THE CAUSES OF ENDOEGENOUS CRISES: HETERODOX EXPLANATIONS AND EMPIRICAL ANALYSIS

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ABSTRACT

The possibility of endogenous economic crises is an issue that divides economists. Many orthodox approaches reject the existence of this kind of crises (economic recessions are the result of exogenous shocks), while various heterodox schools of thought have conceptualised crisis as an endogenous phenomenon of the cycle. However, these schools differ on what are the causes and the origin of such crisis. The main explanations offered about the main driving of the cycle and its ultimate effect producing crisis are underconsumption, the evolution of profits, and investment. The most relevant schools that have contributed to the debate on endogenous crisis are the classical political economists, the Marxist, and the Keynesian schools of thought. However, so far, this is still a topic of intense debate among many scholars and no agreement on the factors leading to crisis has been reached. A distributed lag model is applied to a time series of profits and investment in the UK economy in order to explore for the relationship between variables. The empirical analysis does not provide robust conclusions and more discussion and debate is needed on that issue.

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1 INTRODUCTION

1.1 Motivation

Expansions and crises are two sides of the same coin, the latter being the cycle. Crises have been a recurrent phenomenon in the history of capitalism. These crises and its recurrence have been explained by exogenous shocks in mainstream neoclassical economics. In this essay, I am going to study heterodox schools who though of crisis as an endogenous phenomenon of the dynamics of the cycle. This type of conceptualisation of crisis disrupts the mainstream theoretical framework of a smooth and self-regulating cycle. Due to this conceptual framework, mainstream economics have had some issues by predicting the severity of incoming crisis.

For example, Irving Fisher, two months before the "Wall Street Crash" of 1929, denied the possibility of such event and its subsequent crisis, as he was expecting: "to see the stock market a good deal higher than it is today within few months" (Irving Fisher quoted by McNally, 2011, p. 63). The economy had to wait 25 years to see the stock market to the same heights again (McNally, 2011). In 1969, just at the beginning of the stagflation crisis, in the colloquium "Is the Business Cycle Obsolete", Paul Samuelson stated that the NBER: "has worked itself out of one of its first jobs, namely, the business cycle" (quoted by Gordon, 1986, p. 1-2). Robert Lucas, four years before the triggering of the Great Recession, declared that the macroeconomic discipline had succeeded in solving depression prevention:

> Macroeconomics was born as a distinct field in the 1940's, as a part of the intellectual response to the Great Depression. (…) My thesis in this lecture is that macroeconomics in this original sense has succeeded: Its central problem of depression prevention has been solved, for all practical purposes, and has in fact been solved for many decades. – (Lucas, 2003, p. 1)

In 2004, Ben Bernanke, the Federal Reserve chairman, forecasted an everlasting prosperity due to the perfection of state and central bank policies (Stockman, 2013). In 2007, when the subprime mortgage market collapsed, Bernanke declared he was not expecting any significant spillover to the rest of the economy.

As we can see, leading mainstream economists have failed to predict the end of the recurrence of economic crises. Criticizing this fact, Solow, in a conference in 2011, proclaimed:

> Here we are, still near the bottom of a deep and prolonged recession, with the immediate future uncertain, desperately short of jobs, and the approach to macroeconomics that dominates serious thinking, (…) , seems to have absolutely nothing to say about the problem. Not only does it offer no guidance or insight, it really seems to have nothing useful to say. – (Solow, 2011, p.12-13)

The mainstream studies the cycle as a process of small fluctuations, in which the system self-regulates, and where adjustment is done cyclically. In neoclassical economics, the cycle is not the same as a crisis or recession. Cycles are inherent and internal to the system; however, these smooth contractions and expansions can be converted into rough expansions and contractions through the effect of an exogenous shocks (Shaikh, 1990). Therefore, crises do not appear endogenously as the manifestation of the contradictions of the system, but they appear as the effect of an external cause. Without such shocks, the system self-reproduces smoothly with small fluctuations. The shocks have been described by different economists as the effects of oil prices, lunar cycles, human nature, or other factors (Tapia, 2017). Therefore, crises are not a normal event within capitalist reproduction, but the effect of external factors in the smooth cycle. In this essay, I am going to revise heterodox economic schools such as the Marxist or Post-Keynesian, that tried to understand which were the mechanisms of the cycle that caused the outbreak of crisis without the necessity of exogenous shocks. By that, the purpose is not to deny the existence of exogenous shocks. But to relegate them into a secondary position, and to study the possibility of crises without having to use such concept. Therefore, what motivates this essay is, on the one hand, the study of crisis as an endogenous phenomenon of the cycle. On the other hand, it is to study the different mechanisms of the cycle in the different schools of thought that we will revise.

1.2 Objective of the dissertation

Parting from the evidence that crises exist, in this essay I am going to try to respond to the question of which macroeconomic variable is the main driver of the cycle, and therefore, of crisis. Four macroeconomic variables as drivers of the cycle are going to be explored: Consumption, wages, investment, and profit.

To answer the research question, firstly, the following economic schools will be reviewed: Underconsumptionist, the Profit-Squeeze, Marxist, and (Post)Keynesian. The reason to analyse these different theoretical frameworks is that each one of them focused on one of the variables that are going to be treated as the main driver of the cycle.

In the second part of the essay, an empirical approach is going to be pursued in order to answer the question. For that, I am going to try the model of José A. Tapia (2013, 2015, 2017) in UK's economy. Tapia's conclusion of his empirical findings is that it is present and past profits that motive investment, and not the other way around.

1.3 Structure of the essay

The structure will be as following. First, the underconsumptionist school will be revised. The authors chosen have been Sismond de Sismondi and Robert Malthus. Both authors were precursors of the Keynesian and Marxian schools of thought. To end with this section, a modern theory of underconsumption is going to be explored. Paul A. Baran and Paul Sweezy –economists of the Monthly Review School– derived an influential underconsumptionist theory in the 20th century. Their theory was both influenced by the work of Marx and Kalecki.

Then, the profit-squeeze will follow. Within this school, wages were thought as the main driver of the cycle, and therefore, of crisis. They won notoriety during the 1970s through the work of Rashford Boddy and James Crotty. They have been regarded as Ricardian-Marxists, for the importance they give to distribution between capital and labour. In Japan, Makoto Itoh, a Marxist economist of the Kozo Uno school, defended one particular profit squeeze theory, in which interest rates and speculation play an important role. Nevertheless, the effect of wages on the economy is still the main driver, and ultimate cause of crisis.

The Keynesian and Post-Keynesian school follows, first broadly explaining Keynes' theory of the trade cycle. More emphasis is going to be drawn in Kalecki's view of the cycle. In the Keynesian literature, investment plays the major role in determining the cycle.

To end with our literature revision, the Marxian law of the falling rate of profit is exposed. As I explain more thoroughly in the corresponding section, Marx did not expose a clear crisis theory. Therefore, multiple interpretations arose from it: Disproportionality,

underconsumption, profit-squeeze and the falling rate of profit are the main crises theories that have arisen from Marxist scholars. More emphasis will be drawn in the latter, as it can be argued that it has the best explanatory capacity of the cycle. For this reason, when the "Marxian theory of crisis" is mentioned I am referring to the law of the falling rate of profit.

To end with the essay, Tapia's model (2013, 2015, 2017) is going to be applied to the UK's economy in order to explore the relationship between profits and investments. Therefore, to test the Kaleckian and the Marxian theory of the cycle. Tapia's conclusions of his own results are going to be exposed and critiqued. Applying the model of Tapia in the UK economy, little correlation and statistical significance between investment and profits is going to be find. Therefore, we will find little, if any, evidence to support either the Kaleckian or Marxian theory of the cycle.

2 HETERODOX EXPLANATIONS OF CRISES

Nowadays, mainstream theories of the business cycle assume the idea that crises or recessions are caused by exogenous shocks. However, it has not always been like that. Theories of the endogenous cycle were, during a long time, at the center of the debate. The main controversy among classical authors was precisely about the possibility of crises. Marxist authors assumed that crises were an intrinsic characteristic of capitalism. Also, during the Keynesian revolution the mainstream theory of the cycle was an endogenous one. As neoclassical economics became the new mainstream, theories of the endogenous cycle have been marginalized. In this chapter, I proceed to review some of the major contributions to the theory of endogenous crises in the theory of economic thought.

2.1 The underconsumptionist theories of crises

One of the first theory of crisis that we can encounter in the history of economic thought lies on the underconsumptionist theories, which can also be described as overproduction theories. Underconsumptionist theories are defined by Bleaney (1978) as those containing two crucial elements:

(1) The idea that the economy naturally tends to depression without offsetting factors.
(2) The above is a result of a tendency towards an insufficient demand for consumption goods.

Two authors are chosen in other to revise such theories: Sismondi and Malthus. First, they are being chosen as they represent two of the three main branches of underconsumption theories defined by Schumpeter (Bleaney, 1978): Malthus represents the over-saving theory type theory. This theory attributes gluts to a level of saving-investments leaving no motive to increase production. On the other hand, Sismondi fits the mass poverty type. This theory attributes gluts to the inability of labour to buy its own product.

Secondly, they are chosen as they serve as precursors of the two main schools of thought treated in this dissertation. On the one hand, Malthus serves as a precursor of Keynes as it is discussed in Rutherford (1987) and, therefore, a precursor of the Post-Keynesian school. On the other hand, Sismondi, as Grossman **(**1955) or Jiménez (2012) note, is a precursor of Marxist economic theory.

2.1.1 Debating Say's Law

Before entering into both theories, it is necessary to describe the law of markets, most famously known as Say's law. This law is the conceptual framework on which mainstream economists operate. Most importantly, the distinct crisis theories that are going to be analysed are constructed as a divergence from this law.

Say defines that the value depends on the cost of production and utility, giving a more important role to the latter. Value is determined by exchange, where it equals price. This exchange only takes place if sellers and buyers have different subjective evaluations of the utility of the exchanged commodities. Price is the position of equilibrium of supply and demand (Groenwegen and Vaggi, 2003; Calderón, 2015). Say's law argues that money is not a necessary instrument for there to be exchange, it just facilitates the transaction. Abstracting money from the equation, commodity exchange is just the exchange of one commodity for another. Say explains that the purchasing of a commodity can only be done by the sale of another. Therefore, each offer generates its own demand. As Say writes it:

> The sum of the revenues of all the individuals which make up a nation makes up the revenue of that nation. It is equivalent to the gross value of all her products. – (quoted by Vaggi and Groenwegen 2003, p. 121)

As Vaggi and Groenwegen (2003) note, this formulation entails that the production of a good causes the creation of a demand of equal value. This has a major consequence in the issue treated in this essay, which is the impossibility of a general glut. As Calderón (2015) shows, Ricardo supported Say's law. According to this law, production is a mean to make demand effective. Ricardo argued that a general glut is not possible. Ricardo asserts that overproduction in a sector is possible, but price mechanism and its respective outflow of capital would correct it. Capitalists who can not derive profit from their own sector due to market saturation would invest in other profitable sectors, setting an average rate of profit (Calderón, 2015).

For the interests of this paper, the most important consequence of this law is the impossibility of an endogenously created crisis (Tapia, 2017). Crises can be a result of exogenous factors. Bad policymaking or decreasing returns of land serve as examples. The important point is that crisis cannot be created due to the instability of the capitalist system. This idea will be questioned by the authors treated in this essay.

2.1.2 Simonde de Sismondi

The Swiss economist Sismonde de Sismondi is arguably the father of crisis theory. He is regarded by Marx as the last classical author, alongside Ricardo. Some economists (Calderon, 2015; Bleaney, 1976; Meek, 1951) regard Sismondi's crisis theory as one caused by the impoverishment of the working class. This, in turn, creates general gluts, which is a crisis created by a general overproduction of commodities.

Grossman (2018) and Jiménez (2012) provide a more profound insight of Sismondi's crisis theory and establish that the impoverishment of the working class is not the root cause of such crisis but rather its trigger. I am going to focus on this interpretation of Sismondi. To understand Sismondi's view, Grossman analyses the concept of equilibrium of the economic mechanism, in other words, the equilibrium between consumption and production. As marked above, classical economists as Smith or Ricardo determined that there is a tendency of the productive apparatus to adapt to the size of the population and its needs (Calderón, 2015). The regulator of such equilibrating mechanism is free competition.

Sismondi criticises this theory. To do so, by abstraction, he defines two systems: with and without exchange. He asserts that in the systems without exchange, use value (intrinsic wealth residing on goods) is determined by the labour contained by the commodity. In this system, an increase in production entails an increase in wealth, since men only work to satisfy their own needs. In the system with exchange goods are no longer produced for their use but for their exchange. Exchange value becomes different from use value. Sismondi derives a very important idea in Marx: the difference between exchange and use value. In this system, production takes place in order to generate exchange value, which Sismondi regards an abstract idea. The essence of the capitalist system is not the production of use values, but the accumulation of this abstract exchange value. In the capitalist system each producer produces with imperfect information, meaning that he does not know people's needs, and therefore the tendency towards maximising production appears. Sismondi asserts that the error of classical economists: "stems entirely from the false principle that makes the annual output, in their eyes, the same thing as the income" (Sismondi quoted by Grossman, 2018, p, 84).

According to Sismondi, this error impeded classical economists to understand saturation of markets. The harmonious equilibrium described by classical economists only takes

place in the system without exchange in which the functions of production and consumption are dependent and correlated as people produce to satisfy their own needs. In the exchange system these functions become independent and uncorrelated, and needs are no longer the regulator of production. In such system, capitalist profit becomes the regulator, meaning that exchange value is now the regulator of the economy.

According to Sismondi's value theory, value results from the relation between the needs of the society and the amount of socially necessary labour to satisfy them. Given imperfect information and the separation of the society into different uncorrelated and independent functions, production is random (Bleaney, 1976). Excessive quantity of labour (production exceeding total social needs) has no purchasers and generates no value. This brings down the price of the commodity with excess quantity of labour. Contrary to classical economists, who asserted that there would be an equalization between sectors, Sismondi states that in this situation the capitalist will produce even more quantity in cheaper prices in order to regain his losses. To reduce the costs of production, the income of the workers must be reduced. Overproduction then appears. It follows that overproduction goes hand by hand with the reduction of income. All this happens in a competitive environment in which capitalist depend on creating exchange value to survive.

From this standpoint, the origin of the disruption is the fact that exchange value is used to establish the number of workers necessary for production. As each capitalist enlarges production in relation to the cheapness of labour force, an excessive number of workers is employed on a reduced wage. Annual production increases while demand does not, total income of the working class is diminished which derives in an overproduction crisis. The disruption does not appear on the underconsumption of the masses as the initial cause, but on measuring economic categories with exchange value. This exchange value is measured by labour, but labour does not constitute the real substance of exchange value, but of use value (Grossman, 2018). The last cause of crisis is not, from this point of view, the pauperization of the masses, but the profit (exchange value) as the regulator of the economic mechanism instead of the real needs. Overproduction and pauperization of the masses are its consequence. Imperfect information and a flawed adjustment mechanism do play an important role too.

> It is the confusion between the estimation of a use value and that of an exchange value which is at the heart of the deception of modern systems of chrematistic– (Sismonde de Sismondi quoted by Grossman, 2016, p.101)

This is an endogenous theory of crisis. It is the inherent tendencies of the development of capitalism which causes the general gluts.

The economic policies implications derived from Sismondi are mainly enhancing internal demand by redistribution. Sismondi was a strong defender of State intervention. Sismondi does not express trade as a solution. Trade is only a solution if it serves an outlet for overproduction. For that to happen, a country must export more than it imports for them. Therefore, it cannot be a solution for all.

2.1.3 Robert Malthus

Malthus was an English economist, most famously known for his theory on demography. Yet, he also had a well-formed theory of underconsumption crisis. Meek (1951) stresses that Malthus theory of labour is more developed than that of Sismondi. Understanding his theory of value is fundamental to be able to understand his theory of crisis.

Malthus dissented from Ricardo's theory of labour value, as he asserted that commanded or embodied labour do not determine value. Value is determined by supply and demand and is measured by labour commanded. Under perfect competition, value equals market price. To earn profit, the commodity must command greater amount of labour than that embodied in it. Ultimately, this means that productive workers[1], which is a category implemented by Smith, cannot buy back its production since selling price must exceed the wage cost. As capitalist tend to accumulate capital, which is a classical term for saving and invest, the capitalist relies on unproductive consumption to make the effective demand enough for their supply:

> The demand of those employed in productive activities can never alone furnish a motive to the accumulation of capital – (Malthus quoted by Vaggi and Groenwegen, 2016, p. 302).

[1] Classical political economists' difference between productive and unproductive workers. Smith defined productive labour as these producing vendible goods, and unproductive referring as services. Marx defined productive workers as those that produced labour surplus.

As Bleaney (1976) collects, Ricardo and Malthus discuss this topic. Ricardo states that accumulation of capital is subordinate to effective demand, meaning that investments can only be carried if there is demand for it. From Malthus perspective, overproduction crises appear when the increase in saving-investment[2] is not accompanied by an increase in effective demand due to the inability of productive workers to buy back all its product. This lack of demand weakens the sustaining of the value of output. This in turn causes profits to fall, which derives in the reduction of stimulus to accumulate, which ends up in crisis. Malthus clearly denies the notion of equilibrating mechanism stated by Say.

From this, Malthus concludes recommendations for policy-making coherent to his ideological position as a propagator of Christian political economy. Balance between production and consumption is required, but the consumption of productive workers alone will not be enough to provide the necessary effective demand to match a continuously rising productive capacity. From this it is extracted that to avoid gluts, the unproductive forces such as landlords, clergymen or servants must increase its consumption:

> Under all common circumstances, if an increased power of production be not accompanied by an increase of unproductive expenditures, it will inevitably lower profits and throw labourers out of employment. – (Malthus quoted by Vaggi and Groenwegen, 2016, p. 132)

Bleaney (1976) criticises Malthusian crisis theory in the sense that is derived from the classical perception of investment. Investment was seen as the employment of more labourers, and then portrayed as the increase in production of consumption goods. The sector producing means of production, that would see its output increased by this investment was not portrayed in this conception of investment. Forgetting the sector that produces means of production, the only extra demand comes from the labourers employed, and there is not enough demand to make this investment profitable without unproductive consumption. Schumpeter, who was a great business cycle theorist, also criticized underconsumptionist theory for such error. As wage insufficiency:

> To buy the whole product at cost-covering prices would not prevent hitchless production in response to the demand of non-wage earners either for 'luxury' goods or for investment. – (Schumpeter, 2006; p. 740).

[2] Classical political economists do not difference between the terms saving and investment.

Malthus presented here an idea that will be later exploited by Keynes and Kalecki: the insufficiency of effective demand. That is why Malthus is seen as a forerunner of Keynes (Routherford, 1987).

2.1.4 Monthly review school

Underconsumptionist theories were the first type of crisis theories to appear. Yet, they were the ones that got the hardest critiques by business cycles scholars such as Haberler or Schumpeter. Haberler hardly criticizes underconsumptionists theories, claiming that those theories are less scientific than other business cycles theories (Tapia, 2017).

Such critiques did not suffice for other underconsumptionists theories to appear. Paul A. Baran and Paul Sweezy were Marxist economists with a strong Keynesian and Kaleckian influence. They were the founders of the renowned Monthly Review School. In 1942 Paul Sweezy, in *The Theory of Capitalist Development*, made an attempt to explain crisis from an underconsumptionist perspective. In 1966, there was a second reformulated attempt, this time constructed alongside Paul A. Baran.

In this first attempt, Sweezy (1946) explained that the way for capitalist to maximise profits is accomplished through the mechanization of the productive process, which in neoclassical terms would be defined by increasing the capital/labour ratio. In Sweezy's theory, the sector that produces means of production (for example, machinery or inputs) is vertically integrated in the sector that produces goods of consumption. An investment on investment goods implies then a proportional increase in consumption goods production capacity. At the same time, the more slowly rising expenditure on wages is translated in a lesser workers consumption. In this scenario, as Shaikh (1990) shows, the capacity to produce consumption goods increases faster than its consumption, which creates a demand gap. This could be filled with capitalist consumption, but Sweezy affirms that they tend to invest more than the share of their profits consumed. Both Basu (2016) and Shaikh (1990) show that his fundamental error is to reduce the role of the sector producing means of production to just an input of the sector of consumption goods. As this production goods can be used in increasing the capacity of other producer goods production. When the demand of the investment producer sector is considered, Sweezy's theory does not hold.

In the second attempt, Baran and Sweezy (1966) correct such error. In this book it is argued that capitalism is in a monopolist stage, which tends to stagnation as the expansion

of capacity is larger than that of the effective demand. The main reason, as Duménil, Glick and Rangel (1987) assert, is that within this monopolist form of capitalism there is a partial elimination of price competition while cost competition is maintained. This derives in a rise of the outcome of production at the same time of an insufficient effective demand to *realize* such production.

There have been quite some Marxist scholars that have tried to explain crisis from an underconsumptionist perspective. Yet, Marx in the volume II of Capital shows that the primary source of expenditure, therefore of effective demand, is capitalist expenditure (Basu, 2016). Crisis cannot be explained from an underconsumption view of the workers, as according to his surplus theory, they never get their full product. Therefore, overproduction crisis must be determined by capitalist expenditure, which is formed by investment in both fixed (machinery) and variable (wages) capital and the capitalist consumption.

Baran and Sweezy use this underconsumption theory to explain the Great Depression, from this it should follow that the Consumption/Investment ratio should had fallen prior of 1929. As Keller (1975) shows, the evidence does not support such view. Actually, this ratio increased prior to the 1929 crisis.

2.2 Profit squeeze as the main driver of crises

In the past chapter, we have seen how underconsumptionists theorists argue that low consumption levels, sometimes due to insufficient wages, are the cause of crises. In this chapter, I am going to analyse a school that had an opposite point of view as of the main cause of the crisis: the profit squeeze school. In the profit squeeze theoretical framework, high wages, are the cause of the diminishing profits, which, in turn, cause the crisis. Most scholars adopt Marxist and Post-Keynesian approaches. Maurice Dobb, who was a Marxist economist, was the beginner of this approach, which was followed by other Marxists such as Peter Bell and Harry Cleaver, or by Post-Keynesian economists, such as Amit Bhaduri and Stephen Marglin. Yet, I will focus on the approaches of Rashford Boddy James and Crotty (1975) and Makoto Itoh (1978). From the Marxist approach of the profit squeeze thesis, which is the one that is going to be analysed, authors refer their theory in two passages of Capital, namely Chapter 23 of Volume 1 and Chapter 15 of Volume 3.

2.2.1 Marxist circuit of industrial capital

To understand the profit squeeze approach and its critiques, Marx's production process is going to be explained. The production process follows the following schema:

M-C...P...C'-M'

An individual who has money (M) buys productive capital (C), which is both constant (machinery, raw materials, etc) and variable capital (labour power). In Marx's theory of labour, labour power is the only commodity that can produce surplus value when used in the production process. Surplus value is the quantity of value created by workers that exceeds their own labour costs. The acquired productive capital must be brought to production, represented by P, it is here were the capitalist capital increases through the absorption of surplus value from labour. Once the production process is finished, the capitalist had obtained commodity capital C' which sells, or as Marx calls it, realizes it, converting it to money M'. The difference between M' and M (M'-M) is the surplus value obtained. In a capitalist context, there must be expanded reproduction, meaning that M'>M. Otherwise, if M'=M (simple reproduction), the firm will not be able to compete for a long time, or if M'<M, it will shortly be in bankruptcy.

Underconsumptionist crisis theory find crisis happening in the realization process: C'-M'. Profit squeeze theorists find the crisis happening either on the M-C process, meaning that there's a shortage of labour supply, therefore wage increases, or in the P process, meaning that class conflict within production obliges the capitalist to increase wages. Even if both processes can be related (an insufficient labour supply will imply a higher collective bargaining), the studied theorists choose to highlight one of these issues over the other. Boddy and Crotty have a class conflict theory while Itoh finds the cause in the insufficiency of labour supply without relying that much on class conflict.

2.2.2 Rashford Boddy and James Crotty

Body and Crotty (1975), two Marxist economists leaning to Post-Keynesianism, approached the profit-squeeze theory as a class conflict theory, so crisis are caused in P in the circuit of capital. Their theory derives from their macropolicy study, which analyses class conflict and its effects on the economy. They take into account Keynes and Kalecki's concept of full employment. Kalecki asserted that full employment would not end in a profit-squeeze as prices would be increased due to monopolistic competition,

therefore businessman could pass this extra cost to prices. Kalecki (1971) points out that even if these profit squeeze does not occur, to that end, the capitalist main preoccupation is not profit, but political and social control. Therefore, he states that full employment is not a desirable outcome for capitalists as it would raise class-consciousness of the working class and therefore deteriorate the capitalist position.

As Boddy and Crotty affirm, unlike Kalecki, Marx saw a contradiction between full employment and high profits. Boddy and Crotty take such asseveration to derive their theory of the cycle. For such purpose, they divide the expansion period in two phases: the early or first and the last or second phase. They analyse the labour and capital share of GDP and their developments within the two phases to explain their theory.

They state that, focusing on wage rates, it is in the latter phase of the expansion when wages grow. Wages are relevant due to their importance on determining the unitary labour costs (ULC). Checking their data, they assert that ULC grow much faster than price indices in the second period of expansions. Consequently, profits decline due to an increase of ULC in respect to prices. This is due to what they name "labour problems", understood as a deepening of the class conflict as the expansion period develops. Focusing on ULC, productivity also plays a role in their increase. During the first expansion period productivity increases, while at the second part there is a slowdown. This is partly attributable to technical change:

> Investments in the early part of an expansion are concentrated preponderantly on equipment. Equipment typically substitutes directly for labor and therefore greatly increases labor productivity and the reserve army of unemployed. In the later part of the expansion, the depletion of building space requires that the composition of investment shift towards structures. Structures have a weaker impact than equipment on labor productivity – (Boddy and Crotty, 1975, p. 8)

Going further into class conflict, they stress that full employment does not only have an effect on wages, but on quit rates and strikes. As Kalecki noted, full employment increases class-consciousness and gives the working class a stronger both political and economic bargaining power. This bargaining power is also increased through the equalization of wages along sectors that creates a more homogeneous and unified labour force, as there is less intern conflict of interests within the working class. This equalization of the wage

rate between sectors does also happen while the expansion period develops. This idea of the reduction of wage differentials is taken from Minsky.

All these changes during the expansionary period are then reflected in the factor shares, where the class struggle is materialized. Boddy and Crotty then describe the cycle: Profit share gets to its maximum in the first phase of expansion, then, due to the conflict class and productivity problems stated above, profits come under pressure and decline during the second phase of the expansion. Profits keep on declining till contraction, which is a phase of the business cycle necessary to restart the cycle again. Unemployment is key for this restart process, in which profits are augmented again. When unemployment is created, the threat of it is enough to reduce labour collective bargaining and therefore lower wages during contraction. Their approach is best summarised in the following paragraph:

> We view the erosion of profits as the result of successful class struggle waged by labor against capital - struggle that is confined and ultimately reversed by the relaxation of demand and the rise in unemployment engineered by the capitalists and acquiesced in and abetted by the state. – (Boddy and Crotty, 1975, p.1)

Body and Crotty then conclude that the function of macropolicy in the short run is not to pursue full employment, neither a stable reserve army[3], but:

> (…) its function is to ensure that the alternating pressures for expansion and contraction emanating from the private sector result in that cyclical pattern most conducive to long-run profit maximization. The goal of macropolicy is not to eliminate the cycle but to guide it in the interests of the capitalist. – (Boddy and Crotty, 1975, p.10)

2.2.3 Makoto Itoh

Makoto Itoh, who is a Marxist economist of the Kozo Uno school, develops another type of profit squeeze theory. Before, it is shown how Boddy and Crotty find the cause of the crisis in the production process (P in Marx's circuit of capital), due to class conflict. Itoh (1978) finds the cause of the crisis in the wage expansion due to labour supply scarcity, so that the cause of the crisis can be found in M-C of the circuit. Weeks (1979) regards

[3] Marx uses the concept of reserve army to refer to the unemployed or underemployed.

Itoh as a sophisticated profit squeeze theory while at the same time Boddy and Crotty are regarded as a simple one.

Marx did not develop a clear crisis theory, as he died without finishing that chapter. This has derived in multiple interpretations and formulations of Marxist theorists. As it is seen in this essay, different schools of Marxism have identified Marx crisis theory as underconsumptionist, as created by the tendency of the rate of profit fall or due to a profit squeeze among others. Itoh (1978**)** interprets that Marx developed two types of crises theories:

1. *Excess of commodity* theory, which would be identified as a underconsumptionist crisis.
2. *Excess of capital in relation to labour supply* theory, which would be a profit squeeze crisis.

From Itoh's part, he just develops further the *Excess of capital in relation to labour supply* theory, as he rejects the underconsumptionist proposal. To expose his theory, Itoh starts by describing the expansionary period of the cycle:

Itoh makes a strong assumption for the expansionary period of the cycle: Capital accumulation during expansionary periods is extensive, meaning that there is not an introduction of machinery that offsets labour. This means that expansion of capital is achieved at a constant capital/labour ratio. This type of characterisation of accumulation as extensive can be found in Ricardo. In the type of capitalism that Ricardo coexisted with, it can be argued that this type of accumulation is predominant, the same cannot be held for Dobb or Itoh's. In the following paragraph, the assumption is explained by Itoh:

> Industrial capitalists normally have fixed capitals in their production processes, making them function as a part of profit-yielding capitals. And they convert surplus- value into capital, successively, privately, and on small scales, on the basis of their already existing means of production. The accumulation of capital under these conditions proceeds normally in a capital-widening rather than capital-deepening fashion, on the basis of already existing methods of production. Attempts to gain extra surplus-value through adoption of superior methods of production are narrowly restricted, and undertaken only partially in such a process. Thus, in a period of prosperity, it is unlikely that capital will strive to

> produce relative surplus-value and to create a relative surplus population by scrapping and replacing existing fixed capital – (Itoh, 1978, p. 18)

So, during expansionary periods, within a context of extensive accumulation in which fixed capital is not replaced, there is a tendency to increase labour demand. As labour demand increases, there is a tendency of increasing wages too. This tendency arrives to a point of overproduction of capital in relation to labour supply, where both the demand for labour and wages are so high, that extensive accumulation is no longer possible. In such situation capital can only contract more workers by paying a wage that would affect its profit negatively. Itoh names this point *absolute over-abundance of capital*.

This wage increase affects prices in two different ways:

1. Prices of commodities produced in labour intensives sectors increase as there must be an equalization of profit rates among sectors.
2. Consumption goods prices and inputs to produce such goods increase if the quantity supplied of such goods does not adjust quickly.

This increase of prices create:

> Speculative stock-pilling of this commodities is carried by industrial capitals, and especially by commercial capitals, which fully utilize the elasticity of the credit system – (Itoh, 1978; p. 23)

The credit elasticity diminishes due to the increase of these speculative operations and also due to the increase of demand for credit used to meet additional payments for wages. The following scenario is a tightened money market, in which reserve funds diminish and therefore interest rates rises. Profit is therefore squeezed by the increasing wages and interest rates.

The different tendency of the profit rate and of interest rate ends in a collapse of the credit system, leading to a crisis. Itoh defines crisis as a necessary period to regain the positive conditions for accumulation. During the crisis, unemployment increases, wages decrease, and new means of production appear as fixed capital is no longer profitable and there is a need to depreciate it and replace it. Intensive accumulation takes place, meaning that capitalist investment offsets labour by fixed capital. This process further increases unemployment and decreases wages. The fixed capital replacement happens at the same time as the depression ends:

> (...) in contrast with the prosperity period, the existing fixed capitals are in general no longer profitable, and so there is pressure to depreciate them in order that they may be renewed as soon as possible. When most capitals in the main branches of production come to depreciate a large proportion of the value of their fixed capitals and amass their own money capital sufficient to invest in new equipment, then they adopt new methods of production through renewals of fixed capitals. These renewals of fixed capitals occur competitively and hence simultaneously at the end of the depression. Capitals which succeeded in adopting new methods of production are able to resume active accumulation even under the reduced levels of market prices-of-production – (Itoh, 1978, p. 26)

The following period of expansion will proceed with the given capital labour ratio of such crisis. This view on innovation is very similar to that of Schumpeter. Crises serve as a process of creative destruction.

2.2.4 Critics of the profit squeeze

There is plenty of critiques coming from other Marxist theorists to profit squeeze theorists. Shaikh (1978, 1990) criticizes Dobb's theory and Weeks (1979) criticizes mostly both Boddy and Crotty and Itoh's theory, so I will focus on the latter. Weeks criticizes that the profit squeeze theorists have not understood the Marxist concept of accumulation. Weeks asserts that profit squeeze theorists treat accumulation as if it was the same as expanded reproduction. Expanded reproduction makes reference to the purely quantitative reinvestment of surplus value (achieved in the previous production process) to the circuit of capital (M-C...P...C'-M'). This means the reinvestment of M'— which is larger than the initial M — to the circuit of industrial capital, therefore increasing its capital. Weeks argues that profit squeeze theorists consider this quantitative change without considering any type of qualitative change. Itoh characterizes accumulation as expanded reproduction with a constant capital/labour ratio (extensive accumulation). For Marx the accumulation process entails the expansion of capital and the interaction between capitals, in such process capitals tend to concentrate and centralize[4] due to competition:

[4] Concentration of capital refers to the capital accumulation through the capitalization of surplus value. Centralization of capital refers to the capital accumulation through the absorption or annexation of other individual capitals.

> In the actual process of accumulation, as each capital grows (the concentration of production), it comes into conflict with other capitals, and "the battle of competition is fought by cheapening of commodities." The discipline of competition forces upon capitals the necessity to raise the productivity of labor, which by definition involves the expelling of living labor from the production process. – (Weeks, 1979, p. 11)

Such price decrease is sought in order to find extraordinary surplus[5]. When one capital can decrease prices through technical transformation, others must follow in order not to fall behind. Thus, this process of accumulation by itself helps increase the labour supply, as it replaces labour with machinery so as to achieve a higher degree of competitiveness. Consequently, in Marx, the accumulation process is characterized by the expanded reproduction with productivity increases (by increasing K/L) and a tendency towards concentration/centralization. Capital accumulation on the one hand creates more demand for labour through its expansion, but, on the other hand, at the same time, it expulses labour due to the introduction of machinery, so it increases labour supply. Profit squeeze theorists ignore the second part of the equation. Only if the process of accumulation generates a productivity growth slow enough not to increase the reserve army labour power value can rise while the surplus value is reduced.

Weeks does also assert that the accumulation process would be impossible without increasing wages. Here, profit squeeze obviate competition between capitals once again: As unemployment decreases, increasing wages is the mechanism for capitals to redistribute most efficient labour to more efficient capitals. Profit squeeze considers increasing wages as a distributional struggle between capital and labour, while such struggle happens also between capitals.

To summarize the critique, profit squeeze theorists fail in analysing competition in capitalism among capitalists, as they focus too much in competition between labour and capital (Boddy and Crotty) or directly obviate it during the expansionary periods (Itoh). Thus, they fall in the strong assumption of describing accumulation as extensive during expansionary periods, meaning with a constant ratio of capital over labour. If we analyse competition and its effects in the accumulation process from a Marxist perspective, we

[5] Extraordinary surplus is the surplus appropriated by capital due to other capitals from the same sector lagging behind in productivity.

see that a squeeze of profits due to the increase of wages is never a cause of crisis, at most it would imply a slow-down in accumulation. Marx itself explains it here:

> Capitalist production can by no means content itself with the quality of disposable labor-power which the natural increase of population yields. It requires for its free play an industrial reserve army independent of these natural limits… The production of a relative surplus-population, or the setting free of laborers, goes on therefore yet more rapidly than the technical revolution of the process of production that accompanies, and is accelerated by, the advance of accumulation. – (Marx quoted by Weeks, 1979, p.271)

2.3 (Post)Keynesian explanations of the cycle

2.3.1 John Maynard Keynes

John Maynard Keynes was the father of the Keynesian revolution, which was triggered by the presentation of his famously known book *The General Theory of Employment, Interest & Money.* In this book Keynes presents a new Macroeconomic theory to be able to understand the economy after the change of paradigm created by the 1929 crisis. In his theory, Keynes is very critical with some economists as William Stanley Jevons, Alfred Marshall or Arthur Pigou. He referred to them as the classics.

As we have seen, Say's law assumes that savings equal investment. Keynes claims that in a monetary production economy, in what he claims to be the real economy, there are leakages, meaning that such equality does not hold most of the times. These leakages are created due to the role of money in the monetary economy as the general form of value. When households use their income for other objectives than consumption, monetary injections (investment) do not automatically counteract leakages. It will follow that the aggregate demand will not equal aggregate supply (Hein, 2015). Keynes distinguishes between the capital and the loanable funds market, therefore, denies the equality between savings and investments.

In his principle of the effective demand Keynes claims that, within a monetary production economy, the production is determined by the demand. Weeks explains such causality in Keynes:

> Businesses produce things in order to sell them. The implied causality that spending (demand) determines how much is produced (supply). – (2020)

So, in the Keynesian school, the principle of effective demand takes the place of Say's law. Through the principle of effective demand, Keynes shows that aggregate supply and aggregate demand can be in equilibrium in a point where unemployment exists. Having unemployment due to insufficient demand means that there will be idle resources in the economy, which gives rise to the necessity of government intervention. Such government intervention was completely neglected by the classics as, in their conceptual framework, economies self-adjusted to full utilization of resources.

Keynes develops his theory of the business cycle in the Chapter 22 of the *General Theory*, where he uses the theory developed during his book to explain such phenomena. The macroeconomic instability of capitalism is explained in Keynes through the uncertainty of investments, which materializes in the difference between the speculative marginal efficiency of capital (MEC) and the objective MEC and its cyclical fluctuation (Burkett and Wohar, 1987). As Keynes asserts in the *General Theory*:

> If we examine the details of any actual instance of the Trade cycle, we shall find that it is highly complex and that every element in our analysis will be required for its complete explanation (...) But I suggest that the essential character of the Trade Cycle and, especially, the regularity of time-sequence and of duration which justifies us in calling it a cycle is mainly due to the way in which the marginal efficiency of capital fluctuates. – (2017, p. 271)

The concept of uncertainty, referring to a situation of unknown probabilities, is central in Keynes' theory of the business cycle, which he calls trade cycle. Uncertainty is derived as the opposite of risk, in the latter probabilities can be assigned while in the former assigning probabilities is not possible. The speculative MEC is affected by uncertainty rooted behaviour by capitalists. The subjective MEC will be more volatile as it will be subject to: "The uncontrollable and disobedient psychology of the business world*"* (Keynes, 2017, p. 274).

During the upswing of the cycle, investors will be over-optimist, meaning that the speculative MEC will be higher than the objective one. When the MEC is overestimated, meaning that the rate of return is overestimated, there will be plenty of investments till the speculative MEC collapses, which is followed by a pessimistic period in which investments are reduced. The collapse of the MEC due to uncertainty is followed by an increase for demand of liquidity, resulting in higher interest rate, which ultimately

worsens the situation. In such cyclical movements of the economy, Keynes describes crisis as:

> The fact that the substitution of a downward for an upward tendency often takes place suddenly and violently, whereas there is, as a rule, no such sharp turning-point when an upward is substituted for a downward tendency.– (Keynes, 2017, p. 272)

From this revolution that Keynes started, a school of thought that sought in investments the main cause of the cycle was born. Economists as Hyman Minsky or Robert Oliver Matthews can be highlighted as Keynesian economists that studied the cycle. As Keynes, Minsky focuses his theory of the business cycle mostly in the financial sector. Yet, the economist that we are going to study next is Michał Kalecki, who tried to derive the cause of the business cycle in the investment decisions of the real sector of the economy.

2.3.2 Michał Kalecki

Michał Kalecki learnt economics mostly influenced by Karl Marx or Rosa Luxemburg. Yet, he is mostly known as a left leaning Keynesian economist. His first economics writings in 1933 (Kalecki, 1971) were written before Keynes *General Theory*, and Kalecki arguably anticipated some of the topics that Keynes treated. In terms of theory of the business cycle, Kalecki was a pioneer in offering a mathematical model that described the cycle.

Even if Keynes *General Theory* supposed a great deception for Kalecki, as it undermined the writing of his own book, Kalecki praised Keynes' work. In *Some remarks on Keynes theory* (1936), Kalecki defines two crucial Keynes findings. First, the determination of short period equilibrium with a given investment level and a given production apparatus. Second, the determination of the volume of investment (Targetti & Kinda-Hass, 1982). Kalecki affirms that Keynes successfully solves the first, while fails at the second. It fails as it does not consider the decision-making in investment. Keynes stresses that when marginal efficiency of capital is not equal to interest rate, a change of investment will occur that will equalize the expected profitability and the rate of interest. Therefore, Kalecki (1936) argues that Keynes determines the ex-post level of investment but has nothing to say about ex-ante investment. As we are going to see later, the determination of investment decisions is central to Kalecki work, as he describes it as "the central pièce de résistance of economics (Kalecki, 1971; p.165). As we will see, Kalecki does also

pursue a different methodology than Keynes, as the former takes into account social classes and its conflict of interests.

In the following sections, Kalecki's theory of the business cycle is going to be outlined. Even though the theory of prices and distributions was central to understand the economy, we will assume this as given. Kalecki pictured capitalist economies as oligopolistic, in which there's always idle productive capacity except, in some cases, during the boom of the cycle. In such oligopolistic economy, prices are mark-up over costs, this mark-up is determined by the degree of monopoly of the firms (Sawyer, 1985). Therefore, changes in prices are derived from changes in costs and the degree of monopoly.

In order to fully understand Kalecki's theory of the business cycle, it is necessary to broadly explain its principle of effective demand. To derive his theory of effective demand, Kalecki (1971) made use of Marx reproduction schema. Kalecki assumed a closed economy with no government activity, and with no savings by workers. In such an economy, production takes place in 3 departments: Department 1 (D1) producing investment goods, department 2 (D2) producing consumption goods for capitalists, and department 3 (D3) producing consumption goods for workers. Each department is vertically integrated, so that it produces their raw materials and intermediate components. National product (Y) is the sum of either wages (W) and profits (P) or the sum of workers consumption (C_w) and capitalist expenditure, the latter being investment (I) and capitalist consumption (C_c):

$$Y = W + P = C_w + C_c + I \quad (1.1)$$

As we mentioned above, Kalecki assumed that workers spent all their wage, therefore:

$$P = C_c + I \quad (1.2)$$

Meaning that profits are equal to capitalist consumption and investment. For the matter of this essay, it is very important to note the causal relation between investment and profits in Kalecki. Kalecki makes this causal relationship very clear in his work:

> Now, it is clear that capitalists may decide to consume or to invest more in a given period than in the preceding one, but they cannot decide to earn more. It is, therefore, their investment and consumption decisions which determine profits, and not vice versa. (Kalecki, 1971, pp. 78-79)

Therefore, Kalecki is very clear in determining a causal relationship of investment to profits (Hein, 2015). Workers expenditure determines the production of D3 while capitalist expenditure determines that of D1 and D2. Imagine that due to optimist expectations, firms expand production without, in the same period, increasing expenditure, either capitalist consumption nor investment. The value of this new level of production will be larger than the value of its sales. The latter would increase proportionally to workers consumption increase. As their extra consumption will equal their extra wages, which in turn are lower than the value of extra production, we are going to be in a situation in which low demand will bring as a consequence unsold production that will end up stocked in firms. The following period reaction by the capitalists will be to reduce its production (López and Assous, 2010**)**, as lowering prices and expanding sales is not a usual behaviour in the short term according to Kalecki. The consequence of the reduction in production will be a decrease in employment, and, therefore wages. Which in turn will lower more the effective demand, creating a vicious cycle. The crucial parts of this process is that, on the one hand, it can be reached an equilibrium below full employment and that, on the other hand, when capitalist expenditure is given and effective demand is not enough, change in produced output is by itself an equilibrating force (López and Assous, 2010**)**. The conclusion that Kalecki gets from this is that it is production the one that adjusts to demand and not the other way around. Meaning that, in the end, capitalists' expenditure will determine its sales, and therefore its profits. So, Kalecki asserts that capitalists earn what they spend.

In the scenario where there is an increase of investment, demand for investment goods will expand, leading to higher employment and wages in D1. This in turn will bring a higher demand for wages goods, leading to higher production on D3. This higher production (and demand) increases profits in these sectors. As capitalist consumption is determined by an autonomous variable (B) and one depending on profits (αP):

$$C_c = \alpha P + B \quad (1.3)$$

It follows, therefore, that capitalist consumption demand will increase, therefore increasing the production of D2. Profits and wages will have increased in all the Departments. As we have seen, investment, with a given income distribution, creates an expansive process (López and Assous, 2010).

Once the causality relationships in Kalecki have been identified, and we have seen that it is investment the crucial role determining effective demand and profits, we can start working on Kalecki's theory of the business cycle. This theory is built on his theory of investment. Yet, as we will see, there are multiple theories of investment in Kalecki, and therefore, multiple theories of the business cycle:

> It is interesting to note that the theory of effective demand already clearly formulated in the first papers, remain unchanged in all the relevant writings, as do my views on the distribution of national income. However, there is a continuous search for new solutions in the theory of investment decisions. – (Kalecki, 1971, p. VIII)

Following Steindl (1990), I am going to divide Kalecki's theory of the business cycle in 3: Those written in 1933, 1943 and 1968. I am going into detail on the first theory (1933), as it was the essay that brought more debate, as it was criticized by Frisch and Holme (López and Assous, 2010). Afterwards, the main characteristics from the 2 other models are going to be drawn, without making a thorough mathematical nor theoretical description.

In his first model, described in 1933 essays (Kalecki, 1971), Kalecki develops a particular and innovative theory of investment. In such theory, Kalecki takes into account the process and time lags in investment. Kalecki defines 3 stages:

1. Investment orders (D)
2. Production of investment goods, which is actual expenditure in investment (I)
3. Deliveries of the investment goods (L)

The relationship between investment orders (D) and deliveries (L) is clear, there is an average gestation investment so that deliveries in period t equal investment orders in period $t - \theta$:

$$L_t = D_{t-\theta} \quad (1.4)$$

During the expansionary period of the cycle, investment orders are bigger than the production of equipment (I), that in turn is bigger than the deliveries of investment goods (L) (Vaggi and Groenewegen, 2003).The increase in capital stock (K') results from the deliveries of investment goods (L) less the assets scrapped (U):

$$K'(t) = L(t) - U \quad (1.5)$$

Taking account what's exposed above, capital stock will increase during the upswing. Investment orders are a linear function of profitability:

$$\frac{\mathrm{D}}{\mathrm{K}} = f\left(\frac{\mathrm{P}}{\mathrm{K}}\right) \quad (1.6)$$

When studying the business cycle, Kalecki neglects the interest rate as he argued that even if the interest rate affected investment decision (D), it hadn't a large influence as it is implicit in Kalecki that the rate of profit is much above than the rate of interest. As the interest rate moves with the rate of profit (grows in the upswings and falls in the downswings), the rate of interest could be incorporated in the effects of the profit rate (Sawyer, 1985).

After a set of mathematical deductions Kalecki ends his theory of investment in the following equation:

$$\mathrm{D} = \mathrm{mP} - \mathrm{nK} \quad (1.7)$$

The conclusion is that investment decisions have two lagged relations that affect in two different directions. Increasing investment decisions results in an increase in both profits (P) and capital stock (K). The increase in profits will have a positive effect in investment decisions, therefore increasing them further. On the other hand, as we can see in Equation 1.6, as investments increase capital stock (K), the latter will reduce the profit rate, diminishing investment decisions. It is these two contradictory effects of investment decisions over the profit rate which creates a cyclical movement. Kalecki develops an endogenous theory of the business cycle:

> We face here one of the most remarkable paradoxes of the capitalist system. The expansion of the capital equipment, i.e. the increase in national wealth, contains the seed of a depression in the course of which the additional wealth proves to be only potential in character. (Kalecki, 1971, p. 32)

The transmission from this investment cycle to the general business cycle is created by the transmission of investment into the aggregate economic activity. For this reason, we just have to reframe the principle of effective demand. When investment production increased, that turned into an increase of demand and therefore production of all departments, increasing wages, employment and profits. As profits increase, the savings of the capitalists increases too, therefore increasing investment further (Vaggi and

Groenewegen, 2003). In the boom, the increase in investment decisions creates a profit rate increase that surpasses that of the lagged increase in capital equipment. This will go on till we arrive to a point where the opposite force of the increase of capital equipment will produce a cyclical downward movement by decreasing the rate of profit and, therefore, decreasing investment decisions. This will create a vicious circle that will keep on decreasing the rate of profit and, therefore, will diminish investment decisions further. This downward movement will decrease investment decisions, to a point were assets scrapped (U) will be larger than the delivery of investment goods (L), this will produce a recuperation of the rate of profit (P/K) as its denominator, capital equipment (K), will start decreasing, producing a new upward cycle.

Observing Equation 1.7, we note that the equation of the business cycle is a mixed difference and differential equation (Steindl, 1990). This creates some mathematical issues in the dampening of the cycle and its long-term growth. Frisch noted this, and there was a debate revolving the mathematical derivation and implications of the Kaleckian business cycle. For the matter of the essay, this debate obliged Kalecki to undertake some adjustments in his theory.

In his 1939 model, Kalecki (1971) makes a crucial innovation in the theory of endogenous business cycle theory by installing a non-linear function in the dynamic system. Due to Frisch criticism of his anterior model, Kalecki inserts exogenous shocks into his model to explain the cyclical behaviour. Therefore, even though the model is non-linear, it is only semi-endogenous. (Lopez and Assous, 2010). Thanks, in part, to Kaldor's suggested theory in 1940, Kalecki quickly changes his model in 1943. This is the second version of the business cycle that Steindl (1990) differentiates. This theory is influenced by the recent publication of Keynes *General Theory*. It is again a non-linear model in which there are no exogenous shocks, therefore it is an endogenous model. Instability in the system is explained by entrepreneurs' expectations. The effect of the profit rate as unique determinant is replaced by the principle of increasing risk and marketing prospects (Steindl, 1990**)**. The principle of increasing risk acts as an *ex ante* limitation to investment and is created by imperfect competition in capital market. In this version the entrepreneur's private capital acts as an investment factor (Lopez and Assous, 2010). Marketing prospect are represented by the increase of profits resulting from an increase of sales in the current period. Market prospects are negatively affected by increase in capital, as it means an increase in competition which undermines the volume of profits

(Steindl, 1990). The effect of capital equipment on profit rates and investment does not have such an important role in this version, as Kalecki asserts that capital stock does not have significant fluctuations.

Thus, we arrive to the latest version, from 1968, in which Kalecki affirmed being innovative and correcting its errors in respect with past versions. In this version of the business cycle innovation and technical progress are introduced. Every year there is an increment of capital due to new investment and there is a change in the volume of profits. This change of the volume in profits is divided between the new capital and the old one, being the new capital more efficient. The shift of profits depends on the productivity differential between capitals. In this version, Kalecki recuperates the mechanism of the upswing and downswing of the first version, meaning that investment changes with the rate of profit and capital equipment, but with a crucial change, it is the marginal profit of new investment the only one relevant for the mechanism of the business cycle. As Steindl notes: "In spite of moderate fluctuations in the capital stock, the feedback of accumulation does operate, because the changes in profitability are concerned on new investment" (1990, p. 143). Therefore, with the introduction of innovations and technical change, Kalecki operates here with marginal quantities, meaning profits increment. The most important point about Kalecki's different theories of the business cycle, is that, as Minsky asserted, *investment leads the cycle*. Meaning that we can find the principal cause of the business cycle in investment.

To sum up, Kalecki operates under the principle of effective demand, in which capitalists ultimately get what they spend. From this standpoint, Kalecki derives numerous business cycle theories. From which we highlight the three discussed by Steindl (1990). The first one, is based on the contrary effects of investment on the rate of profit, and the retroactive effects of the latter in investment decisions. The second, leaves the rate of profit into a secondary position, adding the Keynesian term of expectations. The last one is similar to the first theory. But with the difference that, in order to solve the fact that equipment stock does not fluctuate much, Kalecki works with marginal quantities in the last theory. This is done by adopting the concepts of innovation and technical change. The main conclusion is that investment takes the lead as the explicative factor of the cycle.

2.4 The tendency of the rate of profit to fall

2.4.1 Karl Marx

As it is known, the German economist Karl Marx left his work unfinished. Marx's theory of the crisis was left unfinished too. This seems quite paradoxical taking into account that the purpose of Marx's work is to illustrate the inherent contradictions of capitalism. These contradictions come into being and become more evident when crises arise. This lack of a thorough and concrete explanation opened the possibility for multiple interpretations. During the start of the 20th century, the main debate in Marxist theory of crisis was between the so-called disproportionality theory and the underconsumptionists. The crisis of the 1970s served as a turning point. Profits became central in the explanation of the crisis. From there on, the law of the tendency of the rate of profit to fall as cause of the crisis has been central in the Marxist debate.

In this dissertation this theory is highlighted over the others for two main reasons. On the one hand, due to the debate going on in Marxism around this theory. On the other hand, a theory of crisis must serve as an explanation of the cycle, which Marx observed it to be of 10-12 years of duration. I would argue that, starting from the Marxist theoretical framework, the upward period of the cycle can only be explained by the law of the rate of profit. As Mattick argues, taking a Marxist standpoint:

> The expansionary period would be inexplicable if underconsumption and disproportionalities per se led to crisis, for then the crisis would already been the last. – (1981, p.66)

Marx was not the first to analyse the law of the tendency of the rate of profit to fall. It was one of the central topics in classical economy. Adam Smith derived this law from the growing competition over scarce investment possibilities. David Ricardo asserted that the fall in the rate of profit was caused due to the rise in wages, which was caused by the diminishing returns of land (Clarke, 2016). Marx accepted their conclusion, that being the fall in the rate of profit, but not their explanations for such fall. Instead, Marx sought the explanation for the decreasing rate of profit in the accumulation process.

Marx draws the possibility of crisis in a very similar manner as Keynes. Marx denies the neutrality of money in Say's law. The role of money in Marx opens the possibility of the interruption of the sale-purchase circuit and the possibility of hoarding. Such scenarios

would provoke an overproduction crisis. This analysis of the possibility of crisis does not constitute its theory of actual crisis (Hein, 2015).

Marx asserts that the reinvesting of the surplus value in the production process is not an option for the capitalist class. The pressure of competition between capitals obliges them to constantly accumulate in order not to fall behind to the competition. This is what Marx calls *accumulation per accumulation* (Fernández and Alegre, 2018). There is two ways for the capitalist to enlarge its surplus value, in absolute and relative terms. Absolute surplus is increased by enlarging the workday, so if the workday has 8 hours, enlarging it to 9 is the way to augment the absolute surplus. This option has unsurpassable biological and socioeconomic limits. Relative surplus is augmented when an increased labour productivity is achieved through mechanization, less hours of production are needed to cover labour consumption, meaning that variable capital (V) is reduced. Imagine the case in which the workday is constituted of 8 hours, 4 of them are used to produce the necessary commodities of labour consumption (V) and 4 more hours are used to produce surplus value (S). A way to increase relative surplus would be to decrease the necessary hours to produce the labour-consumption goods to 3, therefore increasing surplus value to 5 hours. The mechanization process that permits this relative surplus value increase is labour shedding. It will increase the constant capital (K) that the variable capital (V) operates with, meaning that the ratio of machines and raw material over worker will increase. The increase in the relative surplus finds its limit in the class struggle for absorbing productivity gains in the real wage.

Marx introduces two concepts that are central for understanding the law: the organic composition of capital (OCC) and the rate of exploitation (ROE). The organic composition of capital is the proportion between constant capital (K) and variable capital (V):

$$\mathrm{OCC} = \frac{\mathrm{K}}{\mathrm{V}} \quad (2.1)$$

The rate of surplus value or rate of exploitation is the relation between the surplus value (S) and variable capital (V). It shows, therefore, the surplus value obtained by each unit invested in variable capital:

$$\mathrm{ROE} = \frac{\mathrm{S}}{\mathrm{V}} \quad (2.2)$$

Both ROE and OCC are complementary expressions of variations in productivity. The proportion of both variables vary during the accumulation process. On the one hand, when the production process is further mechanized, the proportion of constant capital over variable capital increases, increasing the organic composition of capital (OCC). On the other hand, mechanization increases labour productivity, so the rate of exploitation (ROE) does also increase. Both of this phenomenon brought by the accumulation process relate to the rate of profit (ROP). The rate of profit is the surplus value obtained in relation with the capital (both constant and variable) invested in the production process:

$$\mathrm{ROP} = \frac{\mathrm{S}}{\mathrm{C}+\mathrm{V}} = \frac{\frac{\mathrm{S}}{\mathrm{V}}}{\frac{\mathrm{C}}{\mathrm{V}}+1} \quad (2.3)$$

As we see in Equation (2.3), the rate of profit can be explained as the relation between the rate of exploitation (S/V) and organic composition of capital (C/V). As value is solely created by labour, and capitalists have to increase their organic composition of capital in order to be able to constantly compete in the market, this rise in the composition of capital, other things equal, will decrease the rate of profit. This tendency is counteracted by the increase in the rate of exploitation.

On the one hand, there is not a clear limit to the increasing of the organic composition of capital. On the other hand, the increase in the rate of exploitation is limited by the fight of labour for higher real wages (Clarke, 2016). Even if fight did not exist, and in the unreal situation in which workers did not receive any compensation (V=0), the limit would be S, which is limited by the limits of the absolute surplus value.

As we have seen, the profit squeeze theorists wanted to derive the theory of crisis from the increase in real wages (decrease in ROE). They assumed a constant composition of capital during expansionary periods, and therefore the decrease of the ROE brought by the increase of wages would reduce profits. Defenders of the law of the tendency of the rate of profit to fall, such as Anwar Shaikh (1990, 2016), Paul Mattick (1981) or Andrew Kliman (2015) argue that, when Marx derived such law, he denied this Ricardian mechanism of the law. They argue that Marx wanted to prove, contrary to Ricardo, that the negative effect of the organic composition of capital on the rate of profit would decrease the latter even though the wages were decreasing. Marx wanted to reject Ricardo's mechanism of the law. We see that Profit Squeeze theorists find in the class

struggle the driving mechanism towards crisis. The defenders of the law of the falling rate of profit focus on the competition between capitals as the main driver of the law. The effect of this competition between capitals is the constant increase of the OCC.

This law asserts that there is a tendency for the rate of profit to fall. This does not mean that this law does always impose itself, as there are countertendencies. What it does mean is that, ultimately, the tendency will overcome the countertendencies. As Charchedi and Roberts (2018) note, Marx named 5 major countertendencies: (1) Increasing the intensity of the ROE (2) The cheapening of constant capital brought by productivity gains (3) The creation of a reserve army – created by the labour-shedding effect of mechanization – and its effects on wages (4) Foreign trade (5) Depressing wages below their value. The one that has brought more debate within Marxism circles is (2). Marx took the increasing of constant capital over variable capital over time as a stylised fact, implying that even if the productivity effects were going to reduce the value of constant capital, it would not be enough to deny the law. Shaikh (1990) algebraically derives this.

The other major debate surrounds the Okishio theorem. Okishio was a Japanese Marxist economist who derived an algebraic theorem which shows that the rate of profit will not fall due to the accumulation process. Okishio asserts that capitalists would not make an investment to end up losing profits (Basu, 2017). Algebraically, the theorem is not debatable. Therefore, the critics of the Okishio theorem have attacked the assumptions over which the theorem is derived. The most notorious critique, that of Shaikh (1990), questions the competition model that Okishio assumes. Shaikh shows that the Okishio theorem is derived over the neoclassical theory of perfect competition, in which firms are price takers. Shaikh (2016) shows that in the theory of competition in Marx firms are price setters. This is achieved through cost reduction with the aim to absorb extraordinary surplus and to kick competitors out of the market through lowering prices. This is mainly done through mechanization of the production process, therefore by raising the OCC. "The battle of competition is fought by the cheapening of commodities, which in turn rests on raising the productivity of labour*"* (Marx quoted by Shaikh, 1978, p. 241). Within this competition theory, it is the same to improve the quality of the commodity with the same cost than being able to reduce costs and therefore reduce price (Shaikh, 2016).

When a capital is able to lower its price through an increase of productivity, it will absorb huge gains in the short term (extraordinary surplus). Other capitals will have two options, either mechanize their production process and be able to cut costs to lower their prices or

be driven out of the market. Once the other capitals have followed, the organic composition of capital will have increased, and therefore the average rate of profit of the industry will have decreased. This is the mechanism with which competition between capitals pushes down the rate of profit.

So far, it has been described what causes the rate of profit to fall, but we have not explained how do crises origin. The fall in the rate of profit originates, in the long term, a decreasing mass of profits. This transition from increasing to decreasing mass of profits is, at the same time, the transition from the expansionary period of accumulation to crisis. This point of stagnating or decreasing mass of profits is characterized as *overaccumulation of capital*, as an investment of constant capital is not compensated with its correspondent increase in profits. In such point, the rate of profit is equal to the rate of interest. This low profitability in the productive sector triggers firms to redirect towards short-term financial and speculative activity (Shaikh, 1990). As firms observe this fall in the rate of profit more or less simultaneously, the increasing mass of money directed towards the financial sector drive stock prices up, creating financial bubbles. Marx described the financial sector as unproductive, meaning that surplus value circulates within the sector but is not produced there. From this it follows that this process only defers the crisis, as surplus value in the productive sector is still relatively insufficient compared to the capital invested. As investors realize that the assets are not worth what they are paying, the bubble bursts, and with it, the crisis does burst too. How this process happens and the patterns followed depends mostly on conjunctural factors. It is important to note that, even if in form it seems that crises are originated in the financial sector, the essence of the crisis lies in the insufficient surplus value created in the productive sectors.

When the crisis begins, firms get bankrupt, and real and fictitious capital[6] get destroyed. During the crisis period there is a devaluation of constant and variable capital, therefore the OCC falls. Crises are a necessary moment to re-establish the necessary conditions for accumulation, and therefore restart the cycle.

Some Marxist sought to find in this law the end of capitalism and its transformation into socialism. Quite far from that, Fernández and Alegre (2018) assert that the only thing Marx observed was that, under his theoretical construct, capitalism is a dead end. This

[6] Marx uses the term fictitious capital to describe assets whose value does not correspond to any real capital. The best example being State bonds.

does not mean that, without the participation of other agents, society can not stay indefinitely in this dead end. The fact that, as Marx observes, the increasing productivity of labour manifests itself as a decreasing profitability of capital, is an absurdity. Yet, there is nothing that indicates in Marx work that this absurdity can not stay indefinitely through recurrent cycles of booms and slumps.

To end with this section, it is important to note that in Marx the causality is inverse than that of Kalecki. It is the profits that determine the level of accumulation, as accumulation is the reinvestment of the surplus value (profits) produced in the production process. Therefore, in Marx, as in other authors as Mitchell or Tinbergen, profits lead the cycle.

3 EMPIRICAL ANALYSIS

In this section of the essay I am going to focus in the Marxian and the Kaleckian models. In order to do so, the models of Tapia (2013, 2015, 2017) are going to be tested for the United Kingdom. Tapia uses a distributed lag regression model in which he regresses profits and investments. With that model, Tapia tries to give some insights on the relationship between investments and profits. The causality between these variables are the cornerstone of Kalecki's and Marx's theory of the cycle, and therefore, theory of crisis. Tapia applies his model to the US economy.

The major findings of Tapia are that there seems to exist a strong effect of past profits to present investments in the US. Past investments do not have such strong effects to present profits and are not as strongly correlated. Finally, the Granger causality tests show a causality link from profits to investment, the same is not found the other way around. These causality results speak in favour of Marx's theory of the cycle, as Marx defined the causality link from profits to investment.

All the empirical work of Tapia is done using US data. Most Marxist study of the cycle or crisis does not go past descriptive analysis. Only few, as Basu and Manolakos (2013) perform econometric analysis. Yet, all of these are concentrated also in the US. One of the major reasons is that the NIPA offers a very detailed dataset.

In the empirical part of the dissertation, the causality link found in Tapia is going to be tested for the UK. I feel it is important to start implementing these models on other economies than the US, in order to see if it is a common behaviour of the cycle, or it is entangled in conjectural issues and peculiarities of the US economy. Therefore, it is important to check for external validity of these findings.

3.1 Data

The data used in the following empirical analysis is to be found in the Office of National Statistics (ONS). Both the Gross Fixed Capital Formation (GFCF) and the Gross Operating Surplus (GOS) of private non-financial corporations are to be found in "GDP quarterly series". GFCF serves as a proxy for investment, GOS as a proxy of profits. This data goes from quarter-1 of 1955 to quarter-1 of 2016. To confirm the results of these dataset, the same regressions are performed on Net Operating Surplus (NOS) of private non-financial corporations and Business Investment (BI) of private business from quarter-

1 of 1997 to q-4 of 2019. The major difference between GOS and NOS is that the latter counts for capital depreciation. The major difference between GFCF and BI is that the latter does not take into account public investment, plus it does also not take into account private business dwellings and costs of ownership transfers of non-produced assets. NOS and BI are a more accurate description of profits and investment. As a counterpart, the dataset of NOS and BI is much smaller, therefore containing less observations.

Profits is used instead of rate of profit. This is because, on the one hand, Tapia does use profits. On the other hand, Kalecki and Marx have different definitions of the rate of profit. In Marx, the ROP is defined as the returns of capital invested, both constant and variable. Kalecki does not take the investment of variable capital (wages) into account. The main difference when using profits instead of the rate of profit is that, while in Marx, the rate of profit tends to fall during the expansionary period, the volume of profits grows, and only starts to fall before the crisis. This is something that, as will be commented later, Tapia did not consider when withdrawing his conclusions.

3.2 Methodology

The model that is going to be used is a distributed lag model. The interest of this model is to analyse the role that investment and profits have in determining each other. The relationship between both variables is central in both Kaleckian and Marxian theories of the cycle. In the Marxian theory of the cycle the causal relationship goes from profits to investment. In the Kaleckian theory the causal relationship runs the other way around. This model helps to shed some lights on the causal relationship. As Tapia shows, this model permits us to understand what effect past profits and investment have on determining each other.

Both variables are non-stationary. Profits and investment were log transformed and converted into first differences. This equals to working with rates of growth (Δ). Once this was done, the Augmented Dickey-Fuller (ADF) test showed no unit roots. The Engle-Granger two-step cointegration analysis showed no cointegration among variables. In the distributed lag model, the rate of growth of profits is going to be regressed on investment growth and its growths in past quarters (lagged investment growth). Then, the regression will be conducted the other way around, using the same model:

$$\Delta Y_t = \alpha + \sum_{k=0}^{r} \beta_k \Delta X_{t-k} + \varepsilon_t \quad (3.1)$$

Therefore, both Y and X will take the form of investment (I) and profits (P). I will be represented by gross fixed capital formation (GFCF) and business investment (BI); P by gross operating surplus (GOS) and net operating surplus (NOS); Δ will account as the change of the given variable between quarter t-1 and quarter t; ε_t is the error term; and r the number of lags. Therefore, the change in Y will be regressed against the change in X on the current period t and its lags r. This will show what is the current and past effect of the growth of X over Y. The model will be run from 0, to r lags. The Akaike criterion will be used in order to point out which number of lags is more reliable for the model.

With this model, Tapia's findings are that change in present and past profits have a positive and significant effect on investment. In Tapia's analysis, Akaike criterion is met at its best when regressing investment with present and 5 profits lags. With such number of lags correlation amounts for 44%. Analysing the regression, the other way around, Tapia finds that lagged effects of investment have no significant effect on profits, and the coefficients have a negative sign. He concludes that "If past investment were determining present profits, we would expect significant and positive lag effects of investment on profits" (Tapia, 2013, p.16). I would argue that this finding does not concord with neither of the two theories. As in Marx, past levels of investment, increasing productivity of work, even if ultimately decrease the rate of profit, increase the volume of profits – till the end of the expansionary period. As we are operating with volume of profits, this non-statistical significance from past investment to profits, from my point of view, does not support any of both theories. Tapia argues that such findings do support Marx theory, as present investments are determined by past level of profits. I hold that, even if the causality link, in Marx, does not go from investment to profits, past investment plays a role in present profits, as recalling Marx theory of competition, capitalists are obliged to invest in order to derive any profits, even if this ultimately lowers its rate of profit. Moreover, I would not say that the finding that past level of profits determine levels of present investment is evidence against the Kaleckian theory of the cycle. Recalling once again the theory of investment decision of Kalecki and the effects of past investment decision on present level of, this evidence does not undermine it. A past positive level of profits would increase past investment decisions, therefore increasing present levels of investment.

Tapia ends his analysis with a Granger causality test, this shows that profits help to predict investment with a high significance, and in all lag specifications. While causality from

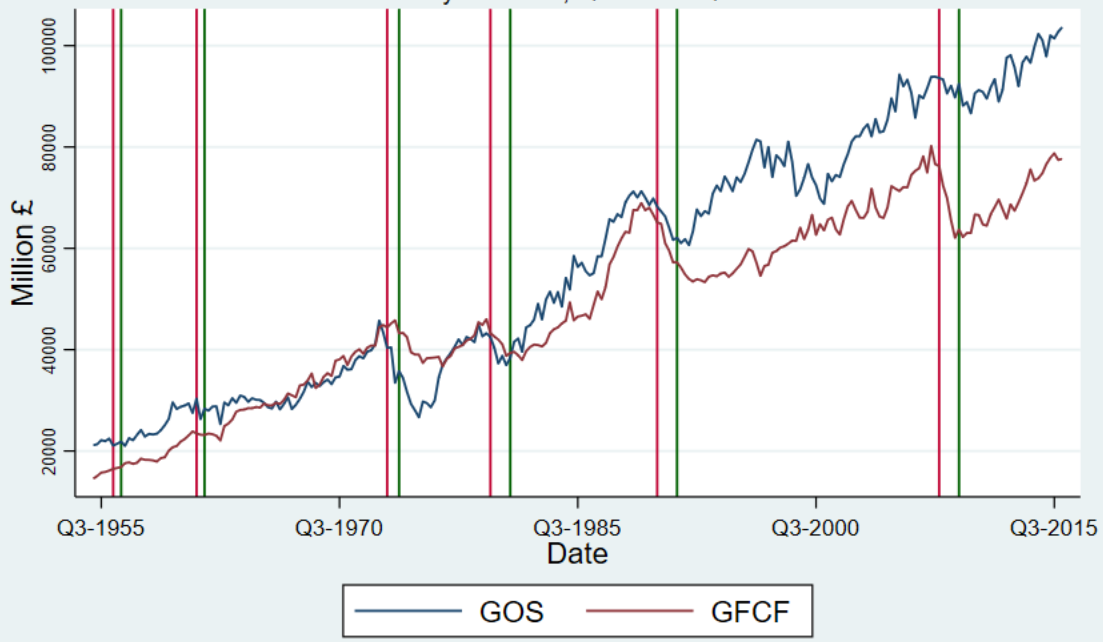
profits to investment is supported, the causality on the other direction – investment to profits – is not supported. Tapia argues that this evidence supports the Marxian theory of the cycle. I agree with this.

In the follwoing regression analysis, the distributed lag model is going to be applied in the UK economy to see if the causal relationships described by Marx and Kalecki hold. Moreover, the interests to performing this regression in the UK data is to see whether the results that Tapia derives do hold outside the US.

3.3 Descriptive Statistics

To start with, Figure 1 plots the inflation-adjusted gross operating surplus and gross fixed capital formation over time. The beginnings and endings of recessions have been marked to see how these variables behave prior to such events. The red line marks the beginning, while the green line marks the end of the recession. Recessions are defined as two consecutive quarters of negative economic growth.

Figure 1: Gross Operating Surplus (GOS) and Gross Fixed Capital Formation (GFCF)
£ base year=2013, Q1-1955 - Q1-2016



Source: Own elaboration from Office of National Statistics (ONS)
Red line= Beginning of recession; Green line= End of recession

Both GOS and GFCF do not fall severely prior to mild recessions, such as those of 1956 and 1961. Yet, there are huge slumps for both variables prior and during major recessions, as those of 1973 or 2007-08. Usually, both variables start falling before the recessions starts, and in most cases, we see how GOS falls earlier than GFCF. Tapia (2013, 2015,

2017) asserts that this is evidence in favour of Marx's theory of the cycle and against the idea that investment leads the cycle:

> These figures do not seem to support the idea that causality runs from investment to profits, since on average profits reverse their growth and start falling several quarters before investment does. – (Tapia, 2013, p.15)

First, it must be clarified that in the US data that Tapia observes, the distance between the fall of profits and that of investment is larger. When deriving the mean of the values and investment within pre-recession quarters, Tapia notes that profits falls two quarters earlier than investment. Nevertheless, I would argue that this fact does not determine the causality that Tapia asserts above if the Kaleckian investment theory is considered. The theory of investment decisions is, for Kalecki, the central issue of political economy of capitalism, and it is his biggest innovation. If we consider this innovation, it could be asserted that investment decisions at t-1 affects, in two opposite directions the rate of profit at t, this rate of profit will then, among other variables, determine investment decisions at t, which in turn will end up determining investment at t+1. So, taking investment decision into account, the Kaleckian causality relationship from investment to profits does not get falsified if profits fall earlier than investments, as both are determined by previous investment decisions, which are not tangible in the macroeconomic figures.

Exploring descriptive statistics, both theories should give not different visible results. I would argue that they are not that different when inspecting macroeconomic variables. In both Marx and Kalecki, it is the effect of investment (accumulation) on capital stock (organic composition of capital) that affects the rate of profit, which determining future investments, causes the economy to fluctuate. The way both economists arrive to these conclusions, its theories, the causal relationship, and its policy implications are very different. But, when analysing how do these both variables move during the cycle, I would conclude that they are not that different. During the expansionary period, both variables increase, to a point, where profits start falling- due to different reasons according to each theory- and the investment consequently fall too.

Having said that, the fall of both variables previous to the recessions infers the effect that both variables have in triggering the recession.

3.4 Regression Analysis

The regression analysis permits to observe whether there are any effects between the independent variable and its lags and the dependent variable. Therefore, to see if present and past levels of profits (investment) have a statistically significant effect on investment (profits).

Let us now see the results of applying such model in the UK economy. Tables 1 and 2 show the results of the regression analysis. In Table 1, GFCF is regressed on GOS. In regression A, no lags are added, in regression B, the dependent variable is regressed on the present value of the independent variable plus one lag, and so forth till we arrive to G, where 6 lags are added. As we see in Table 1, following Akaike criterion, it is regression B has the most statistical quality. In all regressions we see that some lags have significance, yet, correlation is very low. For regression B correlation is 6.8%. Meaning that present and past profits only amounts to a 6.8% for the change in investment. This value of the adjusted R^2 differs much from that of Tapia, that is always around 20-40%. As the sign is positive, it would be interpreted as present and past changes in profits having a positive and significant effect on present investments. Yet, the small correlation indicates us that there are other variables that play much a bigger role in determining investments.

Table 1: Gross fixed capital formation regressed on corporate profits

Lag	A	B	C	D	E	F	G
0	0.141***	**0.175*** **	0.173***	0.164***	0.166***	0.164***	0.161***
1		**0.124*** **	0.121***	0.111**	0.104**	0.105**	0.101**
2			-0,011	0.010	0.001	-0.005	-0.003
3				0.084*	0.100***	0.090**	0.083*
4					0.062	0.080*	0.070
5						0.073*	0.093**
6							0.080*
R^2	0.0402	0.068	0.0633	0.0741	0.078	0.0863	0.0957
AIC	-1007	-1009	-989	-999	-944	-990	-987

*** P < 0.01, ** P < 0,05, * P < 0.1

Source: Own elaboration from Office of National Statistics (ONS)

In Table 2, profits are regressed on investment. Once again following the Akaike criterion, model A is the best fit. Meaning that adding lags do not offer any extra statistical value to the system. Adjusted R^2 is even smaller, signalling that the correlation between

present and past investment and present profits is small. Even, as I argued, this falsifies both theories, Kaleckian theory of investment would take the worst hit by these findings. As the theoretical positive effects that investment have on profits, on which the Kaleckian theory of the cycle (and of effective demand) is build, is disregarded.

Table 2: Corporate profits regressed on gross fixed capital formation

Lag	A	B	C	D	E
0	0.312***	0.313***	0.308***	0.316***	0.318***
1		0.135	0.133	0.142	0.145
2			0.028	0.303	0.03
3				-0.07	-0,07
4					-0.02
R^2	0.0402	0.0447	0.0397	0.0384	0.034
AIC	-814	-809	-803	-798	-792
*** P < 0.01, ** P < 0,05, * P < 0.1					

Source: Own elaboration from Office of National Statistics (ONS)

The signs of the coefficients are not very different of those of Tapia. Yet, the lag selection regarding to Akaike criterion and the correlations do differ a lot to the findings of his regressions based on the US data. This may be, in part, due to the difference between corporate profits calculated by the Bureau of Economic Analysis (BEA) and gross operating surplus. The latter does not take capital depreciation into account. To check the robustness of these results, the same model is conducted more accurate data: net operating surplus and business investment, from 1997 to 2019. This dataset has a big counterpart, which is his small number of observations. Yet, the indicators are more accurate not only for taking into account capital depreciation, but as business investment neglects the public sector. The results of using this alternative dataset are shown in Table 3 and Table 4.

Table 3: Net operating surplus regressed on business investment

Lag	A	B	C
0	0.0797	0.068	0.0645
1		-0.037	-0.029
2			0.022
R^2	0.0049	-0.0013	-0.0198
AIC	-298	-293	-287
*** P < 0.01, ** P < 0.05, * P < 0.1			

Source: Own elaboration from Office of National Statistics (ONS)

Table 4: Business investment regressed on net operating surplus

Lag	A	B	C
0	0.200	0.224	0.196
1		0.190	0.192
2			-0.084
R^2	0.0049	0.0105	0.0023
AIC	-214	-211	-206
*** P < 0.01, ** P < 0.05, * P < 0.1			

Source: Own elaborations from Office of National Statistics (ONS)

Both Tables 3 and 4 show even smaller (sometimes negative) adjusted R^2 and non-statistically significant coefficients. We find therefore, no statistically significant relationship between both variables. The results from Tables 1, 2, 3 and 4 do not fit both Kaleckian and Marxian theories.

Concluding the empirical analysis, the results of Tapia's model do not provide any robust evidence supporting neither of the two theories of the cycle exposed. Present and past profits do seem to have a significant effect within the first dataset used. Nevertheless, the correlation is much lower than that of Tapia's study. The effect of present and past investment on profits is not statistically significant. So present and past investments do not play a role in determining profits. Therefore, there is a need to add more variables so to understand the behaviour of both variables. None of both theories of the cycle are supported by the evidence shown. Yet, the descriptive statistics show us that both variables may have an important role in the triggering of the recession. Summarizing, when using Tapia's model in the UK economy, no robust conclusions are found.

4 CONCLUSIONS

After the crisis of 2007, economists often criticised the unreliable outcomes of the dynamic stochastic general equilibrium (DSGE) models the academia had been modelling with. These models are built upon microeconomics neoclassical foundations of rational optimizing agents. From a general equilibrium standpoint, stochastic shocks are applied. The theoretical strength of such models was the capability to fit the data in them and its predictability power. Yet, they failed to predict the 2007 crisis, and were criticized for that.

This lack of predictability and, to some extent, the lack of confidence from the mainstream circles themselves against these models, motivated the dissertation to review endogenous theories of the cycle. In such theories, the profound fluctuations of the economy are created due to the functioning of the economy itself. Ultimately, the shock is not exogenous, but endogenously created. In the case of Marxism political economy, for example, the financial crisis (shock) is the result of the malfunctioning of the real economy. The explanations of the cycle and the crisis - rather than their predictive power - have been exposed. From the standpoint of the rational optimising agent, which operates in a perfectly competitive market, crisis may be the hardest phenomenon to explain. This may explain the recurrent use of exogenous shocks to explain such events.

One of the main differences between mainstream and heterodox theories of the cycle is that, in heterodox economists, crises can be a necessary phenomenon. If we take the case of the profit squeeze theorists, or of the falling rate of profit, crises are a necessary event that creates the necessary conditions for the upcoming expansionary cycle. The implications of parting from this conceptualisation of the crisis in policymaking has huge differences.

The dissertation started with the underconsumptionist school. Malthus and Sismondi's theories are explained. Such theories sought in the insufficiency of consumption the cause of crisis. The underconsumptionist theories had major shortcomings. Even so, they served to introduce some terms that were later used by others. While Marx used the Sismondian differentiation between use and exchange value, Keynes' inherited Malthus insufficient demand. So, these schools serve as an introduction to the two schools on which I have focused within the dissertation: Marxism and Keynesianism. The underconsumptionist chapter ended by reviewing the thesis of the Monthly Review School and the critiques it

received. Even though, empirically, their theory was proven wrong. *Monopoly Capital* by Baran and Sweezy predicted the following transformations of the capitalist system, namely financialization.

The profit squeeze school followed. There is more than one profit squeeze thesis. Nevertheless, the common denominator is the decrease in profit caused by a raising wage. This thesis had major shortcomings, both theoretically and empirically. From a Marxist theoretical perspective, it failed to recognize competition amongst capitals, while blindly focusing on labour-capital conflict. And so, it failed to recognize the constant innovation process that capitals carry out during all phases of the cycle. On the empirical side, prior to the 2007 crisis, the labour share constantly decreased (ILO, OECD). This evidence is contrary to the profit squeeze thesis.

The Keynesian and Kaleckian approaches differ from the previous profit squeeze thesis. The principle of effective demand is central in these theories of the cycle. Derived from this principle, the paradox of thrift shows that the mechanism of an increasing wages to profits is opposite from that of the profit squeeze theorists. Starting from this theory of effective demand, which is a common denominator in both Keynes and Kalecki, the latter derives the theory of investment decision. This theory is crucial to derive its theory of the business cycle. Once mixing the theory of effective demand and of investment decisions, Kalecki derives a theory of the cycle in which the main driver of the economy is investment.

The revision of literature ends with the Marxian law of the tendency of the profit rate to fall. While Keynesian and Kaleckian literature derive crisis as a moment of insufficient investment, the Marxian analysis is derived from the contradictions of accumulation (investment) itself. This law observes how the increasing organic composition of capital ultimately decreases the rate of profit. Firms act as price cutters, so increasing productivity, and therefore increasing the organic composition of capital is an obligation. As the rising of the composition of capital overcomes the countertendencies, there is a constant flight from the real economy to the financial markets. According to this theory, the crisis, which in form is a financial crisis, in essence is a crisis of the real economy. In such theory, profitability is the main driver of the cycle.

Once the mechanism of the cycle of these theories has been understood. In the empirical part, I have focused on the Kaleckian and the Marxian theories of the cycle. Using Tapia's

method, the causal relationship between investment and profit has been analysed. Marx and Kalecki infer opposite causal relationships.

Not only have I used Tapia's model, but also criticized the conclusions extracted from its findings. When deriving those, Tapia does not consider neither Kaleckian investment theory: the importance of investment decision taking. Nor he is considering the fact that he is regressing the mass of profits, not the rate of profit, which in Marx has related but different macroeconomic dynamics. From this Tapia rushes to conclude that its findings support Marx's theory.

The results of the model applied in the UK find a low correlation between profits and investment, meaning that there is a need to deepen the statistical analysis with other variables. We find that lagged profits are statistically significant while lagged investments are not. Yet, our second dataset provides an even smaller correlation and no statistically significant coefficients.

I conclude that there is an urgent need for Kaleckian and Marxian theorists to expand their statistical analysis beyond the US. Most of the econometric analysis' done by Marxist economists is using US' data. If Marxian theory is right, it should not only hold for the US, but for the rest of capitalist economies of the world, the same can be said for the Kaleckian model.

Personally, from this dissertation I take away the need to keep on studying the crisis as an endogenous phenomenon of the cycle. The heterodox schools I discussed in this dissertation offer profound insights for the analysis of the economy.

Even if the empirical analysis carried out in this essay does not support these theories, I feel that the necessity of studying the cycle and its crisis in an endogenous way is still desirable. This entails the relevance to understand the common denominator and the characterization of this phenomena, rather than the particular sociohistorical contexts in which they occur. As Weeks writes: "Economic crises are unquestionably the most complex moments in the life-cycle of capitalism" (1979, p.280). The mainstream conceptualization of the crisis is limited to stochastic shocks to a self-adjusting economy. Understanding the crisis from different perspectives will help us to understand such complicated phenomenon, which seems difficultly reducible to an exogenous shock.

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