice a present evil for a doubtful advantage in the future. This later becomes a recurring theme in a number of key writings.

His preoccupation with time has been the subject of several observations; see e.g. Backhouse and Bateman (2006)²⁶¹: "In a series of books Shackle argued that the Keynesian revolution concerned time. The essence of time is that it is irreversible and that we can know nothing about the future ... The Keynesian revolution was about breaking with equilibrium, which can occur only in logical time, and creating a theory about how economic activity took place in historical time that was relevant to the real world" and Victoria Chick (1983)²⁶²: "I shall argue that time is the key: that the General Theory is a static model of a dynamic process, the process of production. And it is as thoroughly monetary as the economy it attempts to explain".

Not least, Shackle's well known "de Wries Lectures", which were published under the title Time in Economics in 1958, marks a very significant breakthrough in thinking about time in a more complete Keynesian way.

²⁶¹ Backhouse and Bateman (2006), p. 26

²⁶² Chick (1983), p. 11

Shackle, on several occasions, rounded the concept of kaleidics as an alternative to the ordinary Marshallian equilibrium analysis. This comparison with a kaleidoscope led Shackle to name Keynes's method Kaleido-statics, since Keynes explained each temporary pattern as a natural result of certain circumstances: "The method implicit in the General Theory is to regard the economy as subject to sudden landslides of re-adjustment to a new, precarious and ephemeral, pseudo-equilibrium, in which variables based on expectations, speculative hope and conjecture are delicately stacked in a card-house of momentary immobility, waiting for 'the news' to upset everything again and start a new dis-equilibrium phase"²⁶³. But the abrupt transitions from one into another, Keynes left unexplained. With sufficient attention provided to the method, we now turn to the theoretical elements²⁶⁴.

Keynes in this Early Belief Essay (1938) saw himself as an advocate of a principle of organic unity through time, as seen in his macroeconomic model. He got the inspiration from Moore, that the whole has an intrinsic value different from sum of its part. It is important to notice that Keynes, in 1920, was inspired by this in his work on probability and he was well aware of the relation between individual parts and wholes:

"Yet there might well be quite different laws for wholes of different degrees of complexity, and laws of connection between complexes which could not be stated in terms of laws connecting individual parts. In this case natural law would be organic and not, as it is generally supposed, atomic"²⁶⁵.

Again in 1938 Keynes wrote a letter to Harrod explaining another aspect of organic complexes: "I also want to emphasise strongly the point about economics being a moral science. I mentioned before that it deals with motives, expectations, psychological uncertainties. One has to be constantly on guard against treating the material as constant and homogeneous"²⁶⁶.

²⁶³ Shackle (1965), p.48

²⁶⁴ This presentation is inspired and folded more out in my article: An anatomy of the concept of time in Maynard Keynes. Forthcomming 2017 in Economics World

²⁶⁵ The Collected Writings of John Maynard Keynes (2013): VIII, p. 277

²⁶⁶ The Collected Writings of John Maynard Keynes (2013), XIV, p. 300

This means, that intuition and values always play a part in the art of forming an economic model – rather than induction²⁶⁷. Not necessarily of the whole world, but by choice of certain features or aspects which are determined to be the purpose of the analysis²⁶⁸. Behind this, it is important to determine the relatively constant (psychological) factors to make limited generalizations about the behaviours issuing from them.

The option, in light of Chapter 18 of The General Theory, is to have a short move from a number of invariable basic assumptions, through the economic model towards the determination of the fundamental quaesitum, which is the dependent variables of income and employment measured in wage-units.

Several factors are taken as given in The General Theory. These include the skill and quantity of available labour and equipment, the existing technique, the degree of competition, the tastes and habits of the consumer, the social structure and so on.

The crucial independent psychological variables are the propensity to consume, the schedule of the marginal efficiency of capital, and the rate of interest.

This means that we end up with an interplay between changes in psychological factors and mechanical factors as the multiplier – it also means that both the A-series and the B-series of time logic are represented in Keynes' analysis in The General Theory. It provides the opportunity to pursue how the pattern of the marginal propensity to consume, the marginal efficiency of capital and the liquidity preference specified in the beginning of a production period will unfold in the form of a mechanical law of motion that determines income and employment. The awareness of adequate incorporation of aspects of time as "economic theory in time" in contrast to "economic theory out of time" was after Keynes, and followed in the works of J. Hicks, G.L.S. Shackle, J. Robinson, N. Kaldor and V. Chick²⁶⁹.

²⁶⁷ For an excellent discussion of the induction-problem, see Chp 7, The Fallacy of Composition; in Jespersen (2009)

²⁶⁸ See Togati (1998), p. 34-5 for an elaboration on this point.

²⁶⁹ Hicks (1976), Shackle (1984), Robinson (1980), Kaldor (1972), Chick (1983)

5. Time and implications for economics

A number of factors are important in order to identify how the concept of time is handled constructively. Winston has made clear the serious consequences if not handled carefully: "Careless attention to time can mislead economic and social analysis when the temporal perspective to time can lead to the use of inappropriate methodology"²⁷⁰

The crucial question is whether activities conducted by humans, the subject matter of economics, can be understood in relation to changes in real time, and yet be analysed through abstracted models that follow from a discrete set of general rules²⁷¹.

Theory's finiteness is regularly discussed and Hicks²⁷² has summed it up as follows:

"Our theories, regarded as tools of analysis, are blinkers in this sense. Or it may be politer to say that they are rays of light, which illuminate a part of the target, leaving the rest in darkness. As we use them, we avert our eyes from things which may be relevant, in order that we should see more clearly what we do see. It is entirely proper that we should do this, since otherwise we should see very little. But it is obvious that a theory which is to perform this function satisfactorily must be well chosen; otherwise it will illumine the wrong things ... There is, there can be, no economic theory which will do for us everything we want all the time."

And further,

"... not the need to abolish economic theory altogether, but the need to find a different way to carry it on – less abstract, more history-friendly, less technical, more concerned with real economic phenomena, less reductionist and more open to taking advantage of the contributions coming from other social and moral Sciences."

Many factors are directly linked to the phenomenon of time, which may also explain why Shackle left little room for a Walras-Pareto type of general static equilibrium, since

²⁷⁰ Winston (1988), p.

²⁷¹ See Turk (2012) p 489

²⁷² Hicks (1976), p. 208

special characteristics derived from the lack of time, like: "Time and everything that belongs to time: expectation and uncertainty; change and growth; ambition, hope and fear; discovery, invention and innovation, novelty and news" ²⁷³.

We have theoretical systems that are far from balanced in relation to reality, or in the understanding of time, which otherwise must have a role that is fundamental and constructive. It is also linked to this kind of system that the future may be uncertain and conditions for developing irreversible. This ultimately means that the laws we can form only list the options and not the certainties.

Conscious involvement of time requires the adoption of a number of well-informed choices. This will be explained in the following and relates to: the choice of unit time; whether the events studied are repetitive or unique and to what extent there is a need to be inside of and outside of time; and, finally, how to approach the trinity of past, present and future.

a. The time unit

Statistical agencies often bear the responsibility for the time units used in the registration or description of an economic phenomenon. Work on the application of economic theories, in turn, is often the responsibility of other economists, but also a significant challenge. In some cases, however, there will be some forms of collaboration or joint projects between the producer and user of statistical material.

It is obvious that there always will be a need to assess whether the time unit would be optimal when used in a specific analysis. There may be a significant distance between analysing the economic development of the agricultural sector based on Cochrane's treadmill, and the study of The Minsky Moment or elements of algorithmic trading. Measurement of economic cycles can range from several years to nanoseconds.

²⁷³ Shackle, TE, p. 93.

Financial markets provide a useful analogy. Markets can be turbulent and risky, often to a far greater extent than standard theory admits. It is also a fact that market timing matters greatly, and that large gains and losses concentrate into small packages of time. Markets can be deceptive and inherently uncertain, and bubbles appear to be inevitable, although often associated with extended periods of accumulation. This suggests that the sequence of events through time, as well as the specific instances in time within those sequences, are of great significance.

Measuring time is like a hunted hare. Economics has throughout time been subject to discrepancies in time perception and time measurement, but there is only one way forward: to aim to be as precise as possible in the choice of the size of the time unit in relation to the analysis to be made.

Winston (1988)²⁷⁴ suggests that "[A] more temporally meticulous analysis would selfconsciously choose a time unit short enough to reveal the relevant social behaviour, a time unit that would suppress only that information deemed analytically uninteresting after an effort at explicit consideration".

The objective is to mitigate the risk that any time unit suppresses information about the timing of events within it. Otherwise, we cannot know when or in what order the events occurred.

b. Repetitive or unique behaviour

After determining the unit of time, the next area of focus is how it relates to the events that are explored. This is certainly not an easy exercise, as indicated by Hicks²⁷⁵:

"The more characteristic economic problems are problems of change, of growth and retrogression, and of fluctuation. The extent to which these can be reduced into scientific terms is rather limited; for at every stage in an economic process new things

²⁷⁴ Winston (1988), p. 49

²⁷⁵ Hicks (1979), p. xi

are happening, things which have not happened before—at the most they are rather like what has happened before. We need a theory that will help us with these problems; but it is impossible to believe that it can ever be a complete theory. It is bound, by its nature, to be fragmentary. It is commonly called 'dynamic' in contrast to 'static' ... As economics pushes on beyond 'statics' it becomes less like science, and more like history."

One way of dealing with this problem is to distinguish between what happen frequently and what happen more rarely. "Frequently" can be said to reflect the patterns of repetition in which there may be an opportunity to build a degree of credible knowledge regarding such events. It will reflect what can be detected around the simple mechanical models. Unique events disturb this idea of repeated events, in which case there arises a situation of widespread ignorance. John Hicks²⁷⁶, also in this context, developed an interesting point of view:

"This is not the fault of Economists. It is a consequence of the nature of the facts which we study. Our facts are not permanent. Or repeatable, like the facts of the natural sciences, they change incessantly, and change without repetition. Further, when considered as individual events, they are often great events of interest. Every business has a history of its own, every consumer a history of his own; any of these histories may have its own drama when we come close to it. But as a general rule, we are not seeking, as economists to come close. We are trying to detect general patterns among the mass of absorbing detail; shapes that repeat among the details which do not repeat. We can only do this if we select something less than the detail that is presented to us. In order to analyse, we must simplify and cut down. Further, in practice, we must simplify quickly. Our practical concern is with the facts of the present world; but before we can study the present, it is already past."

When the object of economics, as Hicks indicates, has no constant relationship with a development movement of the repetitive nature it certainly is a major warning that this type of analysis has its obvious limitations. There are many ideas regarding how

²⁷⁶ Wealth and Welfare (1981) s. 232 from the article The Scope and Status of Welfare Economics

non-repetitive events occur and on how these do not fit into formal analyses. This unfortunately reduces the power analysis of a Cartesian-Euclidean approach²⁷⁷. The alternative Babylonian approach comprises, in turn, open logical systems and not a unique system of axioms: "... argument in the Babylonian style is thus conditioned by the problem at hand, employs a range of methods suited to the problem, and these methods cannot be combined into one formal deductive argument without drastically changing their nature."²⁷⁸

c. Inside or outside time

Time from the inside is the time in which we think, time from the outside is the time about which we think, as Shackle²⁷⁹ once said. This initial assumption is made because the interesting effort here is how to come from an exterior approach to economic issues and into an actual issue. This has significant implications for how the economic analyst can work and what can be analysed.

If economics is treated from the perspective of an outside observer, it will, in the sense of Shackle, resemble some form of exterior dynamic that is mechanical in the determinate behaviour of a machine of limited design – and it will claim to be predictive. But theories which tell us what will happen are claiming too much, at least from the econometrician:

"In constructing his predictive macro-dynamics the econometrician naturally and properly treats the economy as a machine whose future behaviour, in the absence of shocks from outside itself, is fully determined by its history over some stretch of the past, so that this future behaviour is in principle predictable"²⁸⁰.

²⁷⁷ See fx Levando (2005): Investigation into the structure of reasoning in economics

²⁷⁸ Sheila Dow (1996), p. 13

²⁷⁹ Shackle (1959), p. 286

²⁸⁰ Shackle (1954), p.8

Further to this, it is also important to acknowledge that one of the most striking changes in economic thinking comes primarily with J.M. Keynes, with his explicit focus on time. An anatomy of Keynes' concept of time can best be understood by studying his philosophical background, his understanding of society and his development of economic theory. This implies that it is possible to view his handling of the concept of time as both related to the *A-series* and *B-series* of time logic. This dichotomy can be found in the General Theory, which both used a dynamic concept of time, which relates to a number of basic psychological mechanisms, and a static concept of time, related to the well-known spending multiplier. Despite numerous challenges to his perception of time, Keynes did not change his position, but rather became sharper in his view – not least when it comes to the concept of uncertainty²⁸¹.

A central point here is the abnormal situation, where the propensity to consume may be sharply affected by the development of extreme uncertainty of what might happen in the future. The same applies for the explanation of the existence of the liquidity preference, where uncertainty as to the future course of the rate of interest is the sole intelligible explanation. It is also evident in his treatment of the future yield of capital assets:

"The schedule of the marginal efficiency of capital is of fundamental importance because it is mainly through this factor (much more than through the rate of interest) that the expectation of the future influences the present. The mistake of regarding the marginal efficiency of capital primarily in terms of the current yield of capital equipment, which would be correct only in the static state where there is no changing future to influence the present, has had the result of breaking the theoretical link between to-day and to-morrow"²⁸².

This means that we have interplay between concretely assessed changes in psychological factors and mechanical factors as the multiplier – it also means that both the *A*-series and the *B*-series of time logic are represented in Keynes' analysis in The

²⁸¹ This is also linked to Keynes' understanding of how economic science is a moral science and requires much creativity when economic models must be formulated.

²⁸² JM Keynes (1936), p. 145

General Theory. It provides the opportunity to pursue how the pattern of the marginal propensity to consume, the marginal efficiency of capital and the liquidity preference specified at the beginning of a production period will unfold in the form of a mechanical law of motion that determines income and employment.

He explained that life and history are made up of short periods, which might be the reason why he did not study the extent to which the value of the multiplier changed in historical time, but instead concentrated on an instantaneous multiplier.

After the release of The General Theory he continued on this track, which dealt with the finiteness of economics models:

"a practical theory of the future ... has certain marked characteristics ... based on so flimsy a foundation, it is subject to sudden and violent changes. The practice of calmness and immobility, of certainty and security, suddenly breaks down. New hopes will, without warning, take charge of human conduct. The forces of disillusion may suddenly impose a new conventional basis of valuation. All these pretty, polite techniques, made for a well-panelled Board Room and a nicely regulated market, are liable to collapse. At all times the vague panic fears and equally vague and reasoned hopes are not really lulled, and lie but a little way below the surface"²⁸³.

This division into A and B time series is also characterized in some contexts as perspective and analytical time respectively. Perspective time is characterized by the *now*, where the analyst has no knowledge of the future, and the future movement is characterized by the arrow of time. In the analytical expression of time, it is possible to make a distant analysis in which it is an option to move back and forth in the analytical perspective. This is an approach that corrupts, and its analytical statements risk a departure from reality. In recent times, there have been efforts to address a number of assumptions to reflect conditions in the real world:

""Bounded rationality" now more often replaces omniscience (Simon 1955; Williamson 1979); surprise replaces known lists of possible events (Knight 1921; Shackle 1958;

²⁸³ Ibid, pp. 114-115

Williamson 1979); search (Nelson and Winther 1982) and discovery (Schumpeter 1934; Kirzner 1973) replace maximization. All of these recognize the temporal perspective of the subjects of social analysis as being inherently different from the temporal perspective of their analysis."²⁸⁴

d. Past, present and future

In his homage to Georgescu-Roegen, Hicks (1976) stated that the concept of time has always been present in much of his own work. And the vital and interesting principle in the concept of time is as follows:

"It is a very simple principle; the irreversibility of time. In space we move either way, or any way, but time just goes on, never goes back. We represent time on our diagrams by a spatial coordinate, but that representation is never a complete representation, it always leaves something out ... It is quite hard to get away, in any part of our thinking, from the spatial representation".

Hicks acknowledged, however, very early, that the method in Keynes' General Theory was the reintroduction of determinateness into a process of change, and in Hicks' optic, from the standpoint of pure theory, the use of the method of expectations was the most revolutionary thing about the General Theory.

"I recognized immediately, as soon as I read The General Theory, and that my model and Keynes' had something in common. Both of us fixed our attention on the behaviour of an economy during a period—a period that had a past, which nothing that was done during the period could alter, and a future, which during the period was unknown. Expectations of the future would nevertheless affect what happened during the period ... expectations, in our models, were strictly exogenous."²⁸⁵

²⁸⁴ Winston (1988), p. 37

²⁸⁵ Hicks (1982): Time in Economics, p. 283

This quote encapsulates very well the relationship between past, present and future. Choices made in the past can possibly affect present decisions and have consequences in the future. In its most simple form, the past can play an explicit role: Path Dependence is an expression of the idea that history matters. It is a way of bringing history into economics. Normally a path-dependent process is one in which the outcome evolves as a consequence of the history of the process. The concept of path dependence is intended to capture the way in which small, historically contingent events can set off self-reinforcing mechanisms and processes that "lock-in" particular structures and pathways of development.

In New Institutional Economics there have been different and well known studies of path dependence concerning technological "lock-in" (Qwertynomics), dynamic increasing returns, and institutional hysteresis as a description of regional economic evolution, but, "... to begin to introduce the concept of historical time into economic theory, we must (at least at present) content ourselves with constructs such as hysteresis, cumulative causation and lock in. These concepts are certainly imperfect ... can at least be conceived as elements of reform, which promise to take us beyond the extreme stasis of orthodox equilibrium theory." (Setterfield, 1995, p. 24)

According to Setterfield (ibid.), the institutional structures of an economy may be best conceived in terms of a process of hysteresis. This 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 past value on the alleged exogenous variables that characterize the system that determines the variable. Empirically, what econometricians have come to call autocorrelation. In other words, hysteresis will exist when current institutions influence the nature of current economic activity, which in turn influences subsequent institutional forms.

Vahabi (1998) also states that the author/scientist of inertial dynamics is then moving away from the role of prophet towards the task of scientific description. An alternative agenda should be set for the work of understanding the potential future development of an economy: From being single-line predictors to scenario planners. From a Shackelian perspective, it will be rejected that economists should make deterministic predictions, but it will not be denied, that it is possible to provide insights on a range of things that could happen. This means that it should be possible to highlight areas of uncertainty and delimit the bounds of the unknown, but also to propose improvements to the design of a system and to discover ways of modifying or eliminating incidence of surprises in the environment²⁸⁶.

6. Concluding perspective

Economics has always been confronted with the formidable difficulties associated with time especially where time involves change. This implies the need for an awareness of adequately incorporating aspects of time as "economic theory in time". Marshall's answer was that The Mecca of the economist is economic biology rather than economic dynamics.

Keynes and the Keynesian tradition develops a sense of time in which it is possible to combine the *A*- and *B*-series, that is, a dynamic and a static analysis of economic phenomena, which clearly offers new potential for analysis.

This also implies that it becomes more a matter of properties of time and studies of temporal argumentation. Conscious involvement of time requires the adoption of a number of well-informed choices for example the choice of time unit, whether events are studied as repetitive or unique and to what extent there is a need for the analyst to be placed inside or outside time and, finally, how to approach the trinity of past, present and future.

²⁸⁶ Madsen (2016): Shackle in time – time in Shackle

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Sammenfatning og forskningsperspektiv²⁸⁷

Studier af John Maynard Keynes selv og en række af hans efterfølgere efterlader ikke tvivl om, at tidsbegrebet indtager en central betydning i økonomiske analyser. Det er også uomtvisteligt, at det i McTaggarts forstand er A-serien med fortid, nutid og fremtid, som er fokus og ikke alene B-serien med før, nu og efter.

Det rejser til gengæld den alvorlige epistemologiske problemstilling, at kunne skelne mellem fortid, nutid og fremtid, og hvorledes teoridannelse og metodologi skal håndteres.

SAMMENFATNING

I de præsenterede artikler i denne afhandling er der en indre sammenhæng, som handler om forskellige aspekter af tid i keynesiansk teori.

I appendiks I er der redegjort for, hvor afgørende det er at insistere på tid i økonomisk teori. Der tages udgangspunkt i Keynes' forvetningsbegreb, men der lægges også vægt på to udlægninger af Keynes og tidsbegrebet, nemlig af henholdsvis Joan Robinson og GLS Shackle. Dette giver et første bud på henholdsvis tidens pil og tids-typologisering. Der afsluttes med en del forhåbninger til, hvorledes der med Kaos-teori og Computable Economics måske åbner sig nye muligheder for virkeligheds-nære studier af komplekse økonomiske systemers dynamiske forløb.

Når det gælder Keynes eget arbejde med tid er der bidrag at hente allerede fra hans studietid, såvel forelæsningsnoter som hans paper "Time". Han har været så tæt på tidsfilosoffen McTaggart at dennes tidsbegreb er blevet en del af Keynes' forståelse, både hvad angår tid, som noget der har med ændringer at gøre og samtidig behovet for at skelne mellem fortid, nutid og fremtid.

²⁸⁷ En del af indholdet i dette kapitel er også anvendt i en nyligt publiceret artikel: Madsen (2019)

Hvorledes Keynes sidenhen håndterer dette gøres meget klart i et brev til Harrod (1938) hvor han fastslår, at økonomi er en videnskab hvor der skal tænkes i modeller og hvor kunsten består i at vælge modeller, der er relevant for den nutidige verden. Dette er nødvendigt fordi det materiale, der er til rådighed – i modsætning til natuvidenskab – ikke er homogent over tid. Formålet med en model er at adskille de semi-permanente eller relativt konstante faktorer fra dem, der er forbigående eller svingende, hvilket giver mulighed for at udvikle en logisk måde at tænke sidstnævnte og forstå de tidssekvenser, som de kan give anledning til.

I Keynes' analyse i *General Theory* var de uafhængige variable således bestemt som de tre fundamentale psykologiske faktorer, forbrugstilbøjeligheden, kapitalens marginale effektivitet og renten samt løn-eneheden og pengemængden. På den baggrund analyseres investeringsbeslutninger og deres betydning for den samlede indkomst og beskæftigelse via indkomstmultiplikatoren.

Det er hermed afgørende for analysen, hvad der fastlægges som semi-permanente faktorer og hvilke faktorer der antages at være svingende. Samlet lægger det grunden for analyse af skiftende ligevægte.

En interessant udlægning af Keynes' metode er Shackles udgave i form af Keynesian Kaleidics. Denne udspringer af Shackles tre hovedinteresser, nemlig tid, forventninger og usikkerhed og dermed også kapitel 12 i *General Theory*. Han introducerer nutid som et moment-in-being og i forlængelse af Keynes brev til Harrod kan man sige, Shackle også nærmer sig en analyseform, hvor man ikke kun kan anskue verden som et panorama, men må være til stede i nuet. Derfor mener han, at et panorama outsideview skal kontrasteres med et inside-view. Sidstnævte situation er den, hvor en økonom på baggrund af sin viden, tanker og forestillinger beslutter i Keynes forstand, hvilken model, der skal bruges.

Keynesian Kaleidics er en svær metodologi, men illustrerer ganske godt, hvorledes et enkelt forholds ændring i en økonomi kan føre til at det samlede billede af en økonomi ændres dramatisk. Den kaleidiske faktor er usikkerhed, hvilket udelukker symmetri mellem forklaring og forudsigelse. Det er således ikke muligt, at lave deterministiske forudsigelser. Til gengæld er det plads til at fantasi kan spille en rolle ved opstilling af scenarier.

Hicks har som Shackle haft et livslangt arbejde med at nærme økonomisk teori til virkeligheden – de er begge fra starten optaget af Keynes' forventningsbegreb i *General Theory*. Vejen for Hicks er ganske interessant fordi den ikke er så direkte og det tager tid før han for alvor erkender begrænsningerne i generel ligevægtsteori og i IS-LMdiagrammet. Til gengæld bliver han efterhånden ret eksplicit omkring tidsbegrebet og konstaterer, at i modsætning til naturvidenskab og i samklang med Joan Robinson, at tid i samfundsvidenskab skal opfattes som irreversibel og ligesom Keynes fastslår han, at de facts, der arbejdes med i økonomi ikke er permanente. Dette fører ham over i arbejdet med tre typer af kausalitet.

Det bliver sekventiel kausalitet, som Hicks fæster mest tiltro til. Dermed nærmer Hicks sig muligheden for at studere dynamiske processer ved ikke kun at ville studere en periode, men sammenhængen mellem flere perioder. Dette er temaet i Kontinuitetsteori, som tillader studiet af effekter på økonomiske processer af skiftende forventninger.

I blandt leveres der af Post-Keynesianere en til tider ukritisk henvisning til Path Dependence ved håndtering af fortid. Ganske vist kan Path Dependence tages som udtryk for både hysterisis, kumulativ kausalitet eller teknologisk lock-in. Det illustrerer samtidig problemet, nemlig hvor langt kan man gå i at lade fortidige hændelser determinere forhold, der vil ske i fremtiden? Den simple og traditionelle udgave i form af Qwerty-nomics rummer ikke nogen farbar vej for økonomi. Til gengæld vil læren fra andre samfundsvidenskabers brug af Path Dependence kunne gøre begrebet mere relevant for økonomi.

Path Dependence begrebet er svagt fordi det hverken er en klar teori, en eksplicit metode eller empirisk endegyldigt eftervist. Og spørgsmålet er, hvor meget eventuelle stier, der identificeres som er generaliserbare, når historien aldrig gentager sig selv? En bevægelse væk fra Querty-nomics mod en ny og reformuleret Path Dependence II giver mulighed for at forlade funktionelle forklaringer på historisk udvikling til at tage intentionale forklaringer i brug.

Dette lægger op til studier af sociale mekanismer i form af institutionelle ændringer. Dette kan indebære et opgør med eksempelvis traditionel regressionsanalyse. I stedet er der behov for studier af kausale kompleksiteter som tipping points, højere-ordens interaktions effekter, strategisk interaktion, to-retningsbestemt kausalitet eller feedback-sløjfer, som kræver nye former for proces-opsporing og systematiske casestudier til at behandle spørgsmål om Path Dependence. Der skal være mere plads til case-studie metoder, der belyser, hvordan kausal mekanismer fungerer i en sammenhæng, men også opsporing sjældne hændelser og "udeladte variable".

De foregående erkendelser får nogle konsekvenser for, hvorledes tid eksplicit skal håndteres i økonomi. Dette fører til en anbefaling af, at der er fire hensyn, som skal tages, hvis tid med keynesiansk inspiration skal være en eksplicit del af økonomi.

Det drejer sig for det første om valg af tidsenhed. Dette er helt afgørende ift hvornår og hvad der kan opfanges af ændring i de medtagne variable i en model – ellers kan man risikere, at kendskab til timing af begivenheder går tabt. Det andet vigtige element er at afgøre, hvad der er repetitiv subsidiært unik adfærd - det vil sige, hvad der har tilbagevendende karakter og hvad der sker mere tilfældigt. Her skimtes analogien til henholdsvis et mekanisk og et forventningsbaseret tidsbegreb. Det tredje element er at tage stilling til at være indenfor eller udenfor tid, hvor perspektivisk tid karakteriserer nuet, medens analytisk/mekanisk tid beskriver konsekvenser. Der skal være et samspil mellem vurdering af i Keynes' forstand eksempelvis konkrete psykologiske faktorer og den mekaniske indkomstmultiplikator. Endelig skal der tages stilling til forholdet mellem fortid, nutid og fremtid. Fortiden er kendt og fortolkelig, hvor nogle historiske processer sættes i gang ved tilfældigheder. Dette er beskrevet via Path Dependence teori, men de er ikke komplette og giver kun et begrænset input til nutidsvurdering, hvor erfaringer skal møde beslutninger under usikkerhed og hvor det i bedste fald er fantasi, der sætter grænsen for hvilke scenarier, der kan tænkes. Den keynesianske teori er således kendetegnet ved at tilføre den økonomiske tænkning et nyt aspekt omkring tid, hvilket sker via den eksplicitte inddragelse af den tilgang, der ligger i MacTaggarts A-serie. Dette giver anledning til at der bør fokuseres på Keynes analysetilgang med skiftende ligevægte såvel som til ideerne med at arbejde med kontinuitets-teori. Disse felter er væsentlige, men absolut ikke færdigudviklede, hvilket klart giver anledning til yderligere forskning.

Forskningsperspektiv

I det indledende metodologiske afsnit skitseres en række problemstillinger, som er blevet undersøgt i denne afhandlings artikler. Det drejer sig om, hvilken tænkemåde, der ligger bag Maynard Keynes opfattelse af begrebet tid. Dette fremgår af artikler og sammenfatning. Ligeledes er der redegjort for, hvorledes fortid, nutid og fremtid skal håndteres i Keynesk forstand. Til gengæld er det mere begrænset, hvad der er beskrevet om generelle krav til eksplicit håndtering af tid i økonomi. Derfor lægges nu nogle sten til opbygning af et fremadrettet forskningsprojekt herom.

Der tænkes primært på, hvad det betyder, hvis McTaggarts A-serie med fortid, nutid og fremtid skal indtænkes i den økonomiske teori. Det vil klart være mere kompliceret, end hvis man alene tænker tid ved hjælp af B-serien dvs. i form af før og efter og hvor der alene bliver tale om en mekanisk og ofte matematisk formuleret model. Dette er kendt fra eksempelvis IS-LM eller multiplikator-accelerator modeller. Analyser, som i empirisk forstand går hen og bliver ex-post studier.

Indledningsvis kan det være nyttigt bare at skabe et overblik over, hvilke konsekvenser de to tilgange til tid kan have i økonomi. Til det formål kan opstillingen i Diagram 1 bruges. Dette tager i første omgang udgangspunkt i et bud på Joan Robinsons skelnen mellem logisk og historisk tid:

Diagram 1: Logical versus Historical Time²⁸⁸

Logical time

Historical time

1. Directionality of time	Reversibility	Irreversibility
2. Time intensity of action	Instantaneous	Discreteness;
		lags; inertia
3. Expectations	Self-realizing; correct	Falsifiable; future
	foresight	unknowable
4. Information/Knowledge	Complete, free, symmetric	Imperfect, costly, local
		learning
5. Capital goods	Substitutability	Specificity; lumpiness
6. Investment	Elastic	Inertia; driven by animal
		spirits
7. Technical change	Disembodied	Embodied; path-
		dependent
8. Money/Finance	Barter; passive money;	Active money; liquidity
	complete	preference; incomplete
	futures market	markets

Dette er en økonomisk tilgang, som modsvarer opstillingen i henholdsvis B- og A-serien hos McTaggart. Her refererer B-serien til logisk tid og A-serien til historisk tid. Sammenstillingen af konsekvenserne af de to tilgange på de 8 variable afslører allerede som udgangspunkt en omfattende forskel på, hvad det indebærer, at have en logisk/mekanisk tilgang til tid og hvad det betyder, hvis der er tale om en subjektiv/dynamisk tilgang til selvsamme²⁸⁹.

Opstillingen illustrerer, hvorledes der fundamentalt kan være forskel i tilgangen til begrebet tid. Sagt med andre ord som noget umiddelbart og reversibelt eller som noget irreversibelt og fremadskridende.

²⁸⁸ Donald J. Harris (2004): Joan Robinson on "History versus Equilibrium" s. 98 i Bill Gibson, ed: Joan Robinson's Economics. A Centennial Celebration. Edward Elgar, Cheltenham,

²⁸⁹ Se også Termini (1981) for en veldisponeret opstilling på forskellende på logisk, mekanisk og historisk tid i økonomi

Robinson har sammenfattet en række konsekvenser, som disse to tilgange kan have for økonomisk analyser. Turk²⁹⁰ beskriver således, hvad det indebærer at fysik primært referer til logisk tid – hvilket økonomi ikke kan: For det første, at modeller fra fysik ikke kan tillempes økonomi da rumslige og tidslige dimensioner i givet fald vil blive sammenblandet. For det andet at modeller fra fysik vil placere økonomi uden for menneskelige erfaringer og historisk tid. Og for det tredje er Robinsons erkendelse af sit centrale forskningsfelt, at økonomi i historisk tid er kendetegnet ved monopolistisk konkurrence²⁹¹.

For den økonomiske videnskab drejer det sig derfor om, hvorledes der kan findes en vej for økonomi, der bevæger sig i og igennem real tid. Men også om, hvorledes menneskelige aktiviteter kan bestemmes:

"Essentially, the first strand might be likened to determining the right pathway along which economics move, as well as the reasons for the breaks, shifts, and discontinuities that might occur *en route*, the second might be seen as establishing a historical context or set of conditions whithin which economic activity takes place. The first may retain elements of parametric time, only now limited as necessarily sequential or ratcheted. The second opens the way to historical description and depiction; What G.S. Shackle referred to as the 'panorama' of history"²⁹².

Dette bringer os igen tilbage til MacTaggarts A- og B-serie, som er en tilsvarende måde at gå til problematikken omkring hvad, der bringer en økonomi igennem real tid. Reelt er der behov for begge typer tidsbegreber for at dette skal lykkes, således som Subert angiver:

"In order to investigate the human world, however, it is necessary to use both types, as human awareness of time contains both the experience of real successions, and the

²⁹⁰ Turk (2010): The arrow of time in economics: from Robinson's critique to the new historical economics. Journal of Economics Thought 17:3, s. 474.

²⁹¹ Robinson (1971): Economic Heresies, s. 63: "But once we bring historical time into the argument, it is not so easy to present the free play of the market as an ideal mechanism for maximizing welfare and securing social justice ... Economic history is notoriously a scene of conflicting interests, which is just what the neoclassical economics did not want to discuss".

²⁹² Turk (2010), s. 477

ability to remember, reflect and expect. Serie B (before/after) creates a time structure that refers to relationships and events that are identical for all observers. Conversely, in series A (past, present, future) the definition of today, tomorrow and yesterday change in connection with the observer and the observer's awareness"²⁹³.

Historisk udvikling kan betragtes som kontinuerlig udvikling af ideer, handlinger og begivenheder. Eller med en lidt anden tilgang kan det siges, at økonomiske aktiviteter består af kontinuerte processer:

"Both choice and action require a passage of time and also involve the psychic and physical experiences felt over time. The process of making choices and taking decisions is a rather complex mind conception. It involves subjective as well as objective judgements. It is at this level that the psychic aspects attached to the 'A series' conceptualisation of time become relevant"²⁹⁴.

Man skal dog være opmærksom på, at den mennesklige bevidsthed varierer fra individ til individ både hvad angår perception og vurdering af virkeligheden samt dennes indflydelse på adfærden.

Selv om McTaggart ender med at give A-serien primat i forståelse af tid, tilbagestår alligevel spørgsmålet, om hvorledes B-serien kan fastholdes. Efter min opfattelse kommer man som sagt længst med en dualistisk tilgang til tid, hvor både A- og B-serien er inkluderet, som det også er angivet her: "Mink has realized that the true resolution of the MacTaggart paradox is to recognize that is is necessary to keep hold of both the A-series and the B-series. He saw clearly that the two series reflect two different ways of looking at the world: what he calls the *discusrsive* aspect, which throws up our tendency to fix on points, to perceive things in succession, as earlier and later, and hence to construct B-series; and what he calls the *transient* aspect, in which we have a sense of a moving series of A-series (which he constructs as a series of vertical pastpresent-future lines), this series of transient and changing A-series being identifiable as

²⁹³ Subert (2001)"The Problem of Time from the Perspective of the Social Sciences", Chech Sociological Review, 2001/2, s.212.

²⁹⁴ Hamouda (1990): Time, Choice and Dynamics in Economics", s. 137

earlier and later than each other, and hence giving the sense of succession that goes with the B-series" ²⁹⁵

Og hvordan håndterer man så det? Der gives to muligheder for at koble de to vinkler: en strategi kan være, at internalisere det eksterne eller alternativt at eksternalisere det interne²⁹⁶:

"... the first of these possibilities might be found in realizing that a vivid and active relationship of man to his "internal world" is required for a humane, future-oriented science. This implies that the way science is practiced on a day-to-day basis has to change accordingly, if our civilization is to keep pace with its enormous amount of theoretical knowledge about the external world. In a broad sense, this is the way of introspection. An option for the second possibility might be the study of toy models, of a virtual reality, transforming Rösslers endo- and exolevels into an empirically domain. The exo-observer is brought down from a superobserver existing in the hidden world of a human observer. The price to be paid is that the endo-world he observes is not real nature but an artificial cyberspace – and the observer's role switches between superobserver and participator".

Rösslers opdeling i endo- og exoniveauer skal forståes som et forsøg på at gøre op med flere århundreders Vesteuropæisk tænkning²⁹⁷. Et endosystem er et system uden en ekstern observatør og exosystem har en ekstern observatør. Den interessante placering for en observatør og deltager er nuet, hvor skæringspunktet mellem det successive og intentionale ligger.

Hvilke konsekvenser har netop denne tilgang i Keynesiansk økonomi for modellering af en økonomi, der bevæger sig igennem real tid?

²⁹⁵ Jaques (1982): The Form of Time, s. 24

²⁹⁶ Atmanspacher og Dalenort (1994) i Inside Versus Outside, Endo- and Exo-Conepts of Observation and Knowledge in Physics, Philosoply and Cognitive Science, s. 9

²⁹⁷ Ibid, s. 2: "Western civilization, its philosophy, and its sciences have to find their specific way to deal with the endo/exo distinction... It comes as a bit of a surprise that this fundament itself has not been *explicitly* investigated during the last four centuries of the golden age of science – with all its benefits as well as catastrophes".
Her er man - måske som forventet - igen nødt til at søge tilbage til Keynes selv. Og her er det ganske overraskende, at der egentlig er foregået ganske lidt udviklingsarbejde, på trods af, at Keynes angiver en metodologi til at håndtere både et successivt og intentionalt tidsbegreb på samme tid. Selv på trods af, at der i en del økonomisk tænkning er en erkendelse af, at usikkerhed og forventninger spiller er afgørende rolle i forståelse af økonomi. Når det så alligevel ikke lykkes at inddrage disse forhold eksplicit i analyser hænger det formodentlig sammen med at de stationære fortolkninger af Keynes – eksempelvis 45-graders eller IS-LM-fortolkninger m.m. – har fået lov til at dominere i både undervisning og forskning i al for lang tid – uden skelen til, at Keynes faktisk meget eksplicit lagde vægt på, at han som sagt opererede med en anden metodologi.

Kregel²⁹⁸ har i en ganske udmærket artikel opsummeret de tre metodologier, som Keynes benyttede sig af:

	Long-periode expectations	Short-period expectations	Interaction of long- and short-period expectations
Static model	Constant at a given level	Realised	Independent
Stationary model	Constant at a given level	May be disapointed	Independent
Shifting model	Shifting over time	Disapointed	Interdependent

De tre modeller er karakteriseret ved hvilke antagelser der er gjort vedrørende de kortog langsigtede forventninger og disses samspil.

Den simple statiske model er først formuleret af Keynes i 1937 med henblik på at vise sammenhængen mellem ændringer i den effektive efterspørgsel og beskæftigelsesniveauet. Den stationære model er den tilgang, som benyttes i de første

²⁹⁸ Kregel (1976): Economic Methodology in the Face of Undertainty: The Modelling Methods of Keynes and the Post-Keynesians. The Economic Journal, no. 86, s 217

18 kapitler af *General Theory,* hvor Keynes opererer med, at forventninger på kort sigt kan skuffes, under forudsætning af at de langsigtede forventninger ligger fast.

Den tredje og mest komplekse model²⁹⁹ er modellen med skiftende ligevægte, hvor både kort- og langsigtede forventninger og deres gensidige påvirkning sættes i spil: "The system will be shifting along the aggregate supply and demand curves at the same time as these curves will themselves be shifting their positions as the system reacts to disappointment of the two types of expectations"³⁰⁰. I virkeligheden er det, der giver den ekstreme kompleksitet, som Keynes³⁰¹ selv siger, at hver eneste af de antagne faktorer kan risikere at ændre sig uden forudgående varsel og i meget omfattende grad. I denne forstand forsøger modelarbejdet at nærme sig virkeligheden i stedet for at abstrahere herfra, med de konsekvenser dette kan have³⁰².

Hvorledes vil en analyse med skiftende ligevægt tage sig ud? Som der er redegjort for i artikel 2 om tidens anatomi i Keynes kan der laves forskellige antagelser om forventninger på kort og langt sigt og når dette er fastlagt kan en multiplikatorproces få lov til at udspille sig og bestemme den samlede indkomst. Jeg vil dog gerne henlede opmærksomheden på kapitel 19 i *General Theory*. Dette handler om, hvorledes man kan analysere konsekvenser af ændringer i pengelønnen³⁰³, hvilket kan være en ganske kompliceret affære og som hænger sammen med den metodologi, der anvendes³⁰⁴.

²⁹⁹ Ibid, s. 215: "This is Keynes's complete dynamic model where current disappointments may affect the state of general expectations and thus the independent expectational functions are free to shift over time; where expectations normally are disappointed".

³⁰⁰ Ibid, s. 216.

³⁰¹ Keynes (1936): The General Theory, s. 249

³⁰² Goodwin (1991): Social Economics: An alternative Theory, s. 123: "On the intuitive level we live in time, and take change for granted as the fundamental fact of life; but time and change are both destroyed by the analytical processes which depend upon taking reality apart into timeless instants; and when we are engaged with those analytical processes we often fail to see that the dissection has altered that which we wished to study".

³⁰³ Se evt. en kort udlægning af denne analyse i Madsen (1986): Lønpolitik – "The missing link"? Samfundsøkonomen, nr.
7. Denne udlægning har også givet inspiration til omtalen af konsekvenser af en pengelønsreduktion.

³⁰⁴ Keynes (1936), s. 257: "It is not possible, however, to discuss this matter fully until our own theory had been developed. For the consequences of a change in money-wages are complicated. A reduction in money-wages is quite capable in certain circumstances of affording a stimulus to output, as the classical theory supposes. My difference from this theory is primarily a difference of analysis; so that it could not be set forth clearly until the reader was acquainted with my own method"

Analysen af en pengelønsreduktion i Keynes' skiftende ligevægtssystem er betydeligt mere kompleks end den neoklassiske (Pigous) analyse og fremstilles af Keynes som et i øvrigt ufuldendt katalog med 7 eksempler over de mest oplagte reaktioner på en sådan ændring i pengelønnen. Centralt i analysen er som omtalt, om de tre fundamentale psykologiske faktorer forbliver upåvirket af en pengelønsreduktion, eller alternativt, hvor omfattende de måtte ændres, og i hvilken retning, dette påvirker beskæftigelsen³⁰⁵.

Kapitel 21 af *General Theory*, der omhandler pristeorien rummer også overvejelser omkring brug af skiftende ligevægte:"... we might make out 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 preset situation. *For the importance of money essentially flows from its being a link between the present and the future*"³⁰⁶. Keynes er meget eksplicit i sin påpegning af, at en ting er at tage udgangspunkt i hvad man kan kalde heroiske antagelser om at forventninger og motiver ligger fast, hvilket gør det relativt let at lave ligevægtsanalyser, men det er en helt anden ting at studere den reale verden, hvor forventninger kan skuffes og hvorledes det kan have nutidig effekt³⁰⁷.

Opsummerende er forskningsperspektivet og - spørgsmålet med baggrund i keynesianske tidsperspektiv hvorledes det er muligt at foretage en sammensmeltning af det intentionale og det successive tidsbegreb. Og hvorledes bringes historien tilbage i den økonomiske analyse. Man kan gøre sig den forestilling, at analysetilgangen med et horisontalt, mekanisk bevægelsesmønster egentlig rejses på højkant, hvor det væsentlige er at klarlægge, de afhængige og uafhængige variable og især klarlægge de mulige adfærdsmønstre og forventning, der kan påvirke en fremtidig udvikling.

³⁰⁵ Keynes (1936), s 262: "Thus the reduction in money-wages will have no lasting tendency to increase employment except by virtue of its repercussion ether on the propensity to consume for the community as a whole, or on the schedule of marginal efficiencies pf capital, or on the rate of interest. There is no method of analyzing the effect of a reduction in money-wages, except by following up its possible effects on the three factors".

³⁰⁶ Keynes (1936), s. 293.

³⁰⁷ Keynes (1936), s. 293-4: "... we can pass from the simplified propaedutic to the problems of the real world in which our previous expectations are liable to disappointment and expectations concerning the future affect what we do to-day ... the theory of shifting equilibrium must necessarily be pursued in terms of a monetary donomi".

Herefter kan der opregnes en mangfoldighed af scenarier omkring den økonomiske udvikling.

En hensigtserklæring om dette, som jeg er ganske enig i, er også formuleret af Carabelli og Cedrini³⁰⁸: "The combination of logical analysis and historical time in Keynes's economics might still represent a star to follow, in the quest for the appropriate way of conducting research on phenomena denoted by their evolving through time (as most economic phenomena are)".

Et dybere studie af dette vil være et naturligt forskningsfelt i forlængelse af denne afhandling.

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Appendiks 1:

ØKONOMI OG TID

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Careless attention to time can mislead economic and social analysis when the temporal perspective of an analyst-observer is confused with that of the actor as the subject of analysis; careless attention to time can lead to the use of inappropriate methodology when the difference between repetitive and unique behavior is ignored; and careless attention to time will hide important economic relationships when too crude a time unit is used.

Winston, 1988

1. Indledning

Med jævne mellemrum kan man støde på den påstand, at samfundsforskere i deres forståelse af samfundet har abstraheret tiden væk. Da dette også inkluderer økonomer, må det være passende, at præsentere et par kommentarer til dette generelle udsagn.

Om tid i økonomisk teori er der stadig stigende opmærksomhed. Et vigtigt startskud blev givet af J. M. Keynes i 1936. I forhold til den på daværende tidspunkt fremherskende neoklassiske teori fik Keynes sat tidsbegrebet på den økonomiske teoris dagsorden.

Keynes lagde eksplicit vægt på tidsaspektet ved formuleringen af sin forventningsbaserede beskæftigelsesteori. I sin bestræbelse på at formulere dette som en monetær produktionsteori indfører han derfor en klar skelnen mellem fortid, nutid og fremtid.

I det følgende skal det vises, at denne tradition meget ihærdigt er forsøgt videreført af to økonomer. Joan Robinson introducerede distinktionen mellem logisk og historisk tid. Et lignende begrebssæt blev udviklet af Shackle, der med en skelnen mellem mekanisk og forventningsbaseret tid har rubriceret forskellige økonomiske teorier med baggrund i deres tidsforståelse. Der kan imidlertid rejses spørgsmål ved, hvor omfattende den analytiske rækkevidde er af det forventningsbaserede tidsbegreb. Derfor afsluttes artiklen med en analyse af, om der er bedre bud på at håndtere tidsbegrebet.

2. Om at insistere på tid

En af de økonomer, der mest vedholdende har insisteret på, at få klargjort tidsbegrebet i økonomisk teori er Joan Robinson. Et illustrativt eksempel er kritikken af den neoklassiske teoris afbildning af prisdannelsen på et marked. I en "forelæsning" fra 1953 har hun givet en eksplicit fremstilling af de problemer, der kan opstå, hvis man forveksler tid og rum i et udbuds-efterspørgselsdiagram.

Udgangspunktet er forestillingen om, hvad der skal forstås ved ligevægt. Når et udbud af en vare overstiger efterspørgslen har prisen tendens til at falde og hvis efterspørgslen overstiger udbuddet tenderer prisen til at stige. I denne forbindelse rejser Robinson spørgsmålet: hvorfor har man ikke tænkt over, at der kan være forskel på at bevæge sig gennem tid og gennem rum? Hun gør i denne forbindelse opmærksom på tre forskelle:

1) I rum kan to punkter simultant bevæge sig i to retninger. I tid kan der kun være tale om "one-way traffic".

 I rum er der ikke noget begreb om tendens. Tid kan være til hjælp ved opfattelse af hvad der foregår i rum, men ikke omvendt.

3) Når der ræsonneres i udbuds-efterspørgselsdiagrammet må man som minimum kræve, at hver bevægelse markeres med en (tids)pil. Dette fremmer forståelsen af, hvor let det er at manipulere med diagrammet og hvor svært det er, at udstrække diagrammets analytiske rækkevidde.



Figur 1: Eksempel på anvendelse af tidspil i et udbuds-efterspørgselsdiagram. Det antages, at producentens udbudsbeslutning er foretaget i perioden forud for det aktuelle salg. Som eksempel kan nævnes produktionsbeslutninger i landbrug, hvor omfanget af såningen går forud for høst og salg af afgrøderne. I figuren har de to kurver en hældning, der gør, at vi får en eksplosiv oscillation.

Diagrammet viser et eksempel på hvorfor en proces, der udspiller sig over tid ikke altid kan indfanges af en metafor, der udelukkende baserer sig på et rums-ligt ræsonnement dvs. hvor udbuds- og efterspørgselskurverne kan flyttes uden hensyn til tidsapektet.

Ræsonnementer vedrørende tid og rum skal senere komme til at danne grundlaget for en berømt diskurs i økonomisk teori, nemlig den såkaldte "kapitalkontrovers", der udspandt sig i 1960'erne og 70'erne. Kontroversens afgørende spørgsmål er, om det er muligt at etablere et entydigt mål af den samlede samfundsmæssige kapital. Allerede i denne forelæsning fra 1953 foregribes indholdet eksplicit med følgende bemærkning:

Let us apply the notion of equilibrium to capital. What governs the demand for capital goods? Their future prospective quasi rents. What governs the supply price? Their past cost of production. For hard objects like blast furnaces and rolling stock demand is of its very nature ex ante, and cost is of its very nature ex post. The tutor cannot find any shelter here from the arrows of time.

Med baggrund i kritikken af neoklassisk teori og J.M. Keynes' arbejder med forventningsdannelse under usikkerhed udvikler Robinson således en distinktion mellem logisk og historisk tid i økonomisk teori:"At any moment in logical time, the past is determined just as much as the future. In an historical model, causal relations have to be specified. Today is a break in time between an unknown future and an irrevocable past".

3. Økonomer og tidens epistemologi

Med dette citat fra Joan Robinson nærmer vi os behovet for en præcisering af, på hvilke måder tid erkendes i økonomisk teori. Begrebet logisk tid optræder også med andre benævnelser som f.eks. analytisk tid eller mekanisk tid. Disse begreber er synonymer for, at tid kan inddeles i tre kategorier med prædikaterne før, simultant og efter. Placeres disse på en linie giver begreberne mulighed for at bevæge sig frem og tilbage på denne linie i søgningen efter forklaringer, mønstre og konsekvenser.

Begrebet historisk tid har ligeledes nogle andre benævnelser som f.eks. perspektivisk tid eller forventningsbaseret tid. Ud fra denne tidsanskuelse er det ikke muligt at bevæge sig uhindret frem og tilbage på en tidslinie. Der er dog fortsat en tredeling af tiden i henholdsvis fremtid, nutid og fortid. Historisk tid er tidsopfattelsen i den reale virkelighed. Mennesker lever, handler og beslutter i nutiden og har ikke nogen absolut viden om fremtiden, medens fortiden er uigenkaldelig, men dog fortolkelig.

Måske kan disse to tidsopfattelser klargøres ved at påpege nogle indlysende forskelle i relation til studiet af social adfærd. I det følgende vil jeg bruge Shackles kategorier, nemlig henholdsvis mekanisk og forventningsbaseret tid.

For det første tillægges viden meget forskellig betydning. I forventningsbaseret tid er fremtiden ukendt og det er ikke muligt at opnå nogen viden om fremtiden. Til gengæld har agenterne i mekanisk tid fuld viden om fremtiden. Udfald gøres endimensionale ved hjælp af værdiafbildning i form af bestemte adfærdshypoteser.

For det andet er det nu'et, der har den afgørende betydning i forventningsbaseret tid. Fortiden er fortolket og oplagret i hukommelsen og fremtiden kan beskrives ved hjælp af forventninger. Til forskel herfra er der ikke nogen forskel på tidspunkterne i mekanisk tid - intet tidspunkt har nogen speciel status, i modsætning til forventningsbaseret tid, hvor hvert enkelt tidspunkt er enestående. For det tredie er man i forventningsbaseret tid fanget i nu'et. Man er så at sige frataget enhver mulighed for at bevæge sig ind i fremtiden eller fortiden. I mekanisk tid kan man uhindret kontrollere en bevægelse både frem og tilbage i tid.

4. Tids-typologisering af økonomisk teori

En umiddelbar følge af dette forsøg på at bestemme tidens epistemologi kan med interessante analytiske konsekvenser benyttes til at foretage en opdeling af økonomisk teori.

Ideen til det efterfølgende diagram er hentet fra G.L.S Shackle (1965). På diagrammets xakse anbringes mekanisk (M) og på diagrammets y-akse anbringes forventningsbaseret (F) tid. Diagrammets heuristiske karakter skal understreges, idet der er tale om en intuitivt begrundet indplacering af de enkelte teorier. Først en præsentation af diagrammet derefter en uddybende forklaring:



Figur 2: Økonomiske teoriers ordning efter to tidsbegreber

De to anvendte tidsbegrebers epistemologi er, som angivet, søgt bestemt i det foregående afsnit. Derfor kan de med tal indplacerede økonomiske teorier drøftes nærmere på denne baggrund.

Indledningsvis startes der i origo, hvor to teorier er placeret. Det er teorier, som naturnødvendigt overhovedet ikke rummer noget tidsbegreb. Som udgangspunkt haves generel ligevægtsteori (1) og endvidere findes her Leontief-modeller (2). Sidstnævnte er et

billede af sektorinterdependens og insisterer ikke på noget tidsbegreb, selv om forskellige input-output tabeller nuturligvis kan sammenlignes.

Bevæger vi os ud af aksen med den mekaniske tidsopfattelse støder vi på østrisk kapitalteori (3), hvor skift i en produktions tidsstruktur sker som mekaniske reaktioner på pris- og profitsammenligninger. Nogle af John Hicks ældre arbejder opererer ligeledes med systematisk bevægelse uden reference til f.eks. usikkerhed og forventninger. En anden model med mekanisk tid er den velkendte accellerator-multiplikatormodel (4), der ofte optræder som rygraden i mange økonometriske modeller. På samme måde etableres såkaldte dynamiske IS-LM-modeller ved, at der sættes tids-fodtegn på centrale variable. Ved f.eks. at ændre på en eksogen variabel kan man herefter følge, hvorledes konsekvenserne udspiller sig over en række perioder for de endogene variable i modellen.

Bevæger vi os herefter op til (5), når vi til Marshalls teoriverden, der både rummer mekanisk og forventningsbaseret tid. Sidstnævnte optræder i forbindelse med analyser af, hvilke forventninger der danner baggrund for eksempelvis investeringsbeslutninger. Endvidere rummer Marshalls analyse af den langsigtede udbudsfunktion også antydningen af et tredie tidsbegreb, der kunne karakteriseres som "evolutionær tid". Dette tidsbegreb vender vi igen tilbage til i slutningen af artiklen.

Forventningsbaseret tid spiller også en central rolle i den svenske skole (6), der bl.a. repræsenteres ved Wicksells renteteori. Analyseformen er senere blevet generaliseret af Gunnar Myrdal og Erik Lindahl.

Keynes General Theory er placeret i punkt (7). Her støder vi på en model, der forsøger at operere med absolut usikkerhed. Forventningsanalyser indtager som tidligere nævnt en meget central placering i teoridannelsen. Man kan dog ikke hævde at mekanisk tid er udeladt hos Keynes. John Hicks har i nyere tid givet en udmærket karakteristik at dette forhold: "There is one, that concerned with the Marginal Efficiency of Capital and with Liquidity Preferences, which is unquestionable in time, it is basically forward-looking: time and uncertainty are written all over it. But there is another, the multiplier theory (and indeed the whole theory of production and prices which is - somehow - wrapped up in the multiplier theory) which is out of time". Når Hicks taler om at være ude af tid kan det henføres til mekanisk tid, og når han taler om at være i tid kan det karakteriseres som forventningsbaseret tid. I punt 8 er vi nået til det Shackle karakteriserer som "ikke-fordelte forventninger". Han beskriver forventningsbaseret tid således: "The question what is decision itself; how a science which seeks to explain all human deliberative conduct in terms of an interaction of tastes and circumstances can concede to the word decision any substantial meaning; how there can be any room for improvisation, the composing, as distinct from the mere enactment, of history; the question of the nature of expectation, its sources and its mode of engendering decisions; these are the matters which should occupy a theory claiming the most extreme place on the axis of concern with expectational time". Netop ud fra denne vinkel vedrørende individuelle beslutningssituation har Shackle selv givet centrale bidrag til udvikling af økonomisk teori.

Der er således uomtvisteligt, at der er skabt nye økonomiske analyseresultater med introduktionen af det forventningsbaserede tidsbegreb. Det gav økonomerne mulighed for at frigøre sig fra den hidtil kendte neoklassiske ligevægtstankegang, der med givne produktionsmidler og given smag hos agenterne udspiller sig i et lukket system. Den historisk-dynamiske model er til gengæld et åbent system, fordi forventningsdannelsen har primat. Systemet er åbent i den forstand, at agenterne handler under usikkerhed, hvilket medfører, at den aktuelle specifikation af forventningsdannelsen bliver afgørende for økonomernes modeldannelse.

Man må imidlertid spørge, om det temporale aspekt i en økonomisk teori bliver tilstrækkeligt tilgodeset når det mekaniske tidbegreb skiftes ud eller suppleres med det forventningsbaserede tidsbegreb. I virkeligheden udskiftes en beslutningsteori med en anden. Der indføres en asymmetri, der bunder i en virkelighedsnær erkendelse af. at agenterne altid vil være usikre på hvad fremtiden vil bringe, og derfor altid er nødt til at etablere et sæt af forventninger, der kan danne baggrund for en beslutning. Men der er tale om studiet af en beslutningssituation og ikke en proces, der udspiller sig over tid. Den historiske udviklingsproces er så at sige kollapset i agentens nutid - det enestående tidspunkt hvor fortiden er analyseret og den usikre fremtid er indkapslet i forventningsdannelsen og alt der mangler er realisering af en beslutning.

Carvalho har udtrykt dette på følgende måde:"It (expectational time) allows for uncertainty in decision making, and for the possibillity of sudden changes in the "state of expectations", but it does not allow for processes. If one is concerned with History, however, one has to go beyond expectational time and combine it with evolutionary time". Herom handler det sidste afsnit.

5. Kaos og computable economics

Økonomiske analyser, der er funderet på det mekaniske tidsbegreb, har været meget populære. De er blevet brugt til at give forudsigelser på komplicerede problemer, som har samfundsmæssig betydning. Imidlertid antages der i disse modeller en bestemt adfærd hos de agenter, der modelleres. Der forudsættes en repetitiv adfærd hos agenterne. I den teoretiske analyse af repetitiv adfærd er ligevægtsanalyse passende, medens den empiriskstatistiske del kan basere sig på traditionel regressionsanalyse

I sin mest radikale eller nihilistiske udgave tager Shackles forventningsbaserede tidsbegreb fuldstændig livet af det mekaniske tidsbegreb. Carvalho præciserer dette således:"In this construct, from the point of view of the decision-maker, there is only the "solitary moment", the present during which the construction of hypothesis is done and actions are chosen. It is an existential experience where imagination performs the main role, creating alternative "scenarios" as Ariel created visions to the shipwrecked in Prospero's island". Man kan ikke vide noget noget som helst om fremtiden.

Denne radikale tolkning af Shackle er i flere henseender søgt modificeret. Man kan hævde, at Shackles bidrag har givet anledning til at den ovennænvte statistiske verifikation bl.a. er blevet suppleret af historiske beskrivelser - alene ud fra den forestilling, at der kan optræde enestående og meget betydningsfulde begivenheder i den økonomiske virkelighed, som ikke lader sig indfange af teori, der udelukkende henholder sig til repetitive hændelser.

Som tidligere omtalt kan det forventningsbaserede tidsbegreb ikke indfange processer. Problemet kan illustreres med et eksempel vedrørende pengefænomenet. I forventningsbaseret tid kan penge lette situationen for en nervøs beslutningstager, men det forklares ikke hvad penge er og hvor de kommer fra. Forventningsbaseret økonomisk teori giver således ikke nogen indsigt omkring interaktion og proces.

Sidstnævnte er netop nøglebegreber i et evolutionært tidsbegreb. Dette tidsbegreb erstatter dog ikke det forventningsbaserede tidsbegreb, men introducerer de institutionelle rammer inden for hvilke beslutning under usikkerhed foregår. Hvordan angribes så denne problematik med en stor mængde af individuelle beslutningstagere i en social fabrik, der bevæger sig over historisk tid? Svaret kunne være SDI (System Dynamics Inquiry), som er mindre deduktiv og formalistisk og mere eksperimentel i sin karakter end traditionel teori baseret på det mekaniske tidsbegreb.

Kaos-teori er et eksempel på systemanalyse, hvor der kan findes tendenser og lovmæssigheder i tilsyneladende irregulær, uforudsigelig adfærd. Kaotiske processer, der udspringer af selv-organiseringsprincippet, har allerede i et stykke tid været studeret i biologiske og fysiske systemer. Moderne computer-teknologi gør det nu muligt at studere store, komplekse økonomiske systemer.

Muligheden for ved hjælp af kaos-teori at afsløre kausaliteter i tilsyneladende kaotiske systemer er væsensforskellige fra hidtige traditionelle økonometriske undersøgelser af repetitiv adfærd:"System dynamics allows us to quantify our intuitive models of complex causation and experiment with modifications. Fluctuations among interdependent functions and vaiables in time is a characteristic of systems that can be mathematically computed only in simulation modeling, as the system will generate nonlinearities of a very high order and dimension. Since these nonlinearities in turn produce evolutionary behaviour that is the manifestation of the cumulative effect of human actions, the study of self-organization is taken to new levels. Recursive feedback modeling, where the changes of rates themselves are determined endogenously and can represent the combinations of other previous changes, is qualitatively different from the iteration of endogenous quantities or static qualities; historical causality can be explained in what would otherwise be a purely descriptive model".

Den system-dynamiske analyse tillader så at sige, at de ikke-linenære sammenhænge taler for sig selv. Dette er en væsentlig forskel i forhold til traditionel økonomisk analyse, hvor præfabrikerede hypoteser søges verificeret eller falsificeret. Et andet væsentligt element er, at de udviklingsmønstre, der fremanalyseres ved hjælp af modellen sker endogent. Dette opstår gennem det samspil, modellen kan generere mellem institutioner, konventioner og læreprocesser.

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Et andet, men familiært svar på spørgsmålet om, hvad der bevæger den sociale fabrik gennem historisk tid er Computable Economics. Leijonhufvud har formuleret målet med dette program således: "We are interested in parallel processing because of its capacity to simulate large, complex dynamic systems at high speed. In particular, distributive processing will be ideal for computing the macro-behavior of systems composed of large numbers of agents who act on the basis of local information and interact according to institutional rules". I denne forbindelse nævnes, at mønstergenkendelse bl.a. kan studeres via modeller for neurale netværk og andre algoritmer fra kunstig intelligens - især når det gælder studiet af forventningsdannelse i økonomi.

Baggrunden for Computable Economics udspringer bl.a. fra en kritik af den traditionelle matematiske iklædning som f.eks. gives den økonomiske mikroteori. Ikke mindst problemerne omkring "undecidability", således som det er formuleret af bl.a. Gödel og Turing bidrager til en egentlig nyudvikling. En vej ud af disse problemer kan være anvendelse af talteori, som sikrer et grundlag, hvor der udelukkende arbejdes med mener som er beregnelige.

I et kommende epos herom giver Velupillai følgende definition på, hvad Computable Economics er:" (a) An attempt is made to formulate economic hypotheses, ab initio, with computability assumption on every theoretical entity. Thus agents, for example, are modelled as Turing machines -- or any of the equivalent formulations predicated upon the Church-Turing thesis. Then, also, the set of alternatives over which preferences are defined so as to generate consistent behavior will be given appropriate recursive structure: say, a recursive metric space. Similar remarks apply to theoretical formulations on production theory; and (b) The emergent behavior of locally interacting algorithmically rational agents must be capable of universal computation".

På dette nye grundlag må det forventes at være muligt at studere proces og interaktion mellem et stort antal agenter (og institutioner). I virkeligheden bør man have store forhåbninger til at den del af den økonomiske videnskab, som er blevet benævnt Computable Economics efterhånden kan udforske et meget komplekst økonomisk systems bevægelse over historisk tid.

6. Sammenfatning

Uanset hvilken del af samfundsvidenskaben, man beskæftiger sig med er det en meget vigtig afgørelse, hvilket tidsbegreb, der tages i anvendelse. Dette kendetegner også den økonomiske videnskab.

Tidsbegrebet i økonomisk teori har i dette århundrede gennemløbet tre generationer. Udviklingen sættes for alvor i gang i 30'erne især med udgivelsen af Keynes' General Theory. Første generation var den umiddelbare reaktion på tidløs ligevægtsteori i form af anvendelsen af det mekaniske tidsbegreb. Omtrent samtidig udvikledes kritikken heraf og førte efterhånden til formuleringen af anden generation: det forventningsbaserede tidsbegreb. Dette åbnede nye analytiske felter for den økonomiske videnskab, men det temporale aspekt blev fortsat ikke tilgodeset. Først med tredie generation af tidsbegrebet, her kaldet evolutionær tid, kan interaktion og proces opfanges. Kaos-teori og især Computable Economics er eksempler på, at tredie generations tidsbegrebets anvendelse har åbnet nogle nye muligheder for virkelighedsnære studier af komplekse økonomiske systemers dynamiske forbløb.

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Eftertanke

"At times I feel certain I am right while not knowing the reason. When the eclipse of 1919 confirmed my intuition, I was not in the least surprised. In fact, I would have been astonished had it turned out otherwise. Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution. It is, strictly speaking, a real factor in scientific research".

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