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The Darwinist Business Cycle

Abstract: Economists have for a long while sought ways to model the mechanisms that generate business cycles but have found it difficult to find models that describe the erratic behavior of business cycles, which can often not be explained by shocks to the economy alone. In this thesis the concept of *the business cycle dichotomy* is presented, a theory according to which business cycles are generated by two mechanisms; one that describes how real and monetary shocks to the economy give rise to business cycles and one that models how the intrinsic dynamics of the capitalist economic system in itself causes economic fluctuations. The business cycles generated by these two mechanisms would perturb and/or complement each other and often give rise to an erratic pattern. If the concept of the business cycle dichotomy has some merit, it could help us in our understanding of business cycles. Because of the limited scope of a Master's thesis, only the latter mechanism will be modeled and assessed. The resulting model is called the Darwinist business cycle, since it explains business cycles as being the result of the economic evolution by which less fit firms and concepts are replaced by more well-adapted firms and concepts. The Analysis will find comparisons with business cycle empirical facts encouraging, but will conclude that further investigations into the model and the framework that it is part of are needed for the assessment of the viability of the business cycle dichotomy.

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1. INTRODUCTION **3**

1.1. THE SCOPE OF THE ESSAY 4

2. OVERVIEW OF DIFFERENT BUSINESS CYCLE MODELS **5**

2.1. THE PRE-KEYNESIAN ORTHODOXY 5
2.2. THE LIQUIDATIONIST ARGUMENT 7
2.2.1. Schumpeter *7*
2.2.2. Hayek *9*
2.2.3. Robbins *9*
2.3. WHY DID ORTHODOXY DISAPPEAR? 10
2.4. KEYNESIAN BUSINESS CYCLE MODELS 11
2.4.1. Keynesian Models Based on Nominal Rigidities *11*
2.4.2. Keynesian Models Based on Coordination Failures *12*
2.5. REAL BUSINESS CYCLE THEORY 12

3. THE MAIN FEATURES OF THE DARWINIST BUSINESS CYCLE THEORY **14**

3.1. ASSUMPTIONS OF THE DARWINIST BUSINESS CYCLE THEORY 15
3.1.1. The Consumers *15*
3.1.2. The Producers *16*
3.1.3. The Market *16*
3.2. THE BUSINESS CYCLE GENERATING MECHANISMS OF DBCT 18
3.3. ANALYSIS 20
3.3.1. Discussion regarding the Method of Evaluation *20*
3.3.2. Business Cycle Empirical Facts *21*
3.3.3. Comparison between Empirics and Results predicted by DBCT *21*
3.3.4. Other Evaluation Methods and Problematization *22*

4. DIFFERENCES BETWEEN DBCT, MODERN BUSINESS CYCLE THEORIES AND ORTHODOXY **23**

4.1. DIFFERENCES AND SIMILARITIES BETWEEN DBCT AND RBCT 23
4.1.1. Differences *23*
4.1.2. Similarities *24*
4.2. DIFFERENCES AND SIMILARITIES BETWEEN KEYNESIAN BUSINESS CYCLE MODELS AND DBCT 25
4.2.1. Differences *25*
4.2.2. Similarities *25*
4.3. DIFFERENCES AND SIMILARITIES BETWEEN DBCT AND ORTHODOXY 26
4.3.1. Differences *26*
4.3.2. Similarities *27*
4.4. CONCLUSION OF PARAGRAPH FOUR: WHAT NEW IDEAS AND CONCEPTS DOES DBCT BRING? 28

5. SUMMARY **28**

6. CONCLUSION **29**

7. REFERENCES **30**

1. Introduction

The most popular business cycle models of today, notably business cycle models that are Keynesian in spirit and real business cycle theory all consider real and monetary shocks as being important drivers of business cycles. The economic orthodoxy that prevailed before the great depression on the other hand assumed an intrinsically dynamic economy, where business cycles where automatically generated by the economic system itself rather than by exogenous shocks.

Orthodoxy was quickly discarded after the great depression; since economists found that it alone could not explain the length and severity of the downturn (it is debatable whether contemporary economists have been able to do the same using modern economic theory). Orthodoxy also considered depressions to be economically efficient; and holding this point of view would most probably be considered quite cynical after all the suffering that the great depression entailed.

These two factors combined made orthodox theory disappear quickly after the great depression and be replaced with Keynesian theories that mainly relied on real and monetary shocks as the causes for economic fluctuations. However, discarding *all* the notions of orthodoxy in order to start looking for a completely new framework might have been a little hasty. That fact that orthodoxy did not succeed *alone* in explaining the great depression does not mean that it is fundamentally wrong. Really, business cycle models that are Keynesian in spirit and real business cycle theory have not been discarded in spite of their failure to thoroughly explain the great depression.

Both the notion that business cycles are caused by real and monetary shocks to the economy and the notion that they are endogenously generated due to some mechanism that is inherent with a capitalist economy are appealing and intuitive. It would thus be interesting to conceive a business cycle theory that relies on both these as being the cause of business cycles.

An approach to doing this would be to assume an economic system with a *business cycle dichotomy*, implying that the business cycle framework would contain two sub-frameworks. One of these would model the intrinsically dynamic business cycle generating mechanism whereas the other would model the mechanism by which business cycles are generated as a result of real and monetary shocks to the economy.

The result of these two overlapping frameworks would be an economy where the pattern of business cycles generated by the intrinsically dynamic mechanism of the economic system would be disturbed and/or complemented by real and monetary shocks hitting the economy.

If it is the case that business cycles are generated through a process in which a business cycle dichotomy of the kind described above is part, this could partly explain why

economists have found it so hard to model business cycles and to make their models fit with business cycle empirics across time.

The dichotomy would lead to a very erratic business cycle pattern that is hard to model, but which is close to reality since business cycle empirics show that business cycles follow an irregular pattern and that it often is difficult to fully explain them by looking at real and monetary shocks to the economy.

If the business cycle dichotomy proves to have some merit, this would aid us in our understanding of business cycles.

A first step in assessing and modeling the dichotomy would be to model a business cycle that is generated by the capitalist economic system itself through an intrinsically dynamic mechanism. This is the main purpose of the thesis, even if the modeling of such a business cycle would only be one step toward assessing and modeling the business cycle dichotomy proposed in this introduction. This priority had to be set because of the very limited scope of a master's thesis.

1.1. The Scope of the Essay

It is important to note that it is beyond the scope of this essay to *definitely* establish whether the model conceived in the essay is a viable alternative or/and complement to the existing modern business cycle theories. Advocates of RBCT, amongst them many brilliant economists, have spent the last two decades promoting and defending the business cycle model they champion, and it is certainly not possible to assess the absolute viability of DBCT in a master's thesis.

All that is intended in this essay is to give a proposal of a business cycle model based on the assumption of an intrinsically dynamic business cycle, which is conform to economic theory. The business cycle model will then be assessed by comparing the results it would generate to stylized business cycle facts. Thorough testing and evaluation could in the future assess the absolute viability of the model.

Even though the Darwinist Business Cycle is a mere part of the bigger framework describing the business cycle dichotomy it has been necessary to limit the thesis to describing it in isolation rather than describing the whole dichotomy framework. The dichotomy has been mentioned and roughly described since it puts the Darwinist Business Cycle in a context and gives it a raison d'être.

This essay will thus only be one step in assessing the concept of the business cycle dichotomy.

2. Overview of Different Business Cycle Models

Before the new business cycle model is conceived, it is helpful to make a review of the different business cycle theories that have existed in the past, and of the ones that are popular today. This especially holds true as regards the economic orthodoxy, since the new business cycle model has borrowed many ideas and concepts from it.

2.1. The Pre-Keynesian Orthodoxy

Although fluctuations in business activity and in the level of income and employment have been occurring since the beginning of merchant capitalism and were acknowledged by orthodox theorists, economists made no systematic attempts to analyze either depressions or business cycles until the 1890s (Landreth, 2002, p. 417). Prior to 1890, orthodox work on cycles and depressions had been nonessential and based on special cases rather than on general phenomena (Hansen, 1951, p. 225).

A few economists had however tried to contrive explanations for economic fluctuations already before 1890, such as Wesley Clair Mitchell (1874-1948) of the University of Chicago. Mitchell was one of the first economists to consider business cycles as being a self-generating process; a depression cannot go on forever, since the elimination of less efficient firms, decline of costs and falling interest rates will ultimately lead to a rebound; and conversely, a boom cannot go on forever because of rising costs' ultimately leading to falling profits and in the long run, a recession. Economic fluctuations were thus according to Mitchell generated by the economic system itself. He was however reluctant to find a general economic theory to explain business cycles, since each recession and each boom would imply an economy with new institutions and new firms (the inefficient institutions and firms having been out-weeded), and a changing economic environment would thus require a new theory to explain each subsequent phase of business cycles (Mitchell, 1913, secondary source).

Mitchell's most famous and important work, *Business Cycles*, was published in 1913 and primarily deals with *describing* different business cycles rather than establishing a model explaining them. However, all of Mitchell's descriptions of different business cycles have the factor in common that they all assume that cooperation profits were the most important variable to study when it came to finding the cause of the upswing vs. the downturn of the business cycle. Yet all his descriptions of business cycles lack a general rule as regards the interaction of business profits and the business cycle (Syll, 2002, p. 261).

One could basically say that two main theories concerning business cycles where dominant in the beginning of the 20th century; the first one considered capitalism to lead to an ever increasing economic growth, following a stable trend, and meant that fluctuations from this trend were due to primarily monetary disturbances and shocks. The other view regarded fluctuations from the trend to be a natural phenomenon, inherent

with the capitalist system. Mitchell's theories on business cycles belong to the latter category, whereas the proponents of the former model basically advocated teachings that are similar to the views of various "neo-Keynesian" economists of today (i.e. Mankiw), save that their models did not contain coordination failures or nominal rigidities, but rather relied on purely exogenous shocks and the fluctuations they could cause in the economy by different propagation mechanisms (Syll, 2002, p. 261).

Another economist who early started to study business cycles was the Frenchman Clement Juglar (1819-1905). His main theory suggested that internal forces within the economy caused the fluctuations rather than exogenous shocks; the capitalist system was in itself dynamic and unstable and gave continuously rise to booms and recessions. Juglar was one of the first economists to state the importance of *liquidation*, the reallocation of resources from inefficient to efficient firms, and according to him, liquidation was the very process that turned a situation of prosperity into a crisis (Hutchison, 1953, p. 372, secondary source).

The business cycle theories of the early 20th century are in many ways similar in spirit to the theories of these two 19th century economists. The prevailing wisdom of the pre-1929 economists, often referred to in the literature as "orthodoxy" argued that the economy was self-correcting and rested on the laissez-faire doctrines of A. Smith that opposed the economic regulation of governments exceeding purely legal matters such as enforcement and the protection of property rights.

The proponents of orthodoxy believed that regularly occurring economic cycles of economic growth and decline where inherent with the economic system, and completely natural. A good illustration of their beliefs is their way of qualifying the great depression as a completely natural, innocuous downturn, which perforce had to follow in the wake of the excesses of the strong economic showing of the 20s "the roaring twenties". The adherents of this belief were often called liquidationist, and many prominent economists of that time counted among their ranks, such as Schumpeter of Harvard University and Hayek of the London School of Economics, as well as top politicians such as Hoover, the president of the United States of America and his secretary of the treasury, Mellon. Mellon was one of the fiercest advocates of the liquidationist theory, and argued that the economy perforce had to liquidate all inefficient investments, bad loans and useless products of the "depraved" 20s before recovery could take place. He thus advocated a hands-off policy that would allow the economy to deal with the liquidation in peace (J. Bradford D. Long's Website).

The generic orthodox business cycle model assumed that prices and wages were totally flexible, and that business cycles were self-correcting. A slump could not go on forever, since the general price level would fall in recessions when output was below its natural rate. This fall in the general price level would induce real money balances (M/P) to rise, which would tend to stimulate aggregate demand. Thus orthodoxy implied that output could not deviate from the natural rate for any length of time, since the movements in the price level would correct for this. Thus, in a way, orthodoxy implied a business cycle in

prices rather than in output. (Website of The Australian Graduate School of Management).

The secretary of the treasury's belief in liquidationism and in the purifying effects of recessions was sometimes tangent to the cynical and fanatical:

"It will purge the rottenness out of the system. High costs of living and high living will come down. People will work harder, live a more moral life. Values will be adjusted, and enterprising people will pick up the wrecks from less competent people" (J. Bradford D. Long's Website).

Mellon was of the opinion that after the liquidation had been dealt with, the deflation, unemployment and negative growth that followed in its wake would turn once prices and wages feel enough to induce capitalists to start making investments and consumers start consuming.

Like most proponents of orthodoxy he believed that unemployment primarily was due to too high nominal wages; labor unions and minimum wage laws had made the labor market less flexible, which caused inertia, and it was thus important to weaken the influence of the unions and restore the flexibility of the market. Some economists pointed out that not only had the labor market become more rigid, but also the industry. Due to a rising proportion of oligopolies and monopolies in the economy, prices were not lowered in response to lower demand or higher production. (Syll, 2002, p. 342). However, this was not considered a major problem, since it was thought that these monopolies were natural products of the capitalist system, and thus efficient.

2.2. The Liquidationist Argument

At the very time of the start of the Great Depression a branch of economic pre-Keynesian orthodoxy was prevalent in the US called liquidationism. The paragraphs 2.2.1.-2.2.4[1] and 2.3. are mainly based on an essay on liquidationism by J. Bradford De Long, accessed from his web site (see references), and describe the theories of three of the most important proponents of liquidationism; Schumpeter, Hayek and Robbins.

2.2.1. Schumpeter

[1] The text below the subtitles"Shumpeter","Hayek" and"Robbins" is specifically based on quotations from http://www.j-bradford-delong.net/pdf_files/Liquidation_Cycles.pdf, pp 8-11. The sources referred to in these sections are sources referred to in this web page, and are given for the sake of credibility and enablement of further research.

Schumpeter was one of the main proponents of economic orthodoxy, and it is believed that he was the one who invented the term *liquidationism*, a central concept of economic orthodoxy.

Liquidationism is a term dealing with the belief that recessions are due to bad and inefficient investments being liquidated, thereby releasing economic resources that can be put into new and efficient investments. Schumpeter thus argued that the massive bankruptcies that depressions and recessions entail were a mere result of bad investments being liquidized to free up resources for new investments. Depressions were thus, in his eyes, economically efficient and beneficial to society on the whole.

Like other orthodox economists, Schumpeter argues that investments and enterprises are gambles on the future, made by innovative entrepreneurs who see new things to be done or new ways to produce old commodities. Sometimes these gambles will fail. The actual future that comes to pass is one in which *ex post* certain investments should not have been made, or in which *ex post* certain enterprises should not have been undertaken because they are not producing the requisite profits.

Like most proponents of orthodoxy, he advocated a laissez-faire approach to recessions; "Depressions are not simply evils, which we might attempt to suppress, but forms of something which has to be done, namely, adjustment to change….This socially productive function of depressions creates the chief difficulty faced by economic policy makers, for most of what would be effective in remedying a depression would be equally effective in preventing this adjustment" (Schumpeter, 1934, p. 16).

Schumpeter did not believe in the possibility of having steady growth without business cycles, but regarded them as being inherent with the capitalist system. He asserts that; "Business cycles are like the beat of the heart of the essence of the organism that displays them. In order for one wave of entrepreneurship to be followed by another, prospective entrepreneurs must know where and in what quantities resources available for recombination and redeployment are available. Until they can learn this, they face the impossibility of calculating costs and receipts in a satisfactory way…The difficulty of planning new things and the risk of failure are greatly increased.…It is necessary to wait until things settle down…before embarking on new innovation" (Schumpeter, 1939, pp. 135-36).

Unlike most modern economists, Schumpeter strongly doubted the ability of monetary policy to remedy economic recessions. The use of monetary policy will only convey the opportunity to choose between having a slight recession now, or a severe recession in the future. (Schumpeter, 1934, p. 16)

"Any revival which is merely due to artificial stimulus leaves part of the work of depressions undone and adds, to an undigested remnant of maladjustment, new maladjustment of its own which has to be liquidated in turn, thus threatening business with another worse crisis ahead"(Schumpeter, 1934, p. 20).

"Since the basic maladjustment is past investments and lines of business that have turned out to be socially unproductive and in need of liquidation, the trouble is fundamentally *not* with money and credit, but with past overinvestment. Stimulative monetary policies, therefore, are particularly apt to keep up, and add to maladjustment and to produce additional trouble for the future" (Schumpeter, 1934, p. 20).

2.2.2. Hayek

Hayek was even as critical of the notion that monetary expansion could be used as a means to mitigate recessions as was Schumpeter.

Moreover, he argued that any policies on the part of the state to reduce unemployment would have a negative effect on the economy in the long run: "This problem of unemployment…is one which will always be with us so long as the economic system has to adapt itself to continuous changes. There will always be a possible maximum of employment in the short run which can be achieved by giving all people employment where they happen to be and which can be achieved by monetary expansion…but…with the effect of holding up those redistributions of labor between industries made necessary by…changed circumstances.…To aim always at the maximum of employment achievable by monetary means is a policy which is certain in the end to defeat its own purposes… and lower productivity" (Hayek, 1944, p. 208).

This view of considering unemployment as something necessary, that the state should not try to mitigate through policy is typical of liquidationism. Unemployment is according to this school of economic thought due to the steady process in which inefficient industries are replaced by new, well-adapted ones. Any policy on the part of the government to create work for the unemployed would mean that resources were being directed to uses that are not optimally efficient, which eventually would entail lower productivity. Only the market can know which industries are optimally efficient, and direct resources to these.

2.2.3. Robbins

Compared to Lionel Robbins, Hayek was a moderate. Lionel Robbins went so far as to attribute the extraordinary depth and length of the Great Depression to excessive expansionary monetary policy. (At the end of the great depression, the US treasury abandoned its liquidationist, laissez-faire policies, and tries to fight the recession with expansionary monetary policies, the typical approach of economic policy makers of today).

Robbins namely argues that expansionary monetary policies on the part of the state, most notably by lowering interest rates, have a negative impact on the economy, since lower interest rates and other expansionary policies make it easier for businesses to borrow money that risks to be invested in "inefficient" firms and goods. He argues that a

recession should imply liquidation of investments, not more investments. More investments would only keep up the "inefficient" economic structure of the past. Robbins even argued that the state contract monetary policy during recessions, accelerating the liquidation process by making it harder for enterprises to borrow. He argued that only the fittest enterprises would survive in such an environment, forcing out more unfit firms from the market, which in turn would free up more resources that later on could be invested in efficient undertakings. (Robbins, 1935, pp. 72–75)

Both Robbins and Hayek cite *imperfect* information as the main cause of unemployment. Even if reallocation costs and other frictions in the labor market are also given importance, the role of imperfect information was considered to be paramount. If investors and employees were aware of what kind of enterprises/investments were efficient; they would instantly make those investments/train to acquire the skills needed for those jobs, and the resulting unemployment would be kept minimal. The recession that the liquidation process entails could thus be seen as an *information lag* constituted by the amount of time it takes for a big enough number of investors to realize what kind of investments are efficient. However a *liquidation lag* also exists; a sufficient amount of resources has to be freed up before the well-informed investors can undertake the efficient enterprises. As mentioned above, Robbins argued that the state could reduce this latter lag by employing contractory monetary policy.

2.3. Why did Orthodoxy Disappear?

When the recession of the thirties came, it was natural for orthodox economists to advocate the removal of existing minimum wage laws, and champion the practice of a laissez-faire approach (Sandelin, 2001, p. 108). The economy would ultimately cure itself, and the downturn would come to an end.

Their beliefs did not come true however; prices, wages and employment kept declining, without the envisaged increase in demand and investment demand occurring.

Periods of high unemployment lasted not for months or years but for decades. They lasted too long to be dismissed as frictions that resulted as the market reallocated productive resources away from what were now seen as low value goods. Most notably, heavy and prolonged slumps in the general price level did not succeed in propping up aggregate demand and increase investments. These mechanisms are the cornerstone-predictions of orthodox business cycle theory.

The great length of the great depression and the failure of the disinflation to reverse it made economists abandon orthodoxy, since they considered the reallocation mechanism through liquidation to be unable to explain the persistence of the unemployment and the huge and persistent fall in output that the 30s experienced.

Orthodox theory was thus discarded mainly because of its failure to alone explain the great depression. However, the importance of political correctness must not be overlooked; in the wake of all the suffering of the great depression it would surely have been considered quite cynical of politicians and economists to attribute all the pain it caused to “economic efficiency”.

2.4. Keynesian Business Cycle Models

Current business cycle theories that are “Keynesian in spirit” are based on the models developed in Keynes’ “General Theory” and are the most popular theories among economists to explain business cycles today. Most of these models have in common that they emphasize nominal rigidities as being the main cause of recessions, as for example sticky nominal wages or sticky nominal prices. Other Keynesian models regard coordination failures as the primary source of economic fluctuations; using a framework where firms sometimes fail to coordinate on a decision leading to an optimal level of output. Real and monetary shocks to the economy are also of importance in most Keynesian models. Today there is almost a consensus view among new Keynesian economists that economic fluctuations are harmful, and that the government can mitigate the damages caused by recessions by using fiscal policy and monetary policy. The latter is considered to be the most efficient.

2.4.1. Keynesian Models Based on Nominal Rigidities

Because of nominal rigidities these models predict that monetary shocks do affect real variables such as output in the short run; if the government for example decides to lower the general price-level by contracting money supply, then the fact that some prices are more sticky that others will result in a situation where some products have prices that are inefficiently high, which can lead to a fall in demand for these products, which will hurt the industry that produces these and its suppliers. Trough propagation mechanisms this will affect the whole economy and possibly cause a recession. These type of theories have been criticized for being hard to model, and even though a lot of empirical research have shown that prices generally are sticky to some extent, some economists find it hard to believe that this an important cause of long-lasting recessions.

Sticky nominal wages can cause recessions if the government undertakes an action that motivates a lower nominal wage level (for example by contracting money supply), or if other changes in the economy motivate the nominal wage level to fall. Rigid nominal wages would in this case imply that firms would have to fire workers instead of lowering wages, which would cause higher unemployment and a fall in aggregate demand, possibly triggering a recession. Sticky nominal wages have been confirmed by empirical

studies, but also in this case some economists doubt that a recession would ensue as a result. The possible causes of sticky nominal prices and sticky nominal wages have frequently been discussed and debated.

2.4.2. Keynesian Models Based on Coordination Failures

Many new Keynesian economists argue that economic fluctuations are due to a failure of coordination. During depressions unemployment is high and production is low; it is then possible to contrive allocations of resources where everyone is better off-the boom of the 20s was for example clearly preferable to the recession of the 30s. If society fails to reach an outcome that is feasible and that everyone prefers, then the members of society have failed to coordinate in some way (Mankiw, 1999, p. 518).

A simple parable illustrates this point nicely; consider an economy that is made up of two firms. After a fall in money supply each firm has to decide whether to cut its price or not; however the fall in money supply gives rise to an *externality*; if neither firm cuts its price, real money balances will be low and a recession will ensue; resulting in low profits for both firms. If both firms cut prices money balances will be high, and a boom will ensue, resulting in high profits for both firms. The problem is that the outcome where one company cuts its price and the other does not leads to an economy where money balances will be fairly high, and a recession can be avoided (even if we will not have a boom). In this case, the firm that did not cut its price will have higher a higher profit than the firm that did, and it is thus in both firms' interest that they cut prices, even though it will be hard for them to coordinate on doing so; especially in the real world were the number of firms in the economy is very large (Mankiw, 1999, pp. 518-519).

2.5. Real Business Cycle Theory

Real business cycle theory was developed by Edward Prescott and his followers in an attempt to break away from Keynesianism which they criticized for being built on assumptions that were not congruous with microeconomic theory; instead of relying on models with slowly adjusting prices and wages, they wanted to create a model to explain business cycles that assumed perfectly working markets similar to those predicted by microeconomic theory (Blanchard, 1997, p.618).

Thus real business cycle theory was invented, a business cycle theory that relies on the assumption of a perfectly working, flexible market that always ensures that output is at its natural rate, and fluctuations in output are thus considered to be the market's efficient response to various shocks to the economy, which implies that movements in output are interpreted as movements of the natural level of output, as opposed to movements away from the natural level of output.

The important shocks in this theory, that is, those that give rise to fluctuations in output, are always supposed to be real, so monetary issues are completely disregarded when trying to account for movements in output (Plosser, 1989, p. 70).

The real shocks considered in real business cycle theory are primarily described as being shocks to technology, that is, shocks which affect productivity. One of the most important results of negative shocks to technology is that they temporarily lower productivity and therefore give rise to lower wages. This induces people to work less for the time being and instead enjoy more leisure. When the negative shock to the economy has passed or when a positive technology shock hits the economy, the reverse will happen.

One of the most interesting implications of this reasoning is that involuntary unemployment does not exist, since the decrease in the number of hours worked in recessions is due to the conscious choice of workers to work less when productivity is low and enjoy more leisure (Plosser, 1989, p. 56).

This implication of the model has often been used by its critics as an argument against it; many economists believe that the notion that there is no involuntary unemployment is not plausible; it would for example be very hard to argue that the unemployed, starving masses of the depression found themselves in that condition because of a personal choice. Empirical studies have also been used as arguments against real business cycle theory, since they clearly show that work supply is not highly elastic; only big changes in the real wage can induce people to substantially change the number of hours they choose to work. (Mankiw, 1989, p. 86).

An empirical piece of evidence that the proponents of real business cycle theory often refer to is the Solow residual, which equals the portion of output growth that cannot be explained by growth in capital or labor. Advocates of real business cycle theory argue that this variable should be interpreted as representing technological changes or shocks. Given that this interpretation is justified, the Solow residual would provide proponents of real business cycle theory with a strong argument in favor of their model, since empirical research has showed that the Solow residual is highly pro-cyclical. Opponents of RBCT argue that the Solow residual does not reflect technological changes, and that the low values of this variable in recessions can be attributed to a phenomenon called *labor hoarding*. Labor hoarding ensues because of high costs of firing workers during recessions and high costs of rehiring and educating new workers when the recessions are over. Given these high costs of dismissing workers, companies will choose to have a bigger workforce than necessary when the demand for their products falls in recessions, which will cause productivity to fall, translating into a decline in the Solow residual. Proponents of RBCT argue that it is unlikely that that the cost of firing the excess workforce exceeds the cost of the wages they demand, and argue that competitive firms would not allow labor hoarding (Mankiw, 1999, p. 512).

Critics of the model also find that it is hard to imagine shocks hitting the technology, especially as people never seem to perceive shocks of this kind. And even if shocks like these really did exist, the law of large numbers would guarantee that they cancelled out

each other, and that their effects on the aggregate economy would average out to zero (Mankiw, 1989, p. 87).

Some RBCT models highlight interaction between sectors, where a negative shock to technology in one sector has effects on the output of other sectors, and thus gives rise to an aggregate business cycle. A sudden deterioration of the technology of one sector would not have effects limited to that sector, since it would reduce the wealth of the individuals in the economy, causing them to reduce their demand for all goods.

This would tend to cause fluctuations in the economy that start in the sector that is hit by the productivity shock and then propagate to the other sectors. The problem with this approach is that it would require a situation where there were very few shocks and very few sectors, since the shocks would cancel out each other otherwise, due to the law of large numbers (Mankiw, 1989, pp 86-87).

Other RBCT models emphasize costly reallocation of labor between sectors as workers have to leave their jobs in sectors hit by negative technology shocks and migrate to more productive sectors. The problem with this approach is that it would imply empirical data showing high vacancy rates coinciding with high unemployment, which is not the case; instead empirical data clearly shows a pattern where recessions are accompanied by low vacancy rates (Mankiw, 1989, pp 86-87).

3. The Main Features of the Darwinist Business Cycle Theory

The business cycle theory conceived in this essay has been labeled “the Darwinist business cycle theory” since it explains business cycles as being partially caused by an evolutionary process by which less fit firms, economic agents and goods are driven out of the market in order to be replaced by firms with more efficient production, and whose goods are better adapted to consumers’ present tastes.

This evolutionary process is in itself of course not a new idea, but rather a consensus view among economists that explains why GDP per capita has increased steadily in the world for the last 100 years (Jones, 2002, p. 15). Due to the competition that the capitalist system entails, all firms have an incentive to provide the market with products that raise the standard of living more than the products of the firm’s competitors, that is, provide the market with the products that convey the highest *value* (value is here defined as utility per dollar).

The new idea that DBCT brings is that it models how this evolution gives rise to business cycles.

Even if there has been a clearly upward trend in GDP per capita, there have also been significant deviations from this trend over time. DBCT argues that we do not need to rely entirely on external monetary and real shocks in order to explain these business cycles,

but that we rather should attribute these fluctuations partly to the intrinsic dynamics of the capitalist economic system.

According to this Darwinist approach to business cycles, we should try to explain economic fluctuations by making the assumption that the economic system is dynamic in itself; the constant amelioration of products and the standard of living that the competition gives rise to due to the capitalist system cannot work out smoothly; even not in the unusual case where we have no exogenous shocks to the economy. DBCT thus assumes an *endogenously dynamic* economic system which constantly changes from recession to boom (albeit not at a regular pace).

Considering the economy as an ecologic system where the best adapted firms survive is quite intuitive and not so controversial in itself. The greatest challenge for DBCT is to show how this evolutionary process will give rise to business cycles, that is, why the cleansing out of unfit firm cannot happen smoothly without giving rise to economic fluctuations.

It is important to bear in mind that the DBCT does not on its own explain business cycles since it is part of the business cycle dichotomy and generates business cycles in combination with the model of the framework that describes the business cycle generating effects of real and monetary shocks hitting the economy. The business cycle reality will thus be an economy where the business cycles created by the DBCT are perturbed and/or complemented by the business cycle generating effects of real and monetary shocks hitting the economy.

It should be added that the business cycle dichotomy could be modeled by a completely different set of business cycle models that do not at all use the assumptions of DBCT. The important thing is that one of the models of the set explains how the economy endogenously generates business cycles and the other model explains how business cycles are created exogenously by real and monetary shocks.

DBCT is thus only a proposition as to how one could go about to model the dichotomy.

3.1. Assumptions of the Darwinist Business Cycle Theory

3.1.1. The Consumers

Consumers are assumed to have short planning horizons and to be only marginally inclined to smooth out consumption over time. Individuals are also assumed to be risk adverse.

As consumers are considered to be interested in maximizing their utility, the above feature could be attributed to the fact that it is impossible to know for sure when a recession will end and that consumers thus will maximize utility in recessions by lowering consumption since this because of their risk-adverseness and the uncertainty will increase their psychological well-being and thus their total utility.

Animal spirits also play an important part in the model. At the onset of a recession a pessimistic consumer sentiment starts propagating in the economy, and it will change with a certain lag vis-à-vis the business cycle. This contributes to the persistence of the business cycles.

It is debatable whether the behavior described above can be said to be fully rational, and it is likewise debatable whether consumers and individuals in reality are completely rational (and if it is rational to be rational!). This discussion will be left out of the thesis.

3.1.2. The Producers

One of the main notions of the DBCT is that it, just like orthodoxy, assumes that enterprises are like gambles that sometimes go wrong. This notion could be modeled by assuming a market structure with high fixed investment costs. It is also assumed that these investments are difficult to liquidize once they have been undertaken. There is thus considerable *investment inertia*; if an investment that has been made is later found to be inefficient it will take time to liquidize it and make a new investment to replace it. Firms may also decide to keep sub-optimal investments if they predict that the increase in pay-offs will be inferior to the replacement cost.

These two assumptions regarding investments imply that producers lock themselves in when deciding on a certain technology, certain differentiating features of their products, certain marketing strategies etc. When it turns out that their investments have been sub-optimal gambles because of changes in trends and tastes or because the technology they have decided to invest in has turned out to be sub-optimal, this will force them to undertake costly restructuring projects, or in some cases, to go out of the market.

The majority of companies are also supposed to have excess capacity. This excess capacity could for example be due to the fact that companies want to have a cushion against sudden peaks in demand. Increasing returns to scale (IRS) is also assumed. An increase in demand will thus often not necessitate substantial extra hiring.

3.1.3. The Market

The market is assumed to have an oligopolistic structure, or at least to have important oligopolistic elements, even though part of the market could be characterized by perfect competition.

The part of the market that is of oligopolistic structure is supposed to have considerable barriers to entry, notably because of the high fixed investment costs mentioned in paragraph 3.1.2.

Trends, notably in consumers' tastes and preferences are an important part of the model. Since the DBCT is supposed to model a mechanism that generates business cycles in the absence of shocks to the economy, this can be problematic in case one considers changes in tastes to be shocks to the economy. However, trends could also be supposed to follow an evolution independent of "trend shocks".

Some companies succeed in predicting trends and adapting their products to these whereas others do not. The model does regard businesses as gambles that sometimes fail, and even heavy investments in marketing research and product enhancing activities might eventually lead to failure. In an economy where all firms invest optimally in these activities, some will still succeed better than the others.

When it comes to technology, the orthodox economists' approach to businesses as gambles that sometimes fail also holds true; heavy investments in R&D aiming to reduce cost and render production more efficient will often have the desired results, but in some cases even the heaviest investments will lead to a sub-optimal outcome. Even in a set-up where all firms in the market invest optimally in R&D and market research, some of them will ultimately fail.

Optimal technology and optimal technology mixes are quite relative terms; what is an optimal technology mix for one firm needs not be it for another. A firm's failure to invent or acquire optimal technology could be due to poor strategic decisions just as well as adverse changes in trends or changes in technology trends. It is in most cases not the failure to acquire or invent some kind of universally superior technology.

Just as in the case with trends, it is debatable whether changes in technology should be seen as an evolution or as shocks. Firms make the strategic choices as to their technology mix depending on their outlook on the future development of their firm and of technology. Sometimes these predictions are wrong, which can be construed as being due to shocks or as being due to evolutions or trends that have not been successfully anticipated by management. It is quite a grey zone.

The changes in the market that are described in the model (restructurings, bankruptcies, increases in market shares, changes in strategies etc), are supposed to take place on the company level. We abstract away from changes on the industry level. .

3.2. The Business Cycle Generating Mechanisms of DBCT

DBCT strives to model how the evolution by which less fit firms and concepts are replaced with new, more efficient firms and concepts will give rise to economic fluctuations. We will consider an economy that is in the midst of a boom and illustrate how the evolutionary process draws the economy into a recession and then turns it around, making the economy enter into a boom anew.

At the onset of the boom the firms in the economy will constantly aim to capture a higher market share (an effort that primarily is due to IRS) by differentiating their products to suit the present trends and the future trends that they are anticipating and by lowering their prices through investments in technology that will render their production more cost-efficient. Companies that have succeeded well in these fields will be labeled fit companies throughout this paragraph.

Competition steadily grows with time and mark-ups decline, a phenomenon which notably makes it more difficult for badly positioned companies to sustain losses in their market share or failures to install optimal cost-efficient production technology.

Badly positioned companies will after a while deal with these problems by undertaking costly restructuring processes which often include lay-offs of personnel and general down-sizing or, in some cases, by filing for bankruptcy.

Companies are assumed to follow a normal distribution when it comes to fitness.

Quite early in the boom, the firms that are at the extreme negative end of this normal distribution of fitness will undertake a restructuring process or file for bankruptcy. It is not until after a while that a big number of firms (which are closer to the center of the normal distribution) will have to take recourse to these options due to a combination of low mark-ups, loss in market share and/or sub-optimal production technology.

It is now that the economy will turn around and enter a recession.

The big number of firms undertaking restructuring or filing for bankruptcy will have two main effects; first, it will cause massive lay-offs, and secondly it will hit the whole supply chain of the unfit firms involved. These two effects will now be treated in more detail.

The lay-offs will cause the households of the recently unemployed workers to decrease their consumption, as short planning horizons and a limited need of smoothing out consumption over time are assumed by the model. *Animal spirits*, in the form of negative consumer and producer sentiments propagate trough the economy as individuals grow more pessimistic about the economic outlook. These animal spirits will change with a

certain lag vis-à-vis economic reality, and will thus contribute to the persistence of the business cycle.

The restructuring undertakings and the filings for bankruptcy will cause a decrease in the number of orders of the supply chains that are hit.

The additional strain that the lower consumption and the decline in orders put on the firms that are somewhat closer to the center of the fitness distribution will cause even more firms to undertake restructuring processes or filing for bankruptcy and we will thus have a snowball effect.

The fit firms in the economy will now temporarily enjoy lower competition and a higher market share, causing mark-ups to increase over time as the recession continues. As excess-capacity and increasing returns to scale are assumed by the model, companies will largely be able to satisfy their increased market-share without substantial increases in hiring. As regards orders, the supply chains of the fit firms will in some cases enjoy temporarily higher orders, which they also will be able to satisfy without substantial additional hiring.

Part of the higher mark-ups could be explained by the lower costs that IRS and better use of capacity entail. Competition does decrease in recessions and since an oligopolistic market is assumed, part of the increase in mark-ups could be attributed to an increase in the (general) price-level. Possibly, this higher price-level could keep consumption low and contribute to the persistence of the recession, but this is not an important implication of the model.

These higher mark-ups will in due course attract new entry into the market by firms that moreover will have the advantage of having observed what the current trends and tastes are like, and what kind of technology and strategy are likely to be optimal. They will thus be able to make investments that correspond to these observations. Less fit firms that are already in the market will also with time have succeeded in adjusting and optimizing their strategy through restructuring. As trends and technology may have changed by now, it is very possible that their strategy mix is more efficient than the strategy mix of the formerly fittest firms, whose strategy mix was optimal under the circumstances of the very recent past.

Note that one of the assumptions of the model is that we have barriers to entry in the form of high fixed investment costs. Mark-ups will thus have to increase substantially before new firms enter. Likewise, the restructuring and revamping of strategy of the unfit firms that stay in the market will take time.

The new entry and the regained strength of formerly unfit firms that have finalized their restructuring will cause competition to increase and mark-ups to decline. The former dominant players of the market will see their market shares decrease. The bigger number of competitive firms in the market will cause employment to increase, which with a certain lag will cause consumption and consumer sentiment to go up, which in turn will

increase production and orders throughout the supply chain. The economy will now gradually enter a new boom.

At a first glance, it might seem more efficient to have a few firms serving the economy (the recession set-up) rather than a greater number (the boom set-up), given the IRS and the excess-capacity.

However, the ability of new firms to adapt to changes in trends and technology will make it economically efficient for them to enter the market since their production is more efficient and their goods are better adapted to present tastes and thus provide consumers with goods that give them a higher utility. The investment inertia makes it difficult for the fittest firms of the recession to adapt to changes in trends and technology as quickly as newcomers or the firms that initiated successful restructuring earlier in the cycle.

As evolution goes on, the fittest firms of one cycle may be trumped by other firms in the next cycle and then come back as dominant players in the third cycle, or perhaps go out of the market completely. They may also remain the fittest through all cycles if they succeed in anticipating trends and technology better than their competitors. The model does not imply that all companies are constantly replaced with each cycle.

3.3. Analysis

3.3.1. Discussion regarding the Method of Evaluation

One way to rudimentarily gauge the Darwinist Business Cycle would be to check whether the results that it predicts are consistent with economic empirics. However, it is important to bear in mind that it because of the dichotomy will co-exist with a business cycle model that describes what happens when real and monetary shocks hit the economy. The business cycles that DBCT predicts will thus be perturbed and/or complemented by the cycles generated by these shocks.

It all depends on whether the perturbations of the “twin” business cycle generating mechanism of the dichotomy are considered to have very strong effects on the economy or not. If one supposes that even weak monetary and real shocks considerably alter the business cycle pattern of DBCT, then one should not expect the results that DBCT would give rise to to perfectly coincide with empirics.

As one of the assumptions behind the theory is that the dynamics that DBCT represents are so strong that they cannot be prevented for any length of time by government interventions (and thus also shocks), it is reasonable to expect a strong inherent business cycle that only very strong shocks can seriously affect. Moreover, one should expect real

and monetary shocks to often take out and counteract each other, which will decrease their importance.

The conclusion is thus that a good fit with business cycle empirics would be a very encouraging finding in the assessment of DBCT.

3.3.2. Business Cycle Empirical Facts

The empirical facts of the business cycle mentioned here are more or less consensus views of today's economists, but some researchers claim other results. These results seem, as so often in economics, to be very dependent of the time-frame chosen, and an article by Susanto Basu and Alan M. Taylor has therefore been chosen, where the authors look at the cyclicality of different economic variables during different time periods, as a reference. The time periods chosen by the authors are the era of the gold standard (1870-1914), the interwar period (1919-1939), the Bretton Woods era (1945-1971) and the modern era (1971-1999).

According to Susanto Basu and Alan M. Taylor, consumption seems to have been strongly procyclical during the whole 19th century, even though it was slightly more procyclical during the Bretton Woods era than during the rest of the century. Investment has also proved to be procyclical, but less so than consumption, although it has been strongly procyclical after the 70s. Prices are slightly countercyclical, but have been more countercyclical after the 70s (Basu et Al., 1999, p. 49). The real wage seems to be fairly procyclical, except for the interwar period, where it was acyclical (Basu et Al., 1999, p. 61). Mark-ups seem to be countercyclical, even though some studies indicate that they are procyclical in concentrated industries. Most studies however indicate that they are countercyclical even in these industries (Carlton et Al., 2000, p. 552).

Since the tests used when assessing the cyclicality of these variables are quite sensitive to the time period chosen and other factors, economists have not been able to reach a complete consensus, investments, the real wage, employment and consumption are widely believed to be procyclical (Cooley, 1995, p. 30; Romer, 1996, p.150), whereas the behavior of the price level and the inflation rate are subject to more controversy (Romer, 1996, p. 150). Many studies have found the price level to be countercyclical though, as Basu et Al. above. The length of the average work week and productivity are generally procyclical (Cooley, 1995, 149).

The model does not have any direct predictions as to the cyclicality of inflation. Empirical studies have mostly shown that inflation is acyclical.

3.3.3. Comparison between Empirics and Results predicted by DBCT

On the whole, DBCT would give rise to results that are conform with business cycle empirics, which is an encouraging sign. Consumption, Investment and wages are procyclical whereas mark-ups are countercyclical. Furthermore, the fact that mark-ups

are procyclical in concentrated industries is conform with DBCT, as these industries probably have even more substantial barriers to entry and thus are sheltered from much of the dynamics of the model.

A procyclical productivity per worker could also be explained with the model. Even if IRS is assumed, and even if the fittest companies' market shares increase in recessions, productivity per worker is predicted to fall in recessions, since aggregate production is assumed to plummet enough to more than off-set these effects.

DBCT would tend to generate a countercyclical behavior of the general price level, since mark-ups increase in depressions. That this will imply a higher general price level is however not self-evident, as much of the higher mark-ups could be explained by the lower costs that IRS and better use of capacity entail. Competition does nevertheless decrease in recessions and since an oligopolistic market is assumed, part of the increase in mark-ups could be attributed to an increase in the (general) price-level.

More importantly, the erratic behavior of business cycles and the difficulty to explain them fully as being the results of shocks makes the dichotomy of which DBCT is part appealing, since its two business cycle generating mechanisms together create a business cycle model that is not static, but yet not dependent on exogenous shocks.

3.3.4. Other Evaluation Methods and Problematization

Another way by which one could test DBCT would be to see if the model's prediction that concentration as to market share rises in recessions. However, the dichotomy would render a straightforward assessment of this inadequate, and the assessment would therefore have to be modified in order to take this into account.

As it is similar in spirit to orthodox business cycle theories, DBCT includes features that are hard to model and that would most probably be considered unscientific by contemporary economists. At the heart of this controversy is DBCT:s embracing of orthodox theory's notion that firms are gambles that sometimes fail. DBCT thereby introduces the concept of luck, which is not only hard to model but also unscientific. On the other hand, the notion of luck is rather intuitive, and it is more the task of business science rather than economics to explain why "optimal" investments in strategy and production sometimes lead to failure (or why some firms fail to adopt an "optimal" strategy).

The questions that need to be assessed are thus; why do some businesses fail to predict and anticipate the directions of trends and technology? What is the optimal strategy for doing this? What would happen if all firms used this strategy? (Again, answering these questions is arguably more incumbent on business science rather than on economics). The intuitive answer to these questions is luck, or better said, bad luck, which is a hopeless thing to model. A *chaos theory* framework could be used, but then again this would be controversial. Maybe the answer is that economists are too eager to model

everything, and it could be we must recognize that some important economic mechanisms are impossible to model.

The entire business cycle dichotomy would furthermore probably be complicated to assess and test, as it contains two different, distinct business cycle generating mechanisms that interfere with each other.

4. Differences Between DBCT, Modern Business Cycle Theories and Orthodoxy

As has been pointed out before, DBCT has been conceived as a part of a bigger framework called the business cycle dichotomy. DBCT is merely the notion of an intrinsically dynamic underlying economy that will co-exist with a second business cycle model that explains the mechanism by which real and monetary shocks generate business cycles that perturb and/or complement the business cycles generated by DBCT. DBCT does thus not on its own completely describe the business cycle generating mechanism. However, it could increase the understanding of DBCT if one understands on which points it differs from the two predominant schools of business cycle thought today; RBCT and various business cycle models that are Keynesian in spirit, and also from orthodoxy.

4.1. Differences and Similarities Between DBCT and RBCT

4.1.1. Differences

The most important difference between the two models is that shocks to technology and shocks in general are not given a prominent role in the DBCT, which instead focuses on the intrinsic dynamics of the system.

Voluntary unemployment is also not recognized by DBCT, and the idea of an efficient, frictionless market congruous with microeconomic theory is not central to DBTC, which does not require wages and prizes to be fully flexible, but neither relies on sticky wages and prices. This issue will be further discussed in the paragraph on the similarities and differences between business cycle theories that are Keynesian in spirit and DBTC.

Just like RBCT, DBCT suggests that efforts of politicians to remedy economic fluctuations by economic policy are likely to be inefficient, but for different reasons; the arguments of advocates of RBCT used to support this view usually center on the view of RBCT that the fluctuations of output are efficient since they stem from people rationally allocating leisure and work over time, which in turn is due to shocks to technology. By interfering with policy the government interferes with the conscious choices of workers and consumers, which is inefficient at best, and possibly harmful.

DBCT in turn does not believe that the output level is always at its natural level; recessions will have a level of output lower that the natural level due to the weeding out of less well-adapted firms. Recessions are seen as being necessary, but not necessarily as being economically efficient, as in RBCT; the higher unemployment rate of recessions does indeed hurt the economy and is not considered to be due to a conscious choice of the workers as it is in RBCT. The question here is only if it is possible for a government to curb high unemployment and low production in a recession without disturbing the renewing, evolutionary effects of recessions. Disturbing these effects would clearly be harmful, and it would also probably be impossible according to DBCT.

4.1.2. Similarities

Both theories do not give monetary issues a predominant role. RBCT provides us with a framework where monetary shocks are not considered important and where both fiscal and monetary policies are considered to have a very limited potential when it comes to remedy the economy. DBCT holds a very similar view, but emphasizes the fact that the economy is dynamic in itself; it is possible that monetary shocks of a larger scale could postpone or accelerate a business cycle; but the main feature of the theory is that nothing can eventually stop business cycles from occurring; they are the capitalist system's means to make the economy evolve.

Another point which makes RBCT and DBTC similar in spirit is that they both emphasize changes in the real economy, which is very nicely illustrated in the case of RBCT in the famous treatise "the economics of Robinson Crusoe". RBCT emphasizes shocks to technology whereas DBTC concentrates on the general evolution in technology and trends where these notions should be seen in a very wide sense. Even if DBTC does not rely on *shocks* to technology per se, one should note that evolutionary changes in technology needn't necessarily be very slow, and that they sometimes could be regarded as what RBCT would describe as a shock.

The idea that interaction between different sectors in the economy plays a major role in the propagation of business cycles is also common of both models, but whereas RBCT has been criticized for making this assumption since economists argue that it would imply that the law of large numbers would assure that the shocks to technology in different sectors would cancel each other out, this criticism is not as much of a problem for DBCT since it does not rely on shocks. DBCT does not only stress the interaction

between different sectors of producers (supply chains) but also the interaction between consumers and producers.

4.2. Differences and Similarities Between Keynesian Business Cycle Models and DBCT

4.2.1. Differences

DBCT emphasizes “endogenous” shocks that come from within the system itself, due to the intrinsic dynamics of the system. Keynesian business cycle models on the other hand emphasize exogenous shocks that affect the real economy or monetary shocks.

DBCT does not require nominal wages or prices to be sticky in order for the mechanisms of the model to work, but (somewhat) rigid nominal prices and wages are perfectly congruous with the model. Many economists were enthusiastic about RBCT since it implied a perfectly frictionless market in accordance with microeconomic theory, and also this view would work equally well with DBCT; the flexibility of nominal wages and prices is really not a major issue with this model. However, depending on how one chooses to model the “twin” business cycle model of the dichotomy, this will be of importance.

Also coordination failures are congruous with DBCT and could help to explain why recessions are persistent in a way comparable to Keynesian business cycle theories, but in order to make the DBCT model parsimonious, one should abstract from this possibility.

Many new Keynesian economists believe that fiscal and monetary policy has effects and that they can help to mitigate recessions. According to DBCT these possibilities are very limited, and could at most postpone the economic fluctuations. In accordance with Keynesian business cycle theories DBCT considers recessions to be harmful, but DBCT also implies that these harmful effects are necessary in order for the economy to develop, and that there is very little one can do to mitigate the damages caused by recessions. If economists could contrive a policy that would ensure an economic evolution without its negative side-effects this would of course be optimal, but the question is whether this really could be attained in practice.

4.2.2. Similarities

DBCT is on the whole more similar to RBCT than it is to the Keynesian business cycle models, but there are a few similarities worth mentioning.

In accordance with Keynesian business cycle models, DBCT implies that recessions have harmful effects, but in accordance with RBCT it questions whether policymakers should try to mitigate the harmful effects of economic downturns.

It also agrees with new Keynesian economists when it comes to rejecting the RBCT concept of voluntary unemployment as a cause for falling employment in recessions.

4.3. Differences and Similarities between DBCT and Orthodoxy

4.3.1. Differences

When it comes to *theory,* orthodoxy and liquidationism in particular stress the liquidation of bad investments and the reallocation of the freed-up resources as the main drivers of the business cycle, whereas DBCT instead emphasizes evolution.

Orthodoxy imagines an economy where an increasing part of the capital stock is bound up in bad investments. A recession is started when a big portion enough of bad investments has been accumulated, since these investments have to be liquidized and used to more efficient purposes.

DBCT instead describes an ongoing evolution where unfit firms are continuously driven out of the market or forced to restructure due to the competitive pressure. Even if DBCT describes a certain limit at which a big enough number of firms will exit the market to trigger a recession, exit of firms and restructuring will take place both before and after this limit has been passed (even at the peak of a boom).

Orthodoxy emphasizes the notion of resources being bound up in bad investments, which after a while will cause the economic engine to run out of gas, which triggers the recession.

DBCT instead emphasizes the survival of the fittest as the driver of business cycles; the notion that resources are being bound up in bad investments and need to be freed up is given less importance.

Orthodoxy assumes economic fluctuation to be completely economically efficient, and recessions not to be harmful in a strictly economic sense. DBCT recognizes the difficulty of having an evolution in the absence of economic fluctuations, but also the harmful effects of fluctuations.

When it comes to the *model,* orthodox models rely completely on an endogenous mechanism to explain business cycles, whereas DBCT through the business cycle

dichotomy is coupled with a business cycle model that describes how real and monetary shocks generate economic fluctuations.

Orthodoxy predicts that the general price level will fall in recessions when output is below its natural rate. The fall in the general price level will cause real money balances, (M/P) to rise, which in turn will tend to stimulate aggregate demand. Hence, output cannot deviate from its natural rate for a longer time, as movements in the price level will counter this.

This mechanism will give us a business cycle in P rather than in Y.

This is a major difference between DBCT and orthodoxy. DBCT predicts a countercyclical behavior of the general price-level (and of mark-ups), and we would have rising prices and mark-ups in recessions. Thus, the business cycle generating mechanisms of DBCT are quite different from orthodoxy's.

4.3.2. Similarities

Just like orthodoxy, DBCT considers dynamics inherent with the capitalist system to be the cause of economic fluctuations. This is the main idea it shares with orthodoxy.

Both theories doubt the efficiency of real and monetary policy when it comes to mitigating economic fluctuations. Policy could at best delay the fluctuations for some time. It is important to note that fluctuations due to shocks. i.e. fluctuations described by the second business cycle generating mechanism of the dichotomy, can successfully be countered using monetary and fiscal policy.

At the heart of both theories is also the notion that businesses are gambles that sometimes fail. The best way to illustrate this point would be to consider an economy where all firms have undertaken optimal investments in R&D, marketing, market research and production. In a model which assumes businesses as gambles that sometimes fail this set-up would still result in a situation where some firms would capture a disproportionate part of the market share and some firms would go out of the market. This notion thus introduces the concept of luck, or chance, which can be criticized for being difficult to model and for being unscientific, but which in a way also is quite intuitive.

Orthodoxy's information lag and liquidation lag described on page 11 are also part of the model, or at least concepts that are similar.

To conclude these two chapters, one could state that DBCT and orthodoxy have many commonalities when it comes to *theory*, whereas the exact functioning of the business cycle generating mechanisms of the *models* is quite different.

4.4. Conclusion of Paragraph Four: What New Ideas and Concepts does DBCT bring?

As seen in paragraph five, DBCT has a very different approach to explaining business cycles from the most popular business cycle theories of today; RBCT and business cycle theories that are Keynesian in spirit. Its main difference from these models is that it assumes an intrinsically dynamic economy that generates economic fluctuations even in the absence from shocks.

DBCT is also not a mere revival of orthodox theory; both the model described in this essay and the theories and assumptions behind it differ from earlier established orthodoxy. The main difference is that DBCT predicts a countercyclical behavior of prices and mark-ups whereas the prediction that recessions coincide with a falling general price-level is a cornerstone of orthodox business cycle theory. However, DBCT and orthodoxy are also in many ways similar in spirit.

One of the most important notions of the thesis is not in DBCT itself, but rater in the framework it is part of. The business cycle dichotomy conciliates the notion of an endogenously dynamic economy with the concept of economic fluctuations caused by real and monetary shocks.

If we start considering the interplay between these two business cycle generating mechanisms, it could maybe help us in our understanding of business cycles.

5. Summary

In this essay I have given an account of the business cycle theories of the pre-depression era and have pointed out in which ways they differ from modern business cycle theories. I have also thoroughly described these modern business cycle theories, their advantages and their shortcomings.

All this has served as a background to the goal of this essay, that is, to conceive *the Darwinist business cycle model*, a business cycle model which is built on the assumption of an intrinsically dynamic economy, where business cycles are generated by the economic system itself rather than by exogenous shocks. The Darwinist business cycle model in turn is part of a bigger framework called *the business cycle dichotomy* which states that business cycles are generated by two different mechanisms that

perturb/complement each other. One of these mechanisms generates business cycles as a result of real and monetary shocks to the economy, whereas the other describes business cycles as being generated by the inherent dynamics of the economic system itself. Because of the very limited scope of a Masters' thesis, I have limited myself to describing only this latter mechanism, which is the Darwinist business cycle described above.

In paragraph three the assumptions of the model are stated and its business cycle generating mechanism and the results that it would give rise to are described.

In the following analysis it is concluded that this model is conform to the main stylized business cycle facts. Whereas it is established that this is an encouraging finding, the result is mitigated by the fact that the DBCT is only one part of the business cycle dichotomy and has to be considered in combination with the rest of the framework in order to be thoroughly assessed.

In order to assess the viability of DBCT and the business cycle dichotomy one has to complete the framework by modeling the business cycle generating mechanism that accompanies DBCT. Testing and assessing this completed framework of the dichotomy should be quite complicated as it contains two different and distinct business cycle generating mechanisms whose business cycles will interfere with each other.

The thesis is concluded with a paragraph where DBCT is compared with modern business cycle theories and orthodoxy. It is established that whereas it has features in common with each of these theories, it also differs from each of them on several important points.

6. Conclusion

Whereas it has been impossible to present any definite, conclusive evidence in this Master's Thesis for or against the absolute viability of the Darwinist business cycle theory and the framework of the *business cycle dichotomy* that it is part of, it has been possible to reach the goal of constructing a business cycle model which is built on the assumption of an intrinsically dynamic economy. This model has also proven to be conform to the main stylized business cycle facts.

The idea to consider the economy as a dichotomy in which there is an underlying intrinsically dynamic economy that is driven by principles such as those described by DBCT, and another, juxtaposed business cycle generating mechanism, which is driven by real and monetary shocks to the economy, is interesting since it conciliates two economic schools of thought, and since it could provide an explanation for the erratic behavior of business cycles, the difficulty to model them and the difficulty to explain them as being solely the result of real and monetary shocks to the economy.

The modeling of DBCT is a first step toward modeling the business cycle dichotomy, which then in turn could be tested and assessed. If the business cycle dichotomy is found to have some merit, it could help us to better understand business cycles and the mechanisms by which they are generated.

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