A study on the effect of functional distribution of income on aggregate demand

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Abstract

In this thesis, we study the causal relationship between functional distribution of income and economic growth. In particular, we focus on some of the aspects that might alter the effect of the profit share on growth. After a brief introduction and literature review, the empirical contributions will be presented in Chapters 3,4 and 5.

Chapter 3 analyses the effect of a contemporaneous decrease in the wage share among countries that are major trade partners. Falling wage share and wage moderation are a global phenomenon which are hardly opposed by governments. This is because lower wages are associated with lower export prices and, therefore, have a positive effect on net-exports. There is, however, a fallacy of composition problem: not all countries can improve their balance of payments contemporaneously. Studying the country members of the North America Free Trade Agreement, we find that the effect on export of a contemporaneous decrease in the wage share in Mexico, Canada and the United States, is negative in all countries. In other words, the competitive advantage that each country gains because of a reduction in its wage share (to which is associated a decrease in export prices), is offset by a contemporaneous increase in competitiveness in the other two countries. Moreover, we find that NAFTA is overall wage-led: the profit share has a negative effect on aggregate demand.

Chapter 4 tests whether it is possible that the effect of the profit share on growth is different in the long run and in the short run. Following Blecker (2014) our hypothesis is that in the short run the growth regime is less wage-led than it is in the long run. The results of our empirical investigation support this hypothesis, at least for the United States over the period 1950-2014. The effect of wages on consumption increases more than proportionally compared to the effect of profits on consumption from the short to the long run. Moreover, consumer debt seem to have only a short-run effect on consumption indicating that in the long run, when debt has to be repaid, consumption depends more on the level of income and on how it is distributed. Regarding investment, the effect of capacity utilization is always larger than the effect of the profit share and that the difference between the two effects is higher in the long run than in the short run. This confirms the hypothesis that in the long run, unless there is an increase in demand, it is likely that firms are not going to increase investments even in the presence of high profits. In addition, the rentier share of profits – that comprises dividends and interest payments – has a long-run negative effect on investment. In the long run rentiers divert firms' profits from investment and, therefore, it weakens the effect of profits on investment.

Finally, Chapter 5 studies the possibility of structural breaks in the relationship between functional

distribution of income and growth. We argue that, from the 1980s, financialization and the European exchange rate agreements weakened the positive effect of the profit share on growth in Italy. The growth regime is therefore becoming less profit-led and more wage-led. Our results confirm this hypothesis and also shed light on the concept of cooperative and conflictual regimes as defined by Bhaduri and Marglin (1990).

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Declaration

I declare that, except where specific reference is mentioned about the contribution of others, this dissertation is a result of my own research work and has not been submitted for any other degree at the University of Glasgow or any other institution.

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1 - Introduction

Two of the main macroeconomic trends that characterised western industrial countries during the last decades of the past century are a substantial increase in income inequality and a decrease in the rate of economic growth (Smeeding 2002, Picketty and Saez 2006 and Hein 2015).

The aim of this thesis is to study the effect of the rising trend in inequality on economic growth. In particular, we will study three aspects of the relationship between income distribution and growth that have been partly overlooked by the relevant literature. We will try to answer the following three sets of empirical questions:

A. *Do changes in the distribution of income in a country have any impact on other countries' economic growth? If so, is this positive or negative?*

B. *Do the effects of changes in the distribution of income on a country's economic growth differ over the short and long-runs? If so, in what ways do they differ, and what is the source of the difference?*

C. *What factors can cause a change from a 'co-operative' to a 'conflictual' growth regime? What is the impact of this change?*

Before we start to address the above questions it is worth noticing that, in the last century, the relationship between income distribution and economic growth has been one of the main themes of the economic debate. In fact, most books on growth theory have a chapter that tries to answer the following question: does growth have an effect on the distribution of income?

Probably the most famous argument in this regard is the Kuznets hypothesis[1]. In 1955, the Nobel laureate Simon Kutznets argued that the process of economic development causes, in its initial phase, a rise, and later on a decrease, in income inequality. The inverted U shape of the evolution of inequality is said to be due to the migration of workers from traditional sectors to industrial ones. Indeed, when economic development begins, most of the population is employed in rural activities which are characterised by a low level of marginal product and thus low income per capita. However, during the development process more and more workers migrate to cities and start working in the industrial sector where the marginal product is higher than in agriculture. Thus, the difference between the income of the rural and urban populations increases, as does the level of inequality. Finally, when a country completes its industrialisation process**,** most of the

[1] The Kutznets curve is more properly a relationship between output per capita and inequality rather than between growth and inequality.

population works in the industrial sector, hence, inequality decreases because most people now earn a higher income.

Until the late 1990s, both theoretical and empirical studies on this topic seemed to confirm Kuznets' view on the evolution of inequality. In fact, an inverted U relationship was usually found between levels of GDP and income inequality (Fields 2001). However, these results were obtained using cross section regressions that are probably not appropriate to test a relationship that evolves over time. When Ravaillon (1995), Deininger and Squire (1998), Schults (1998) and Angeles (2010) tested the same hypothesis using panel data, the findings failed to support Kuznets' theory. After controlling for country-fixed effects, the inverted U relationship is no longer significant. It seems that previous empirical results were driven by the presence, in the samples, of Latin American countries. Indeed, Latin America is characterised by high levels of inequality and average levels of income per capita (Field 2001). Moreover, both Deininger and Squire (1998) and Angeles (2009), using time series regressions for each country, find that this relationship is not statistically significant and that many countries show a U relationship instead of an inverted U one.

More recently, however, the World Bank is supporting the thesis that growth is not a determinant of income distribution. Dollar and Kraay (2002, 2004) provide some evidence that suggests that the neoliberal growth agenda does not have an effect on the distribution of income. Analysing panels of countries for over forty years, they found that there is a one-to-one relationship between the share of income of the poorer quintile of the population and the average income. Growth does not affect the distribution of income. These results are however often criticised even by supporters of free trade. Nye et al (2008) for example point out that the one-to-one relationship between average income and income of the poor is only an average relationship: the vast majority of countries in the panel deviate from the one-to-one relationship. Moreover, even if the average income of the poorest quintile was increasing at the same growth rate of the income of the richest - since the level of income of the highest quintile is higher than the level of income of the poorest quintile - income distribution would actually become more unequal.

The measure of income inequality used in the studies mentioned so far describes how income is divided between households (or individuals). Since the "unit of analysis" of neoclassical models is the representative agent, it makes sense that they focus on how income is distributed among individuals without any distinction. This is one of the biggest methodological differences between the neoclassical and many of the heterodox schools. The theoretical and empirical analysis of the Marxist and post-Keynesian school is mostly a class analysis. That is, the focus of the analysis is not on the behaviour of fictitious representative agents but on the different behaviour of different

social classes. For this reason, even though the personal distribution of income is not entirely discharged, the analysis in the Marxist and pos-Keynesian tradition is focused on the functional distribution of income. With functional distribution of income, we refer – broadly speaking - to the division of income between profit and wage earners. The rationale for dividing society into classes is that capitalists and workers have different economic behaviours and roles. In spite of this distinction, an increase in functional income inequality usually corresponds to an increase in personal income inequality because most profit earners have a high personal income while wage earners are in the lower part of the income scale.

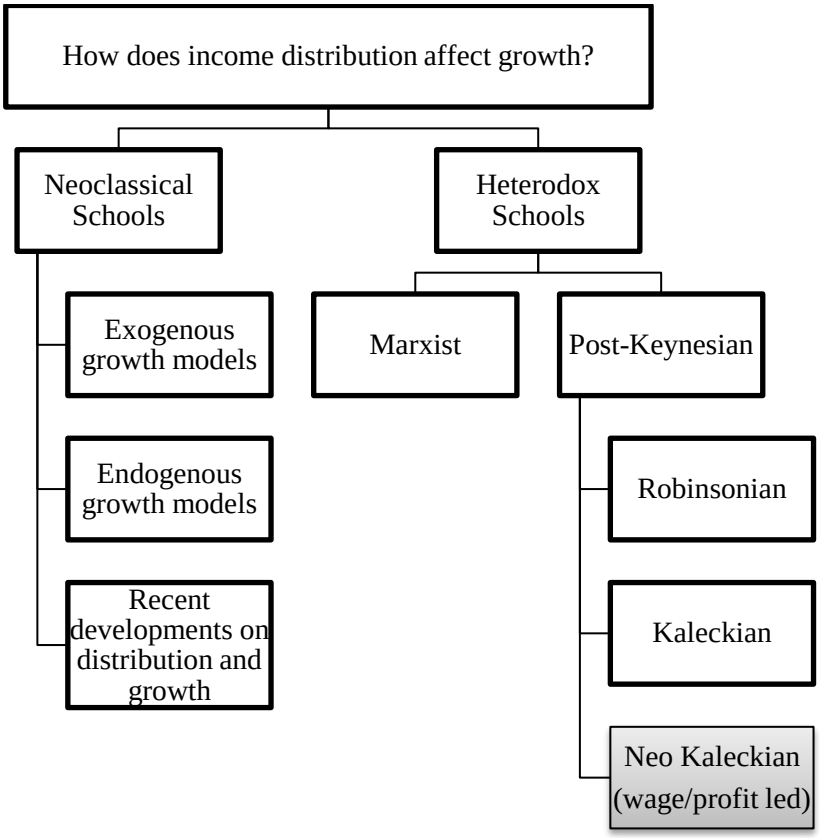
According to the heterodox tradition, the share of wages can move either counter-cyclically and cyclically with respect to income. From a Marxian perspective for example, an increase in growth rate, which increases employment, reduces the reserve army of labour and increases the contractual power of workers which has a positive effect on their wage (Thirlwall 2002). On the other hand, according to Kalecki (1971), the distribution of income between workers and capitalists depends on the mark-up pricing decision of firms. The wage share is negatively related to the mark-up that firms charge on top of unit variable costs. The mark-up in turn is positively related to the overhead costs which are relatively high during a recession. Therefore, when growth is high, overhead costs are low, the mark up is low and the wage share is high (Hein 2015)[2]. We will further discuss the relationship between mark-up and wage share in Chapter 5.

What has been presented so far on the effect of growth of inequality only scratches the surface of the vast debate that exists in literature both within and between different schools of thought. In the remainder of the thesis we will not discuss this issue further - except briefly in Chapter 5 – because, as stated at the very beginning of this introduction, our empirical analysis focuses on the opposite direction of causality: what is the effect of a change in the distribution of income on growth?

[2] Assuming for simplicity that labour is the only variable cost, prices are set adding a mark-up to the variable costs: $P = (1 + z)Wa_0$. Where W is the money wage rate, a_0 is the inverse of labour productivity (hours worked divided by output) and z the mark-up. Rearranging, the price equation, the share of wages is equal to $\psi = \frac{Wa_0}{P} = \frac{1}{1+z}$. It is easy to notice the mark-up has a negative effect on the wage share. Therefore, anything that has a positive effect on the mark-up will have a negative effect on the wage share and vice-versa. According to Kalecki (1971), two of the main factors that influence – positively and negatively respectively - the mark-up are overhead costs and the bargaining power of labour labour. Empirically, Stockhammer (2012) finds that growth has a statistically significant negative effect on the adjusted wage share. He argues that this result could be justified by the fact that in the short run prices are probably more responsive than wages to growth: the denominator of ψ rises while the numerator falls.

Figure 1.1 summarises the main voices of this debate which will be analysed in more depth in the next chapter. On the mainstream side there are two contrasting sets of arguments. The growth models "à la Solow" imply, indirectly, that a more unequal distribution of income is associated with a higher steady-state level of income per capita and that an increase in inequality will cause a temporary increase in the growth rate until the new steady-state level is reached. Since the end of the 1980s however, some new theoretical models found a negative relationship between inequality and growth. The main channels through which inequality influences growth are endogenous fiscal policy, political instability, capital market imperfection and the size of the domestic market. Also among the Heterodox schools there are no common views on the overall effect of inequality on growth. The main Marxian argument is that since investment depends on the profit rate, inequality is positively related to growth. On the other hand, the-Post Keynesian prediction on the effect of functional distribution of income on growth is not well defined. Initially Robinson (1962), because of the assumption of full capacity utilization, implied a negative relationship between wage share and growth. During the 1980s, as the assumption of full capacity utilization was relaxed, Kaleckian models predicted a positive relationship between wage share and growth. Finally, during the 1990s, most models allowed for both a positive and a negative effect of the wage share on distribution.

Fig. 1.1: *The debate on the effect of income distribution on growth*



This thesis will contribute to the debate on the effect of inequality on growth by trying to answer the three sets of empirical questions (*A*, *B*, *C*) stated at the outset of the present chapter from a neo-Kaleckian standpoint and it is organised as follows.

To contextualise our contribution, the next chapter briefly survey the relevant literature as schematised in Figure 1.1.

Chapter 3 delves into the set of questions *A* on the between-country effects of income distribution on economic growth. More specifically, it analyses an aspect that is particularly relevant for the neokaleckian literature: "What is the effect of a contemporaneous decrease in wage share among countries that are major trade partners?" As highlighted by the post-Keynesian/Kaleckian school, wages play a double role in the functioning of the economy. On the one hand, wage share has a positive effect on consumption because wage earners consume a larger proportion of their income compared to profit earners. On the other hand, wage share is negatively related to both investment and exports. A decrease in wage share – which corresponds to an increase in profit share – increases profitability and retained profits and therefore it has a positive effect on investment. Similarly, a decline in wage share is associated with a lower unit labour costs which makes export less expensive and therefore more competitive. However, decreasing labour costs are a global phenomenon and not all countries can improve their balance of payments at the same time. This chapter studies the effect on aggregate demand and trade of a contemporaneous decrease in wage share of income in the members of the North American Free Trade Agreement. Testing the effect of a contemporaneous change in the distribution of income in NAFTA is realistic because, in spite of a stable rise in real income per capita, the real hourly wage in the manufacturing industry remained steady, or decreased, since the late seventies in the United States, Mexico and Canada. Consequently, the wage share - that is the portion of total income received by wage earners - decreased as well. Specifically, the adjusted wage share[3] was constant in the US and Canada from 1960 to 1970 and then it decreased by about 10% until 2007. In Mexico instead, apart from the initial increase, the wage share fell by 30% from 1970 to 2007. Our results show that the effect on export following a contemporaneous decrease in wage share is negative in all countries. In other words, the competitive advantage that each country gains because of a reduction in its wage share (to which is associated a decrease in export prices), is offset by a contemporaneous increase in competitiveness in the other two countries. Moreover, we find that even though an increase in profit share has an overall positive effect in Mexico and Canada and a negative effect only in the United States, NAFTA is overall wage-led: profit share has a negative effect on aggregate demand.

[3] Adjusted wage share is the wage share augmented by the share of income earned by the self-employed.

This is because the negative effect of the profit share in the United States is larger than the sum of its positive effects in Mexico and Canada. The three countries, therefore, could all benefit from a - coordinated - redistributive policy in favour of wages.

In Chapter 4, we study the set of questions B on the different effects of income distribution on growth in the short run and in the long run. Using a neo-Kaleckian terminology this set of questions can be re-stated as: "does the growth regime change over the long run compared to the short run?" Blecker (2014) suggests that it is possible that in the short run the growth regime is less wage-led than in the long run. That is, growth tends to be more positively related to wage share in the long run rather than in the short run. Briefly, he argues that this could be the case because the components of aggregate demand should respond more positively to wages in the long run rather than in the short run. Firstly, consumption is, in the short run, a function of both income and debt. In the long run however, debt must be repaid and therefore income and its distribution should become the main determinants of consumption. Regarding investment, while in the short run profitability is important for firms, in the long run it is likely that they are not going to invest more unless there is an increase in demand. Finally, net exports are more likely to be positively affected by low labour costs in the short run than in the long run because of automatic adjustments that might come into play such as a currency appreciation. The results of our analysis of internal demand support Blecker's hypothesis. In the United States, an increase in the wage share has a larger positive effect on consumption in the long run than in the short run while debt has only a short run effect. At the same time, investment depends less on profit in the long run compared to the short run: not only the effect of capacity utilisation is always larger than that of profits in the long run but the effect of the rentier share of profits has a long run negative effect on investment.

Chapter 5 is the final empirical chapter and will study the last set of questions (*C*). In particular, we will test two of the main intuitions of the Bhaduri and Marglin (1990) model, which is the theoretical framework for most of the empirical work on the effect of functional income distribution on growth. Specifically, we will study the possibility of a switch in the growth regime (caused by a structural break) and underline the distinction between cooperative and conflictual regimes. On the one hand, in literature the effect of functional income distribution on growth is mostly estimated as linear in the second part of the twentieth century. Instead, we make the case that this effect of distribution on growth might vary because it depends on variables that can very well change magnitude over time, even within the same country. On the other hand, the distinction between cooperative and conflictual growth regimes has been substantially overlooked by empirical research. According to Bhaduri and Marglin, a wage-led cooperative regime is one in which an increase in wage *share* stimulates enough growth to allow for an increase in *total* profits,

in spite of a decrease in profit *share.* On the other hand, a profit-led regime is cooperative if the increase in profit *share* causes an increase in growth that is large enough to cause, in spite of a decrease in wage *share*, an increase in the wage *bill* – through higher employment for example. Symmetrically, a conflictual regime is one in which an increase in profit (wage) *share* does not stimulate the economy enough to allow the *total* level of wages (profits) to grow. For the empirical analysis we use Italy as a case study. In this country, the growth rate of the wage bill was similar to the growth rate of the level of profits during the 1960s and the 1970s but from the 1980s while the former started to decrease sharply the latter remained high. This indicates that the regime was initially cooperative and that it became conflictual from the 1980s. Our hypothesis is that the demand regime in Italy was initially cooperative and profit-led. From the 1980s, however, the combination of increasing financialization and reduced net exports due to the European trade agreements weakened the effect of profits on investments and net exports. As the positive effect of profit share on aggregate demand became weaker, the increase in profit share that happened from the 1980s did not manage to stimulate enough growth to allow for an increase in the wage bill together with the level of profits: the profit-led regime became conflictual. The results of our analysis confirm our hypostasis and the intuitions of the Bhaduri and Marglin's model regarding the possibility that the nature of growth regimes might change over time. As the growth regime in Italy is becoming wage-led, the economic policy should adjust accordingly. If Italy keeps implementing policies of wage moderation the growth rate will remain low, as it has been the case since the early 2000s.

The limitation and the policy implication of our work will be discussed in chapter 6 which concludes the thesis.

2 - The debate on the effect of distribution on economic growth

Even though the empirical analysis of the following three chapters is based on a Post-Keynesian and specifically neo-Kaleckian framework, in this chapter we discuss both mainstream and heterodox theories on distribution and growth. The aim is not only to contextualise and pinpoint our contribution to the literature, but also to highlight how different schools of thought might reach similar policy conclusion. I think this chapter will show that there is some room for collaboration in terms of policy conclusions in so far as a more equal distribution of income is concerned. In this attempt to explain different arguments, I propose a division into school of thoughts that is somewhat arbitrary. The label given to each argument is however secondary to my purpose of explaining the main intuition of each approach.

Starting with our "guests", we first discuss the mainstream side of the debate.

2.1 Neoclassical models of growth

2.1.1 The Solow model

The first generation of Neoclassical growth models - à la Solow (1956) - are characterised by three main assumptions: the growth rate of population and technological progress are exogenous, investment is determined by savings as a fixed portion of output (I = S = sY) and the production function has constant returns to scale and diminishing returns to capital and labour (Thirlwall 2002). Following Neil (2009), the production function is a Cobb-Douglas

$$Y = AK^{\alpha}\,(L)^{1-\alpha} \tag{1}$$

Where Y is output, K is capital, A is the level of technology, L is the labour force, α is the elasticity of output respect to capital and 1- α is the elasticity of output respect to labour[4]. To obtain the production function per worker, (1) is divided by L

$$y = Ak^{\alpha} \tag{2}$$

Where $y = \frac{Y}{L}$ and $k = \frac{K}{L}$.

Intuitively, the growth of capital per workers is equal to investment minus depreciation *d* and the growth rate of the labour force *n*

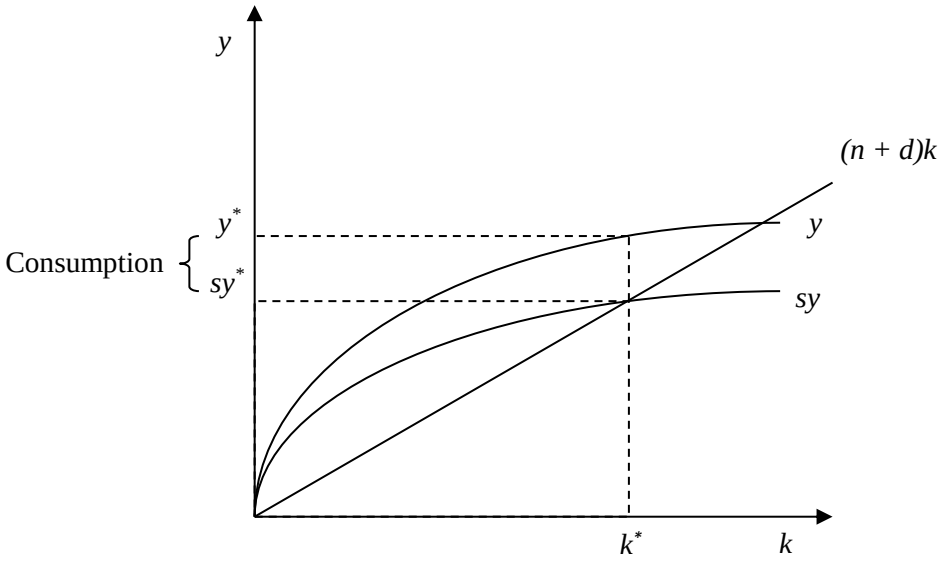
$$\Delta k = sy - (n + d)k \tag{3}$$

[4] Since in neoclassical economics the remuneration of factor of production is equal to their marginal product, α and 1- α are also the capital and labour share of income, respectively.

The equilibrium level of y^* – the steady state level – is where $\Delta k = 0$ and therefore the growth rate of income per worker is zero

$$sAk^{\alpha} = (n + d)k \tag{4}$$

Fig. 2.2: *The Solow diagram: steady state*



Solving equation (4) we obtain the steady state level of capital per worker

$$k^* = \left(\frac{sA}{n + d}\right)^{\frac{1}{1-\alpha}} \tag{5}$$

Substituting (5) into (2) we obtain the steady state level of output per equivalent worker

$$y^* = A^{\frac{1}{1-\alpha}} \left(\frac{s}{n + d}\right)^{\frac{\alpha}{1-\alpha}} \tag{6}$$

At a given steady state, the growth rate of the economy is equal to the growth rate of the labour force so that the availability of capital per worker remains constant($\Delta k = 0$). When an economy is at its steady state, only the growth rate of A – which is exogenous – can have a positive, lasting effect, on the growth rate of income per worker. A one-off increase in the saving rate, for example, would cause an increase in the steady state level of income per capita but it would stimulate only the growth necessary to reach this new steady state. This would correspond to an upward rotation of the investment curve in Figure 2.2. As we can see from equation (6) the Solow model does not directly include the distribution of income as a determinant of the equilibrium level of output per worker and of the growth rate of the overall economy. However, if we accept that the propensity to save increases with income, higher inequality will translate into higher saving rate because rich people will earn a larger fraction of income. Therefore, within this framework, higher inequality

will determine a higher level of income per capita and therefore the economy will temporary grow at a higher rate until the new steady state is reached.

Since the 1980s many growth models tried to extend the Solow model. The main reason was that the Solow model implies that sustained income per capita growth can only be achieved though technological progress which is exogenous. Without technological progress, per capita income should stabilise around its steady state level. However, the sustained increase in per capita income over that period stimulated a lot of research that tried to explain and endogenise the rate of what they thought to be the engine of growth: technological progress.

2.1.2 Endogenous growth models

The AK model is an endogenous growth model which does not endogenise technological progress but rather the growth rate. In particular, as explained below, unlike the Solow model, there is no need to assume that technology is growing at an exogenous rate in order to justify sustained per capita growth.

Let us assume for simplicity that there is no population growth and therefore there is no distinction between the evolution of per capita and overall output. The production function is similar to the Cobb Douglass function used in the Solow model with the difference capital does not have diminishing marginal return[5]. Moreover, A is the level of technology that is constant over time.

$$Y = AK \tag{7}$$

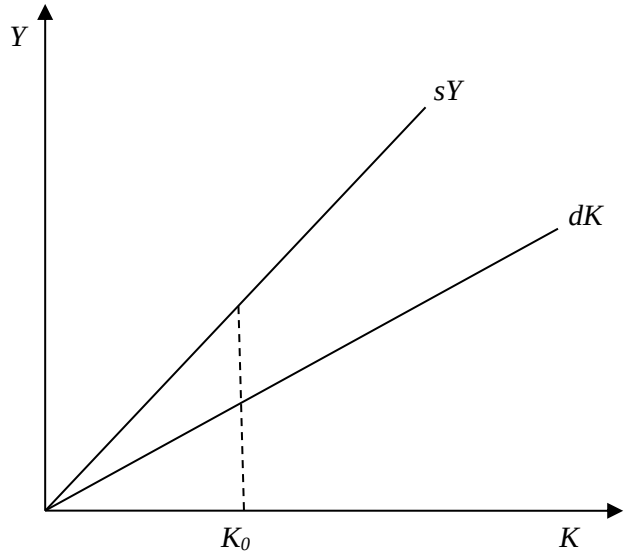
As in the Solow model, capital accumulation is equal to investment minus depreciation

$$\Delta K = sY - dK \tag{8}$$

Figure 2.3 shows the implications of this new production function with constant return to capital. If investment is higher than the depreciation of capital $(sY > dK)$, both the level of income per capita and the overall output will keep growing indefinitely. This result is due to the assumption of constant return to capital which make the production function a straight line. In fact, the marginal product of capital A, is constant and does not decrease when the total stock of capital increases. Consequently, if productivity of capital does not decrease with capital accumulation, output can grow indefinitely.

Fig. 2.3: *The AK model*

[5] In equation (1), diminishing marginal returns of capital were caused by $\alpha < 1$. In equation (7), there are constant return to capital as it is assumed that $\alpha = 1$.



This can be seen by dividing both sides of the equation (8) by the level of capital

$$\frac{\dot{K}}{K} = s\frac{Y}{K} - d = sA - d \tag{9}$$

Note that from the production function we know that $A = \frac{Y}{K}$. Moreover, by taking logs and difference (respect to time) of the production equation, we have that

$$\frac{\dot{Y}}{Y} = \frac{\dot{K}}{K} = sA - d \tag{10}$$

As we can see from equation (9), an increase in the saving rate has an effect not on the equilibrium level of output per worker as in the Solow model but on growth itself. Therefore, higher inequality, associated with larger propensity to save, will cause a long run increase in growth. Similarly, everything else being equal, a country with a more equal distribution of income will have a lower growth rate compared to a country with higher income inequality.

However, not all models of endogenous growth reach the same conclusions regarding the role of the saving rate. Romer (1986), for example, improves the Solow model by endogensing what according to Solow is the engine of growth: sustained technological progress. He does so by expressing the rate of new discoveries as a function of the population employed in research and development. The conclusion of the model is that technological progress depends ultimately on population growth. In this case, the saving rate has the same role as in the Solow model and therefore it has no effect on growth even though it has a positive effect on the level of investment per capita. In another famous model, Lucas (1988) endogenises the rate of human capital accumulation rather than technological progress. He divides the time available to each worker into time spent working and time spent accumulating skills and specifies human capita per person as a

positive function of time spent accumulating skills. As a result, a policy that redistributes workers time towards skills accumulating activities produces a permanent increase in workers' productivity. The effect of an increase in the saving rate remains similar to that of the Solow model.

2.1.3 Evidence of conditional convergence

To test the validity of the Neoclassical models we should look at how the data fit their main prediction: conditional convergence. If two countries have the same steady state level of income per worker, the poorer country will converge towards the steady state at a faster rate than a rich country. This is because, everything else being equal, a country with lower income per worker must have a lower level of capital per worker. Therefore, given the assumption of decreasing marginal product of capital, the capital of a country with less capital per person should be more productive than the capital of a country in which the capital stock per person is higher.

Let us consider the following cross-country model

$$\frac{\dot{y}}{y} = \beta_1 y_0 + \beta_2 s + \beta_3 n + \beta_4 h + \beta_5 A + \beta_6 X$$

Where $\frac{\dot{y}}{y}$ is the growth rate of income per capita, $y_0$is the income per capita at the beginning of the period under examination, $s = \frac{I}{Y}$ is the propensity to save or the investment rate, n is population growth, h is a measure of human capital, A is a measure of the technological level and X is a set of control variables. There is evidence of Conditional convergence is $\beta_1 < 0$, that is, a low level of initial income per capita is, other things being equal, associated with higher growth of per capita income during the subsequent period. Moreover, a positive and statistically significant coefficient of variables such as education and R&D would support the thesis of the new endogenous growth model that try to explain differences across countries thorough different level of technology and productivity of human and physical capital. Initial empirical studies seem to find consistent proof of conditional convergence. Two of the earliest and most influential studies in this area are the ones of Barro (1991) and Mankiw, Romer and Weil (1992; henceforth, MRW).

Barrow (1991), using a cross-country dataset of 98 countries, finds robust evidence of conditional convergence between 1960 and 1985. After controlling for primary and secondary school enrolment rates, the investment ratio, the fertility rate, the ratio of public expenditures on total income and regional dummies for Latin America and Africa, the initial level of income per capita is negatively correlated with per capita growth. Moreover, while education and the investment ratio are positively correlated with growth, fertility and government expenditures as a share of income have a negative effect on growth.

Similar results are found by MRW (1992). Like Barro (1991), they also analyse a sample of 98 countries from 1960 to 1985 but in addition, they repeat the analysis for three subsamples: non-oil countries, OECD and countries with intermediate level of income per capita. The initial level of income per capita has a negative effect on the average growth between 1960 and 1985, once the other determinants of the steady state are kept constant. In particular, the investment ratio and school enrolment are positively related with per capita growth while the sum of population growth and depreciation has a negative effect on growth. These results are robust in all the subsamples.

Further evidence for conditional convergence comes from the works of Barro and Wha Lee (1993), Knight, Loayza and Villanueva (1993), Levine and Renelt (1992), Levine and Zervos (1993). The main limitation of this studies is that their results could be biased because the initial level of efficiency and technology are not the same across countries. Most researchers tried to solve this problem using panel data rather than cross sectional datasets. Panel data analysis in fact allows to control for time invariant country specific factors as it could be the starting level of technology. For example, Islam (1995), using panel data comprising the same sample of countries as MRW, finds a faster speed of conditional convergence and a larger output elasticity of capital respect to MRW. Similarly, using different datasets, Caselli et al. (1996) and McQuinn and Whelan (2007) estimate rates of conditional convergence to the steady state level of output per capita of 10% and 6-7% which are substantially higher compared to the rate estimated by MRW (2%).

An aspect of disagreement among neoclassical studies concerns the relative weight of technological progress and physical capital accumulation in determining the growth rate. In particular, new endogenous growth models were developed because it seemed that difference in physical and human capital per person were not able to explain why growth rates of income per capita are so different across countries. In this regard, MRW find that their estimate of the Solow model augmented by a measure of education, can explain about 80% of the difference in growth rates between countries. Similarly, Alwyn Young (1994, 1995) argues that the exceptional growth of the "four Asian tigers" (Hong Kong, Singapore, South Korea, and Taiwan) was driven more by physical capital and labour rather than high productivity growth. On the other hand, most studies that use growth accounting techniques find total factor productivity to have a major role in explaining growth[6]. Klenow and Rodriguez-Clare (1997) find that human capital contributed less to growth per capita compared to what estimated by MRW. They argue that when primary school enrolment is included in the estimations together with secondary school enrolment, the explanatory power of human capital decreases. This is because since primary schooling is more homogeneous

[6] In growth accounting, total factor productivity is calculated as a residual. Precisely, it is equal to the growth rate of per capita income minus the contribution (to growth) of capital, labour and other possible factors of production.

across countries, the measure of education becomes less able to explain large differences in income per capita. Regarding productivity, they find that total factor productivity is accountable for at least 50% of the differences in income per worker across countries in 1985. In addition, the difference across growth rates seem to be explained mainly (up to 91%) by difference in total factor productivity growth. Similarly, Hall and Jones (1999) report that productivity plays a major role in determining cross-country differences in income. For example, according to their analysis, while differences in total factor productivity contributed a factor of 7.7 to the difference in income per worker between the United States and Nigeria, capital accumulation and education (schooling) contribute factors of 1.5 and 3.1 respectively. Furthermore, they argue that the underlining cause of differences in the three factors mentioned above is to be found in differences in social infrastructures. In fact, they find that capital accumulation, education and total factor productivity are positive functions of their measure of social infrastructure. This measure is an index composed of measures of protection of private property, risk of government expropriations and oneness to international trade.

Finally, it is important to point out that even though the evidence of a negative correlation between initial level of income and subsequent growth seem to be robust, there is a different explanation for this result other than the neoclassical story of conditional convergence. According to the theory of "catch-up", poor countries will growth faster than rich countries because of technological transfers. When a country has a level of technology embodied in its capital stock that is below that of the country that is the technological leader (at that moment), productivity growth will be faster in the former than in the latter. This is because reproducing existing foreign technology it is easier than innovate (Veblen 1915). As Abramovitz (1986) points out industrial latecomers, provided that they have adequate "social capabilities" necessary to be able to absorb foreign technology, will have higher rate of productivity growth compared to the technological leaders. This will translate in higher rate of income growth[7].

2.2 Neoclassical models of distribution and growth

Starting from the end of the 1980s, within the Neoclassical school of thought there has been an outpouring of models that, unlike those described above, focused specifically on the relationship between income distribution and growth. This literature, identified four main channels through which income inequality affects economic growth: endogenous fiscal policies, political instability, constraint in physical and human capital accumulation and market size constraints.

[7] An in-depth review of the catch up theory is beyond the scope of this literature review as it is not related to the relationship between distribution of income and growth. Other studies on the subject are Gomulka, 1971 and 1990; Dowrick and Gemmell, 1991 and Amable, 1993.

2.2.1 Endogenous Fiscal Policy

In the models proposed by Alesina and Rodrik (1994) and Persson and Tabellini (1994) income inequality has an effect on future investment through redistributive policies. Their argument is based on Meltzer and Richard's (1981) median voter hypothesis. In democratic countries, where decisions are taken using majority rule, the vote of the median voter is the decisive one. There are three important assumptions behind this hypothesis. Firstly, each individual votes in favour of the option which maximises his/her income. Secondly, taxes are proportional to the level of income of each individual. Thirdly, a lump-sum method is used to redistribute the income collected by taxes. Therefore, the amount of tax paid by each individual is a positive function of their income, while the amount of income redistributed is equal for everyone (Perotti 1996). It follows that, if a country is characterised by high inequality, the median voter has an income which is below the average income and consequently he/she will vote in favour of higher taxes and more redistribution. In other words, income inequality is a determinant of the tax rate: the higher is the distance between the income of the median voter and the average income, the higher is the tax rate. (Meltzer and Richard 1981). The tax rate, on the other hand, has a negative effect on investment since it decreases the net profits. An initial high level of inequality, then, will determine a high level of taxation which in turn will discourage investment and will ultimately reduce the pace of economic growth.

This approach, however, is not supported by empirical evidence. Even though Alesina and Rodrick (1994) and Persson and Tabellini (1994) find a negative correlation between the initial level of inequality and growth, their results do not particularly support the transmission channel proposed in their models. Moreover, Perotti (1994) finds that there is no correlation between initial income distribution and fiscal variables in democratic countrires. Indeed, even if four out of six measures of fiscal activity have the coefficient that is in line with the theory, only one is statistically different from zero (Perotti 1996). Finally, Deininger and Squire (1998) not only find that the initial level of inequality does not influence future economic growth in democratic countries, but they discover that inequality is correlated to future growth in undemocratic counties. This suggests that the link between inequality and investment cannot be explained by the argument that democratic voting results in a higher tax rate which in turn have a negative effect on investment.

Saint Paul and Verdier (1996) highlight a few objections that try to explain why empirical results were unsupportive of this mechanism. On the one hand, the median voter hypothesis might not be valid for two reasons. First, not all voters have the same weight because the rich part of the population tends to be more involved in politics than poor one. Second, the distance between the

median voter's income and the mean income is a suitable determinant of direct taxation only if the assumptions of a non-progressive tax rate and a lump-sum method of redistribution hold. On the other hand, these models might have been unsuccessful because a reduction of income inequality can be good for investments for four main reasons. First, if taxes are used to pay education then the effect on economic growth might very well be positive since the level of human capital increases. The remaining three objections of a negative relationship between redistribution and investment will be described in the next three sections.

2.2.2 Political Instability, Crime and Violence

Acemoglu and Robinson (2000) propose this second mechanism which links inequality and investment through the channels of political instability, crime and violence. In their model, inequality, in non-democratic societies, causes political instability, changes of regime and violence while, in consolidated democracies - as previously analyzed by Meltzer and Richard (1981) - the effect of inequality is high redistribution of income. Their argument is based on the assumption that in democratic societies the poor have more political power than in undemocratic countries and thus they manage to make the rich pay high taxes (or at least higher taxes compared to undemocratic countries). Consequently, poor people in non-democratic societies tend to be pro-democracy while the elite who are ruling the country tend to be against democracy since they would have to pay more taxes in a democratic system. When inequality increases too much, the elite might begin to concede some temporary redistribution in order to avoid threats of revolution or social unrest. However, if social unrest does not stop, the government will have to accept a higher degree of democracy and thus a higher level of redistribution of wealth. Nevertheless, this situation is far from being stable. Since democracy is more expensive for the elites, they will likely try to mount a coup in order to restore their political power. In this way, high inequality causes to a non-consolidated democracy to oscillate between non-democratic and democratic regimes, resulting in political instability. The political instability, in turn, will result in fiscal uncertainty because the amount of redistribution varies with the social group in power. Moreover, if the elites in power use repressive methods to suppress social unrest and prevent a democratization of the country, higher inequality would be positively related to the level of violence.

Alesina and Perotti (1996) and Perotti (1994, 1996) argue that political instability and violence are negatively related to investment. Firstly, they both create uncertainty with regard to fiscal policies and the protection of property rights. Secondly, they can cause disruption of productive activities. Moreover, these authors point out that excessive inequality might drive the poorer parts of society to take on rent-seeking activities through illicit or violent acts. This would have a further negative effect on investment.

To sum up, the hypothesis of this approach is that an increase in inequality will raise political instability, crime and violence, especially in non-democratice countries. This in turn, will reduce the incentives to invest there. Therefore, Saint Paul and Verdier (1996) suggest that a redistributive policy could stimulate investment by reducing social unrest and crime.

The empirical evidence partially supports the validity of this channel between income distribution and capital accumulation. In particular, Alesina and Perotti (1996) and Perotti (1994, 1996) find that a large middle class is positively related to political stability and that political instability has a negative effect on investment. However, Keefer and Knack (2002) argue that the results of these works depend on the particular index of political violence used and on the lack of reliable data. Indeed, when they repeat the analysis using high quality data from the Deninger and Squire inequality dataset, they do not find a statistically significant effect of inequality on violence.

2.2.3 Capital Market Imperfections

Benabou (1996), Aghion and Bolton (1992 and 1997), Banerjee and Newman (1993), Galor and Zeira (1993) and Piketty (1997) proposed different models which have in common the fact that, in the presence of capital market imperfections, inequality reduces access to credit among the very poor and thus prevents certain investment projects from taking place. This channel between inequality and investment is based on the presence of credit rationing that is caused by imperfect information between two economic agents (Acocella 2008). In particular, imperfect information might cause moral hazard and repayment enforcement problems. When poor people want to invest, they need to borrow more money from the bank compared to someone wealthy. Consequently, they will have to share a higher part of the investment return with the lender. For this reason, poor borrowers might decrease the level of effort that they exert in order to succeed in their investment because the incentives (namely the profits) are low (Aghion and Bolton 1992). The second problem, instead, is related to the repayment of the loan once the project is successful. In this case, particularly with big loans, there is the risk that the borrowers would hide the returns of their investment in order to avoid the enforcement of their contract with the lender (Ehrhert 2009). For both these reasons, a bank (or another lender) could decide to lend only against collateral or decide to set a higher interest rate. A high interest rate however, would incresae the problem of adverse selection as only risky projects with very high returns would be able to repay the high rate (Acocella 2008).

In line with this, Benabou (1996) notes that in the presence of capital market imperfections, loans for investments with high returns requested by poor people will be denied in favour of loans for projects with possibly even lower returns but requested by wealthy people. This reduces

economic growth by excluding good projects. Moreover, Aghion and Bolton (1997) highlight that redistribution would raise production efficiency. If poor borrowers have to ask for less credit, they have a greater incentive to succeed in their projects since they can retain a higher part of their investments' returns.

Finally, just like investments in physical capital, investments in human capital can also be negatively affected by the presence of capital market imperfections. According to Galor and Zeira (1993) in the presence of credit rationing and indivisibility of investments, poor individuals who cannot use personal wealth as collateral, or get credit against future income, will not have the possibility of investing in their education. Hence, income inequality has a negative effect on growth since it prevents, in the presence of this kind of market imperfections, an increase in the level of human capital. Moreover, because of the lack of investment in education, more unequal societies will have more unskilled than skilled labour and thus the wage differential between the two will be higher.

Empirical evidence seems to support this channel between income distribution and investment in both physical and human capital. Perotti (1994) finds that the income of the first two quintiles is positively correlated with the level of capital investment and that, for a given level of inequality, increasing market imperfections have a negative effect on investment. However, using an interaction term between a measure of market imperfection and the income of the two bottom quintiles, Perotti finds that the importance of this channel decreases if the capital market becomes less imperfect. The same author, two years later (Perotti 1996), tests the effect of inequality on human capital investment in the presence of capital market imperfections and the results seem to confirm a negative correlation between the two variables. The main criticism to his work is related to the fact that the measure of market imperfection used is not precise since only developed countries have data on credit rationing. At the same time, these countries have fewer capital market imperfections when compared to developing countries (Ehrhart 2009). To conclude, Deininger and Squire (1998) find that the level of land inequality at the beginning of the sample is negatively correlated to average economic growth and that this effect is both larger and more statistically significant than the one between income inequality and growth. Since the distribution of land is a considered to be a better proxy for the distribution of wealth, this finding support the hypothesis that a more equal distribution of wealth would allow more people to invest and this would enhance economic growth.

2.2.4 A Long Run Unified Theory

The unified theory proposed by Galor and Moav (2004) suggests that the effect of inequality on economic growth depends on the stages of development. This unified theory, has the merit to bring together two important streams of economic thought and to highlight a non-linear relationship between inequality and economic growth that may explain the heterogeneous empirical results that have been found in the literature. Most of the studies mentioned above, indeed, tried to find a linear effect of inequality on growth.

Galor and Moav (2004), underline that the very first step in order to start the industrialization process is to accumulate capital. Thus, since rich people save a higher percentage of their income, they are able to carry out large investments in physical capital. Higher inequality hence might have a positive effect on capital accumulation and growth at the beginning of the industrialization process. In later stages of development, however, when human capital accumulation becomes the engine of growth because of the capital-skills complementarities, inequality is harmful for growth. As discussed above, high inequality makes impossible for the poor to invest in education. Moreover, when wages become sufficiently high, more and more people will be able to afford expenses in education for their family. Consequently, The effect of inequality on growth through this channel will decrease.

The different effects that inequality might have on investments and economic growth, in different stages of development and industrialization (through the mechanisms presented above), might be an explanation for the mixed evidences that we have discussed in the previous sections.

2.2.5 Market Size and Domestic Demand

As we discussed above, an increase in income inequality usually causes the propensity to save to increase because rich people tend to save more than poor people. When a large part of income is in the hands of a few rich people, the economy will have a higher propensity to save and a lower propensity to consume compared to a situation characterised by a more equal distribution of income. While the Solow model predicts that this has a positive effect on income, here we present the studies that argue that the opposite is true. High income inequality, associated with a lower propensity to consume, reduces the domestic market and creates a lack of internal demand which could have negative effects on growth. In the following sections, we describe three of the main arguments that have theorised a negative effect of smaller markets on growth.

2.2.5.1 Division of Labour and Demand Constraint

The first economist who pointed out the relevance of a big market in the development process was Adam Smith (1776) in "An Inquiry into the Nature and Causes of the Wealth of Nations". One of his main arguments was that, thanks to the division of labour, industry is characterised by increasing returns. The division of labour, indeed, raises labour productivity through three mechanisms. First, it allows the worker to specialize in a small and simple activity (learning by doing process); secondly, it facilitates the invention of a great number of machines; and finally, it makes it possible to save time in moving from one work to another. Hence, through the division of labour, labour productivity (and thus, in a fair world, income per worker) increases when the amount of output produced increases. However, this mechanism might not work if there is a demand constraint. Smith, indeed, pointed out that it is not cost-effective to build machines in order to produce only a few products. Thus, the expansion of the industrial sector (and the amount of investment) will depend also on the extent of the market.

In addition, Young (1928) underlines the relevance of external economies of scale: the interaction of different industries can increase productivity. For example, let us assume that a new technology reduces the cost of producing iron. All the industries that use iron in their production process can now lower their prices and increase production (because the quantity demanded should increase). Finally, the iron industry will also benefit from price reductions in other industries. It is evident that, even in this case, a constraint on the demand side would prevent the exploitation of this type of economy of scale.

We now discuss two of the possible solutions to the problem of scarcity of demand that have been proposed by other classical economists. Rosenstain Rodan (1943) suggests that, in order to solve the problem of a small market size in a developing country, the surplus of labour from agriculture should be relocated into those industries that produce the bulk of goods consumed by the working class. In this way, the relocated workers would create the necessary demand for the goods produced by the industries in which they work and relax possible demand constraints. Kaldor, instead, suggests that to avoid demand constraints an economy should look at international markets and specialize in products that have a high income elasticity of demand. Indeed, increasing exports not only would increase the level of aggregate demand, but it would also have the advantage of allowing a country to import more without the problem of incurring a deficit in the balance of payments (Thirlwall 2002). This is particularly important for developing countries that do not yet produce capital goods.

2.2.5.2. Neoclassical models

Murphy et al. (1989) and Mani (2001) elaborate two models that try to explain how income distribution affects growth through the size of the market.

In their model, Murphy, Sleifer and Vishny (1989) formalized the theory of the big push proposed by (among others) Rsenstein-Rodan (1943) and Nurske (1968). Their main argument is that in order for increasing return technologies to become profitable, the level of demand must be high enough. The first step to increase demand at the beginning of the development process is to increase the national income. This can happen thanks to and increase in productivity inside the agricultural sector or an exogenous export boom. Once the level of income is increased, it must be distributed in such a way that enhances the demand for manufactured goods. In this model, there are three "classes" of individuals. Poor individuals who consume mainly food, rich individuals who consume mainly imported luxuries rather than goods produced by local firms, and the middle class that consumes local manufactured goods. Hence, especially in developing countries, redistribution from the richest towards the middle class will foster investments, through a bigger domestic market which makes profitable the use of modern technologies that are efficient only on a large scale. To conclude, it is necessary to underline that one fundamental assumption of this model is that trade with other countries is costly and difficult. If international trade was costless, domestic demand would have a minor role since the Country could rely on foreign demand.

Mani (2001) proposes a second model on the role of market size in which focuses on the interaction between domestic demand and human capital accumulation. Contrary to Murphy et al. (1989), in this model there is more than one kind of manufactured goods. Indeed, now it is possible to consume essential goods, simple manufactured goods and sophisticated goods which are produced by workers with different degrees of skills. Unskilled, medium-skilled and high skilled workers produce respectively essential, simple manufactured and sophisticated goods. As in the previous model, the composition of consumption changes with the level of income of each individual. The rich consume expensive goods; the middle class consumes simple manufactured goods; while poor people buy essential goods. In addition, this model considers the problem of capital market imperfections and assumes the indivisibility of investment in education. As suggested by Galor and Zeira (1993), the level of education of each individual depends on the income of the parents since it is difficult to secure loans without any collateral. If income is extremely unevenly distributed, people would either be too poor to buy manufactured goods or rich enough to buy sophisticated goods. This means that the demand for medium–skilled labour decreases and consequently the wages for this category will decrease as well. Accordingly, medium-skilled workers will not be able to invest in human capital for their children who, in turn,

they will never become skilled workers. On the other hand, low inequality would imply the formation of a large middle class which consumes manufactured goods and would increase the demand for medium skilled worker and hence their wages. In this case, parents would be able to invest more in the education of their children and the general level of human capital in the country would rise. According to this model, redistribution might increase investment in both physical and human capital through an increase in the income of the middle class.

These two theoretical models have not received much attention from the empirical literature. Keefer and Knack (2002) tested the big push hypothesis that is incorporated in the model proposed by Murphy et al (1989). They found that although domestic demand plays a more important role in relatively closed economies than in more open ones, the difference between the two coefficients is small and not significantly different from zero. Moreover, their results suggest that income inequality has a larger negative effect on growth in those countries in which the market size is small compared to the countries with a large domestic market. However, in this case as well, the difference between the two effects is not significant.

2.2.5.3 The Role of Market Size in the Theory of Foreign Direct Investments

Another important point of view about the role of the size of a country market comes from studies that analyze the behaviour of foreign direct investment (FDI). Market size is considered to be one of the main determinants of horizontal FDI. The theory distinguishes between horizontal and vertical foreign direct investment, the former are those foreign investment which take place when the main objective of an enterprise is to sell in a new country while avoiding trade costs and barriers, whereas the latter is characterized by an attempt of multinational enterprises to reduce costs of production.

In the first case, according to the Proximity-Concentration theory, a firm decides to replicate its production plants in a foreign country in order to serve the local market, only if the cost of opening new plants is lower than the trade costs that the firm would face in selling its goods in that same country through exports (Brainard 1997). Hence, if tariffs and transport costs are high, the firm might prefer to open an affiliate abroad. Moreover, two additional reasons to produce in the same country where the firm wants to sell its products is that, in this way, it is easier to shape the product based on the preferences of the local population and to respond better to changes in local market conditions. On the other hand, if a firm is characterized by high economies of scale at plant level, splitting the production over more than one site would be more expensive and the firm will not open a new plant in another country. Consequently, the larger the size of the foreign market, the greater the probability that the firm would manage to cover the costs of opening a new plant.

The size of the market is determined principally by the average income and total population but, as discussed above, also the distribution income plays a role. The empirical results on determinants of foreign direct investment confirm that market size has a fundamental positive role in the decision on whether to produce (and hence invest) or to export in a certain country. Kravis and Lipsey (1982) and Wheeler and Mody (1992) found a positive and significant effect of market size on investment by American firms in other countries. Similarly, Yeaple (2003) found that foreign investment rises by 1.79% when the market size of the host country increases by 1%. Moreover, and unexpectedly, the size of the market seems also to be important in the case of vertical foreign investments. Finally, the results from Azemar and Desbourdes (2009), in a study on the main determinants of FDI, show that market size is an important factor considered by multinational firms when they have to decide where to produce.

To conclude this section, it is important to highlight that FDI might have a negative (crowding out) effect on national investment. However, according to Agosin and Mayer (2000), this effect of FDI on domestic investment varies from region to region. For example, they found that in Latin America FDI tends to substitute for the activity of local firms while in Asia the effect is the opposite.

2.3 Marxist growth theory

Before turning to the post Keynesian approach to growth and distribution we briefly analyse the main characteristics of Marxist theory of growth. In spite of Neoclassical and Marxist being virtually at the opposite end of the scale of the schools of thought in economics, they have surprisingly similar conclusion about the growth process.

Two of the most striking differences between the Marxist and the Neoclassical school are the class analysis as opposed to the methodological individualism of the neoclassical school and the presence of unemployment in the economy. Marxist theory focuses on the dynamics between the capitalist and workers class. The real wage rate and consequently the distribution of income depend on the struggle between these two classes and the level of the "reserve army": the highest is the unemployment rate, the weaker is the bargaining powers of workers. Assuming that firms have no access to external financing and there are no "realisation" problems – that is, firms can always sell all produced goods – investment is equal to realised profits. Hence, the rate of capital accumulation directly depends on the rate of profit (Crotty 1993). This is the foundation of the Goodwin (1967) cycle. An increase in the real wage rate lowers the profit rate and this causes a fall in accumulation which in turn increases the level of unemployment. When the reserve army increases and workers lose contractual power, the profit rate can increase again and with it the

accumulation rate. High accumulation and growth then make unemployment fall and the reserve army shrink. This causes the wage rate to increase again and the profit rate to decrease starting a new cycle. As Crotty (1993) points out, it is worth noting that during the cycle two different models of accumulation can take place: capital widening and capital deepening. When the profit rate is high, there is no incentive for firms to change the technical composition of capital i.e., to make labour saving investment. In the second part of the cycle, when capital widening erodes the reserve army and the profit rate falls, firms will now invest in labour saving techniques. A lower level of (labour saving) investment causes unemployment to rise again and this restores the original profit rate. However, Crotty (1993) explains how this interpretation of the investment function, which depends only on the profit rate, rests on the assumptions of Volume I of Marx's Capital mentioned above. He expands the argument by relaxing such assumptions: when firms face the possibility of not selling all of their product and are allowed to borrow funds in the financial markets, it is possible, for short periods of time, that excessive competition among firms leads to an increase in capital accumulation even when firms face decreasing profits.

The theoretical positive relationship between the profit rate and the growth rate is however not always easy to spot in the empirical data. In particular, while the profit squeeze that characterised most Western countries during the 1970s was associated with lower growth rate, as predicted by Marxist theory, the redistribution of income from wage earners to profit earners, which took place in the past few decades, was associated with medium-low levels of economic growth. Dumenil and Levi (2004) argue that, to defend Marxist theory of investment, it is necessary to distinguish between overall profit rate and rate of retained profits - which excludes interest payments and dividends. Accumulation depends upon the latter rather than the former because firms do not invest interest payments and dividends in productive capacity. The increase in interest rate that took place at the end of the 1970s when the main priority of monetary policy became reducing inflation, put a wedge between overall and retain profits. Hence, the very modest growth performances of the last decades are justified by the fact that retained profits did not increase. According to Dumenil and Levi (2004), during the 1980s, the overall profit rate increased mainly because of the increase in the amount of interest payments and dividends rather than retained profits.

> "After having associated, in Chapter 3, the decline in the rate of profit and the decline in the rate of accumulation in the crisis, until l982 (the year when profit rates reached their low), one expected a symmetrical development: the profit rate trend, now on the rise, would prompt a resumption of accumulation - which was not the case. We now know the answer: the rate of accumulation is controlled by the rate of

> retained profit and the rise in the rate of profit before the pay out of interest and dividends was confiscated by finance." (Dumenil and Levi, 2004, p.77)

Lazonick and O'Sullivan (2000) propose a similar argument which, as we will discuss in the following sections, also inspired many post-Keynesian empirical studies. They explain the rise in the profit rate to the low growth rate of the past few decades with a shift in the strategy with which corporations allocate their revenues. In particular, during the 1980s corporations started to follow the strategy of "downsize and distribute" as opposed to "retain and reinvest". This happened because of the emergence of agency theory which implies that shareholders should have a main role in managing the firm and managers should simply be their agents. In addition, institutional investors - such as pension funds and insurance companies - were in those years allowed to include corporate equities in their investment portfolios and therefore the collective power of the shareholders increased greatly.

Kliman and Williams (2014) however find that in the long run, from 1948 to 2007, overall accumulation decreased because of a decrease in the profit rate rather than because of financialization. They reject the argument according to which accumulation, in the last part of the millennium, did not keep up with the profit rate because profits were "diverted" from production towards shareholders. In particular, they find that the relationship between high dividend payment and low productive investment is not statistically significant and that this can be explained by the tendency of firms to finance financial expenditures by borrowing funds rather than diverting profits.

In conclusion, independently of the role of financialization and whether the relevant measure of profits is overall profits or retained profits, Marxist theory implies that a more equal distribution of income (from profit to wage earners) leads to a fall in the rate of accumulation and therefore to a decrease in the growth rate. Moreover, as in the Neoclassical models, demand has no role in the determination of long run growth.

2.4 Post-Keynesian models of growth and distribution

The models and theoretical approaches discussed so far are part of the so called supply side economics: growth is determined by supply and demand always adjusts to it. As we have seen, in the Solow model and the endogenous growth models, investment is entirely endogenous and driven by savings and the growth rate depends on production constraints such has growth rate of labour force and productivity. Similarly, in the more recent studies on distribution and growth, the effect of distribution is always a supply effect: distribution affects growth because it affects human and physical capital accumulation and the productivity of the factors of production.

The primacy of supply over demand is probably one of the most important points of disagreement between the Neoclassical and Post-Keynesian schools of thought. In particular, Post-Keynesian models of growth and distribution try to expand to the long run the Keynesian principle that demand matters. The Keynesian short run analysis can be simply explained using the aggregate demand function.

$$Y = C_0 + (1 - s)Y + I + G + X - mY \tag{11}$$

Where Y is income, C_0 is autonomous consumption, $(1 - s)Y$is induced consumption, s is the propensity to save, I is investment (which is considered here to be exogenous with respect to income), G is government spending, X is export and m is the propensity to import out of current income.

Assuming that the capital stock and prices do not change, income is positively related to the exogenous components of demand and negatively related to the propensity to save and to import.

$$Y = \frac{I + G + X + C_0}{s + m} \tag{12}$$

These short run conclusions are substantially different compared to those of the Neoclassical models discussed above. Not only has autonomous demand a positive role in determining income (it does not simply adjust to supply), but also the propensity to save has a negative effect on income. This is known as the paradox of thrift: while at the individual level increasing savings to accumulate wealth has no effect on personal income, at a macroeconomic level, an increase in the propensity to save has a negative effect on aggregate income. Unlike in the Neoclassical models then, an exogenous increase in income inequality, that increases the propensity to save, has a negative effect on the income.

In the sections below, we will present a summary of the three main theoretical Post-Keynesian approaches: Robinsonian, Kaleckian and NeoKaleckian. We choose a chronological exposition as this should help to show the evolution of the arguments.

2.4.1 Robinsonian models

The first Post-Keynesian models were developed by the members of the so-called Cambridge school: the most famous contributors are Nicholas Kaldor (1957), Joan Robinson (1956, 1962) and Luigi Pasinetti (1962). We labelled these models as Robinsonian because, following Stockhammer (1999), we will use a stylised version of the model proposed by Robinson (1962) as

reference point. As Lavoie[8] (1995) points out, the main characteristic that differentiate this first group of models and the Kaleckian and neo-Kaleckian models is the assumption of full capacity utilisation. The Robinsonian models, similarly to neoclassical models, assume that in the long run capital is fully utilised.

The model is composed of three main equations, the investment and saving functions and the equilibrium condition i.e. the equality between savings and investment. Both saving and investment are normalised by the stock of capital.

Investment (I) is a function of autonomous demand (γ) and the expected profit rate proxied by the current profit rate ($r = \frac{R}{K}$).

$$g^i = \frac{I}{K} = \gamma + \beta r \tag{13}$$

Contrary to Neoclassical models, investment is not constrained by savings because firms have access to external sources of credit. As Robinson puts it:

> "Profit influences investment not only by providing the motive for it but also through providing the means. An important part of the gross investment is financed by gross retained profits. Moreover, the amount that a firm puts up of its own finance influences the amount that it can borrow from outside." (Robinson 1962, p.86)

The profit rate therefore, not only is an indicator of investment profitability (which should influence the "animal spirit") and of the firms' capacity to self-finance their investment, but it is also a measure of firms' access to external credit. This characteristic of the investment function will be present also in the Kaleckian and Neo-Kaleckian models.

Savings is determined as a share of total profits (R): s_c is the capitalists' propensity to save. For simplicity, we are assuming that wage earners consume all their income and therefore the propensity to save out of wages is zero.

$$g^s = \frac{S}{K} = s_c r \tag{14}$$

In equilibrium, in a closed economy, investment must be equal to savings.

[8] Lavoie (1995) labels this first groups of models and Neo-Keynesian models. While this is probably a more appropriate name, we choose Robinsonian to avoid any terminological confusion. The term Neo-Keynesian is sometimes used to identify the Neoclassical-Keynesian synthesis and the works of John Hicks, Franco Modigliani and Paul Samuelson among the others.

$$g^i = g^s \tag{15}$$

Substituting (13) and (14) into (15) we get the equilibrium rate of profits (r^*)

$$r^* = \frac{\gamma}{s_c - \beta} \tag{16}$$

Thus substituting the equilibrium rate of profits into the capital accumulation function (13), we get the equilibrium growth rate i.e. the growth rate that guarantees the equality between investment and savings.

$$g^* = \gamma + \frac{\gamma\beta}{s_c - \beta} \tag{17}$$

The model has two main results: the propensity to save out of profit is negatively related to growth and there is a negative relationship between aggregate demand and the wage share of income. Taking partial derivatives of equation (16) and (17) respect to the propensity to save, we can see how the profit rate and capital accumulation are negatively influenced by the propensity to save. One merit of this model therefore, is that the Keynesian paradox of thrift discussed above is maintained in the long run.

$$\frac{\partial r}{\partial s_c} = \frac{-\gamma}{(s_c - \beta)^2} < 0$$

$$\frac{\partial g}{\partial s_c} = \frac{-\gamma\beta}{(s_c - \beta)^2} < 0$$

On the other hand, taking the partial derivative of the profit rate respect to autonomous demand in (16), we see that an increase in demand leads to a redistribution of income towards profits (if the stability condition of savings reacting faster than investment to profits is respected, i.e. $s_c > \beta$).

$$\frac{\partial r}{\partial \gamma} = \frac{1}{s_c - \beta} > 0$$

Regarding the relationship between autonomous demand and the profit rate, two aspects should be underlined. Firstly, in this model, an increase in the profit rate is equivalent to an increase in the profit share. Let us consider the following decomposition of the profit rate into profit share (π), capacity utilisation (u) and capital productivity ($\frac{1}{v}$). Since both u and $\frac{1}{v}$ are assumed constant, a change in the profit rate must entail a proportional change in the profit share.

$$r = \frac{R}{K} = \left(\frac{R}{Y}\right)\left(\frac{Y}{Y_{fc}}\right)\left(\frac{Y_{fc}}{K}\right) = \frac{\pi u}{v} \tag{18}$$

In the second place, we should note that the direction of causality in this relationship goes from autonomous investment demand to the profit rate. In particular, given that full capacity is assumed, an increase in investment will put upward pressure on prices and consequently real wages will decrease (Stockhammer 1999). This in turn, increases the profit rate and decreases the wage share. Distribution of income is therefore endogenous in this model.

2.4.2 Keleckian models

The implied endogeneity of income distribution is one of the main differences between the first group of models inspired by the work of Michel Kalecki and the model proposed by Robinson. A second difference is that Kaleckian models maintain in the long run, Kalecki's paradox of cost according to which an increase in the wage share does not comport a decrease in the profit rate.

Lavoie (1995) identifies four common features to most Kaleckian models. Firstly, unlike in Robinson's model, in addition to labour, also capital is not supposed to be fully utilised because the models are framed in an oligopolistic world. The rationale is that spare capacity is necessary for firms to respond quickly to demand shocks but is also constitute an entry barrier for new firms that might want to join the market. Moreover, as Steinld (1952) points out, excess capacity might be due to indivisibility of capital. Secondly, since firms do not operate at full capacity, there are constant returns to labour as additional workers would be able to use the spare capital and therefore their productivity would not decrease. It follows that an increase in output does not put upward pressure on prices, i.e. prices are not demand driven. In the third place, given the oligopolistic framework and the presence of excess capacity, prices are mainly determined adding a mark-up to variable costs. Dutt (1984), for example, specifies prices as

$$p = (1 + t)wa \tag{19}$$

Where p is the level of prices, t is the murk-up, w is the nominal wage rate and a is equal to the inverse of labour productivity. From equation (19) we can easily derive that the profit share (π) and the wage share (WS) are respectively a positive and a negative function of the mark-up.

$$WS = \frac{wa}{p} = \frac{1}{1 + t} \tag{20}$$

$$\pi = 1 - WS = \frac{t}{1 + t} \tag{21}$$

Therefore, in this simple model functional income distribution is determined by the mark-up which is in turn influenced, according to Kalecki (1971), by the degree of monopoly, i.e. the relative strength of capitalists with respect to workers. The degree of monopoly and the mark-up are determined by four main characteristics of the market. First, the degree of concentration within industries is positively related to the mark-up. When a few firms dominate a certain market, it is easier to organise tacit agreements or cartels. Second, the mark-up is positively related to the degree of non-price competition such as advertisements and selling agents as this causes an increase in the degree of monopoly. Third, overhead costs are positively related with the mark-up. When overhead costs increase, firms have to increase the murk-up on variable costs in order to avoid a profit squeeze. Finally, the degree of monopoly and the mark-up are negatively related to the power of trade unions. Empirically, Stockhammer (2012) and Hein (2015) suggest that neo-liberalism and finance have been the main drivers of the change in income distribution because they weakened the bargaining power of labour respect to capital and increased the overhead costs - especially managers' salaries. Moreover, Hein (2015) underlines how in more sophisticated models in which price is the weighted average of the price level in different industries, the structural composition of the economy is also a main determinant of the profit/wage share. If sectors traditionally characterised by high mark-up increase their share of production, the overall profit share will increase. The exogeneity of the functional income distribution is therefore justified in this model by the fact that given excess capacity, output does not influence prices and therefore real wages. At the same time, however, since the degree of monopoly is only partially influenced by growth (through overhead costs for example) and Financialization and neo-liberism policies are not influenced by growth, the assumption of the exogeneity of the profit share with respect to the growth rate seems reasonable.

The final characteristic of Kaleckian models is the investment function. As firms have a desired level of capacity utilisation (below full capacity), the investment function used in the Robinsonian models is augmented by the level of capacity utilisation. If current capacity is above the desired level, firms will invest in new capital in order to restore the desired level of utilisation (Steindl, 1979).

$$g^i = \frac{I}{K} = \gamma + \beta r + \delta u \tag{22}$$

According to Amadeo (1987) the first Kaleckian models were developed by Bob Rowthorn (1981) and Amitava Dutt (1984). In the remaining part of this section, we use a simplified version of Dutt's model to explain its main intuitions.

As in the Robinson's model, we have an investment and saving function and an equation that equates investment and savings - (14), (22) and (15) respectively. In addition, there is a profit cost function derived substituting (21) into (18)

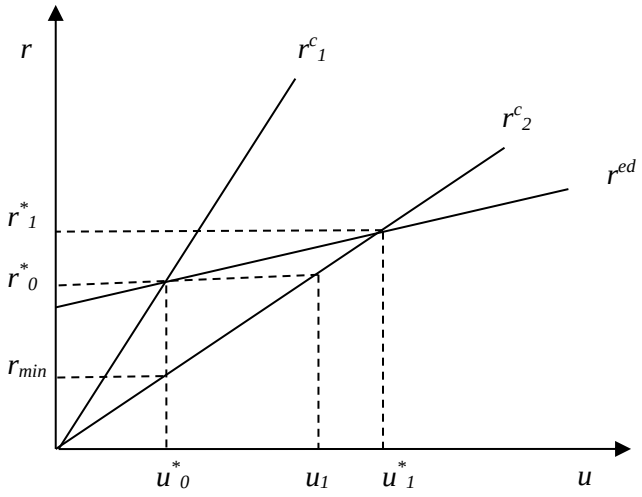
$$r^c = \frac{tu}{(1+t)v} \tag{23}$$

Giving this setting, it is easy to see that the paradox of costs holds. Substituting (22) and (14) into (15) we obtain what Lavoie (1995) calls effective demand equation.

$$r^{ed} = \frac{\gamma + \delta u}{(s_c - \beta)} \tag{24}$$

Plotting in the (r,u) space (Figure 2.4) the profit cost and the effective demand equation, we get a clear picture of how the paradox of cost works. Since the partial derivative of (23) respect to t is positive - $\frac{\partial r^c}{\partial t} = \frac{uv}{[(1+t)v]^2}$ - a decrease in the profit margin that corresponds with an increase in the wage share rotates downward the profit cost curve. If the level of capacity utilisation were to remain fixed, as it would be the case in Robinson's model, the profit rate would decrease to $r_{\min}$. However, as capacity utilisation increases to u_1 due to the rise in consumption expenditures, the profit rate will remain constant at r^*_0. The higher level of capacity utilisation however, in the long run, stimulates investment and therefore it increases the level of utilisation and rate of profit even further. The paradox of cost works: a higher wage share is associated with a higher profit rate, at a macroeconomic level.

Fig. 2.4: *The paradox of cost in a Kaleckian model*



To verify the paradox of thrift we first substitute equation (18) into the investment and saving functions - (22) and (14) respectively – in order to express savings and investment in terms of capacity utilisation and profit share rather than the profit rate.

$$g^i = \frac{I}{K} = \gamma + \beta\frac{\pi u}{v} + \delta u \tag{24}$$

$$g^s = \frac{S}{K} = s_c\frac{\pi u}{v} \tag{25}$$

Equating (24) and (25), and assuming for simplicity $v = 1$, we get the equilibrium level of capacity utilisation

$$u^* = \frac{\gamma}{(s_c\pi - \beta\pi - \delta)} \tag{26}$$

Then substituting the equilibrium level of capacity utilisation into the accumulation function, we get the long run growth rate of capital

$$g^* = \gamma + \frac{\gamma(\pi\beta + \delta)}{(s_c\pi - \beta\pi - \delta)} \tag{27}$$

Since the saving rate appears only in the denominator, the partial derivatives respect to the profit share are both negative i.e. $\frac{\partial u}{\partial s} < 0$ and $\frac{\partial g}{\partial s} < 0$. Hence, an increase in the saving rate is associated with a fall in the growth rate and capacity utilisation: the paradox of thrift holds. To give an example, let us plot in the (g, u) space the investment and saving functions (Figure 2.5).

We start from a position of equilibrium determined by the intersection of the saving and investment functions: the growth rate is g^*_0 and capacity utilisation is at its desired level, u^*_1. A decrease in the saving rate rotates the g^s curve downwards. In the short run, at a given rate of capital accumulation g^*_0, capacity utilisation increases to u_1 because the capital stock remains fixed while consumption rises. In the long run, however, the accelerator effect will come into play: the initial increase in capacity utilisation cause an increase in the rate of accumulation which raises capacity accumulation even further until savings and investment meet again at a higher level of growth (g^*_1) and capacity utilisation (u^*_1).

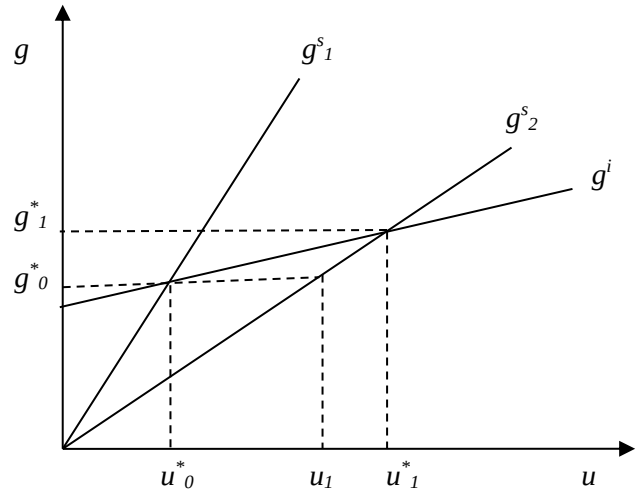
Symmetrically, the profit rate has an effect on growth and capacity utilisation similar to that of the saving rate. In fact, the derivative of (26) and (27) with respect to the profit rate are negative if the Keynesian stability condition is respected ($s_c > \beta$).

$$\frac{\partial u}{\partial \pi} = \frac{-\gamma(s_c - \beta)}{(s_c\pi - \beta\pi - \delta)^2} < 0 \; if \; s_c > \beta \tag{28}$$

$$\frac{\partial g}{\partial \pi} = \frac{-a\delta s_c}{(s_c\pi - \beta\pi - \delta)^2} < 0 \tag{29}$$

The negative relationship between profit share and growth implies that growth is positively influenced by the wage share: the growth regime is wage-led.

Fig. 2.5: *The paradox of thrift in a Kaleckian model*



2.4.3 Neo-Keleckian models

Most of the assumptions listed above behind the Kaleckian models are maintained in the Neo-Kaleckian models. The main difference between the two approaches is the different specification of the investment function. One could argue that the wage-led result of the Kaleckian models is driven by the fact that capacity utilisation in equation (22) and (24) is counted twice. Bhaduri and Marglin (1990) propose a new investment function in which investment is only a function of the (expected) profit rate[9]. However, they allow the components of the profit rate - see equation (18) - to have different effects on investment. In other words, the profit share and capacity utilisation enter the investment equation as independent and separate arguments[10].

$$g^{i} = \frac{I}{K} = \gamma + \beta\pi + \delta u \tag{30}$$

Equating the investment and saving functions, we obtain the equilibrium level of capacity utilisation

$$u^{*} = \frac{\gamma + \beta\pi}{(s_c\pi - \delta)} \tag{31}$$

[9] To cite a few, Kurz (1990), Taylor (1991), Blecker, (2002) and Naaspepad (2006) use a similar investment functions.

[10] The third component of the profit rate, capital productivity (v) does not enter equation (30) because it is assumed to be constant.

Then substituting the equilibrium level of capacity utilisation into the accumulation function, we get the long-run growth rate of capital

$$g^* = \gamma + \beta\pi + \delta\frac{(\gamma + \beta\pi)}{(s_c\pi - \delta)} \tag{32}$$

Taking the partial derivatives of equations (31) and (32) respect to the profit share, we can see the main difference between the Neo-Kaleckian and the Kaleckian models.

$$\frac{\partial u}{\partial \pi} = -\frac{\beta\delta + s_c\gamma}{(s_c\pi - \delta)^2} < 0 \tag{33}$$

$$\frac{\partial g}{\partial \pi} = \beta - \frac{\delta(\beta\delta + s_c\gamma)}{(s_c\pi - \delta)^2} = \beta + \delta\frac{\partial u}{\partial \pi} \tag{34}$$

As before, the profit share has a negative effect on capacity utilisation. The effect on growth, however, is undetermined and it depends on the magnitude of the elasticity of capacity utilisation respect to the profit share. The growth regime is said to be wage-led or profit-led if the sign of the derivative in equation (34) is negative or positive, respectively. We will explore the Bhaduri and Marglin model in detail in chapter 4, for now it is sufficient to highlight that such model implies that whether distribution of income has a positive or a negative effect on growth depends on country specific characteristics. This has sparked a vast amount of country specific empirical literature which tries to determine what growth regime is present in each country. Since the contributions of the next three chapters build on this branch of literature, we will survey these empirical studies at the end of this chapter.

2.4.4 Open economy considerations

The closed economy models considered so far allowed to describe the evolution of the main assumptions and findings of the Post-Keynesian models of growth and distribution. In this and the next section, we discuss two main extensions of such models: the role of international trade and the role of supply.

Blecker (1989) and Bhaduri and Marglin (1990) were the first to extend the Kaleckian framework to the open economy (Blecker 2011). The setting of the model changes in two important ways. First, net exports ($\frac{NX}{K}$), which is a function of real exchange rate (q), domestic capacity utilisation (u) and foreign capacity utilisation (u^f), is added to the equilibrium equation (15)

$$\frac{NX}{K} = n(q, u, u^f) \tag{35}$$

$$\frac{S}{K} = \frac{I}{K} + \frac{NX}{K} \tag{36}$$

Second, the distribution of income is expressed as a function of the real exchange rate. In an open economy, firms have to take into account the price of foreign products in order to determine their price. If, following an increase in the nominal wage rate, firms increase the price level in order to keep the profit share constant, they will lose market shares as their prices are increased compared to those of imported goods (Blecker 1989). Following this logic, the mark-up and the profit share will be positively related to the exchange rate. Bhaduri and Marglin (1990) on the other hand, argue that depreciation will cause the cost of imported raw material to increase and this will squeeze the profit share. At the same time, however, following a depreciation of the exchange rate, workers will ask for a higher wage because of the increase in prices of imported goods. If the nominal wage increase more than labour productivity, the wage share will increase.

The main finding of these post-Keynesian open economy models is that even if a country is internally wage-led (as it was the case in the Kaleckian models), it might very well be that, in an open economy, it becomes profit-led (or in any case less wage-led). For instance, if the central bank increases the target exchange rate, firms will be able to set a higher mark up and hence the share of wages decreases. If the economy is domestically wage-led, as it was the case in the Kaleckian models, this will result in a lower level of growth and capacity utilisation. However, an increase in the exchange rate now stimulate export and discourage imports and therefore it has a positive effect on growth. In other words, if the price elasticity of demand for imports and exports is high enough, even though an economy could be internally wage-led, there might be an overall negative relationship between wages and capacity utilisation caused by currency depreciation. As Bleckers puts it

> "*[in Kaleckian models] it is possible to increase both real wages and employment on the one hand, and realised profits and growth on the other hand. This comforting conclusion must be drastically revised in the light of the model of an open economy. With a flexible mark-up, the possibility of a conflict between a redistribution toward wages and maintaining international competitiveness greatly lessens the prospects for a happy coincidence of workers' and capitalists' interests. In a relatively open economy, the aggressive pursuit of high wages by the working class in one nation can impede that nation's economic growth and reduce its level of employment.*" (Blecker, 1989)

Consequently, in an open economy it becomes essential to have some cross-country wage coordination to avoid "beggar thy neighbour's effects" rather than a race to the bottom of real wages to increase competitiveness.

2.4.5 Integrating supply side aspects

A further extension of the Neo-Kaleckain models regards the inclusion of supply side elements. For instance, Naastepad (2006) and Naastepad and Storm (2010) augment an open economy Neo-Kaleckian model with a Neo-Kaldorian productivity function. The model is therefore characterised by a demand regime, which can be either wage or profit-led as discussed above, and a productivity regime. The labour productivity (λ) equation is expressed as a function of output and real wage rate

$$\lambda = \alpha + \emptyset x + \theta w \quad \alpha, \theta > 0;\ 0 < \emptyset < 1 \tag{37}$$

$\emptyset$ captures the Verdoorn law (1949) according to which output has a positive effect on labour productivity[11]. This relationship can be explained in different ways. First, as discussed above, Smith (1776) and Young (1928) when production increase productivity raises because of the exploitation of economies of scale. Second, as new capital equipment is more productive than older capital, labour productivity increases. Finally, there is a "learning by using" effect on productivity. θ, on the other hand, captures the positive effect of real wages. Higher labour costs will push firms to find more labour savings techniques of production: productivity is wage-led.

In the (λ, g) space, we can represent the productivity regime (PR) with an upward line as $\emptyset$ is positive. The demand regime, instead, can be described by an upward or downward line depending on the nature of the regime. An increase in λ, keeping the real wage fixed, causes a reduction in the unit labour cost and an increase in the profit share which will entail an increase in the propensity to save. This in turn will translate in an increase in net exports, an increase in investment and a decrease in consumption. If the demand regime (DR) is wage-led, the negative effect of a change in the distribution on consumption will be greater than the positive effect on investment and export and therefore growth will slow down (the curve is sloped downward). If, on the other hand the demand regime is profit-led, the curve will have a positive slope because the positive effect on investment and export will be larger than the negative effect on consumption.

[11] This law was later revised by Kaldor (1966) and became known as Kaldor's second law: an increase in manufactory output increases labour productivity in manufactory.

Fig. 2.6: *Productivity regime and profit-led demand regime*

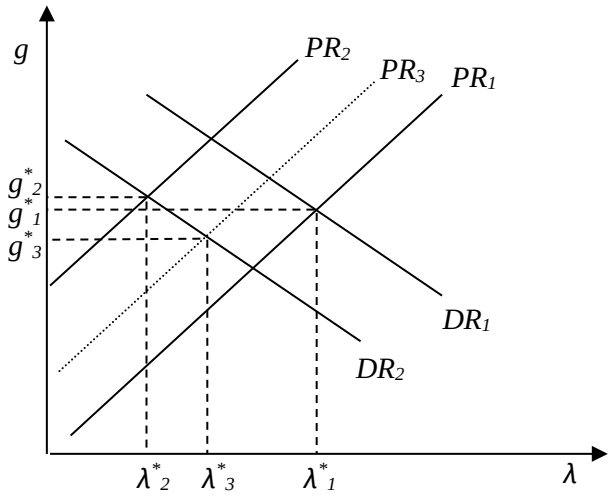


Figure 2.6 shows the effect of a fall in the real wage rate when the demand regime is wage-led. DR_1 shifts downward to DR_2 as, in a wage-led regime, growth is positively related to the wage rate. At the same time PR_1 moves upward because of the negative effect of lower wages on productivity. The final effect on the growth rate depends on how productivity reacts to changes in the wage rate. For high values of θ, PR will move to PR_2 and the equilibrium growth rate will increase slightly. This is because initially a decrease in the real wage rate causes a decrease in the wage share and therefore growth. The decrease in productivity, however, is so large that - for a given (new) wage rate - the profit share will fall and therefore growth will increase. We can easily see that if the reaction of the productivity to the wage rate fall is smaller - PR moves to PR_3 – the impact on the growth rate will be negative. On the other hand, independently on how productivity reacts to the wage share, the final effect on the equilibrium level of productivity growth will be lower ($\lambda^*_2, \lambda^*_3 < \lambda^*_1$)

Fig. 2.7: *Productivity regime and demand led demand regime*

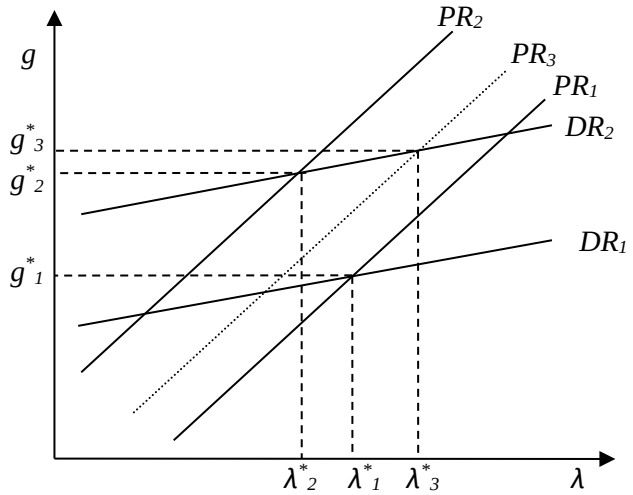


Figure 2.7 shows the dynamics of a change in the distribution of income when the demand regime is profit-led. A fall in the wage rate shifts DR_1 to DR_2 because of the positive effect of a lower wage share on aggregate demand. As before, productivity is negatively affected by a fall in the wage rate and hence it moves to either PR_2 or PR_3. In this case, the effect on growth is always positive provided that DR is flatter than PR, i.e. the increase in demand caused by an increased in productivity is lower than the increase in productivity caused by an increase in output growth. The effect on productivity, on the other hand will vary with the sensitivity of productivity respect to the wage rate which determine whether PR_1 shift to PR_2 or PR_3. This is because in a profit-led regime, there are two contrasting effects on productivity caused by a fall in the wage rate. Higher growth has a positive effect on productivity while lower wages a negative one.

To sum up, when productivity is not too responsive to real wages (PR shifts to PR_3), a fall in the real wage will cause respectively, depending on whether the regime is wage or profit-led, a decrease and an increase in both productivity and growth. It follows that, in the light of this extension of the Neo-Kaleckian models, it becomes even more relevant to determine by which demand regime individual countries are characterised.

2.4.5 The long and the short run

Closely related to the problem of accounting for both demand and supply is that of determinant of long-run and short-run growth. Outside the post-Keynesian school, there have been some attempts to reconcile supply and demand by Marxists and Neoclassical scholars. The conclusion that both approaches reach is that growth can be driven by demand in the short run but it is constrained by supply in the long run. On the neo-Marxist side, Duménil and Lévi (1999) expand the Kaleckian model by endogenising inflation and adding a reaction function of the central bank to inflation. Inflation ($\dot{p}$) is modelled as a positive function of the difference between actual and desired level of capacity utilisation (u and u_d respectively).

$$\dot{p} = \varphi(u - u_d) \tag{37}$$

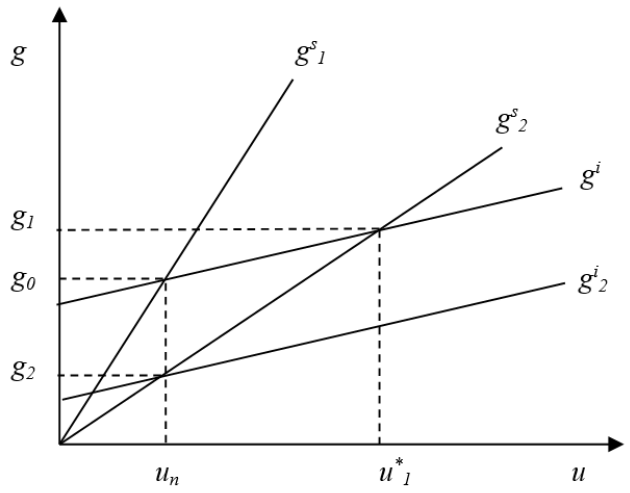
Moreover, inflation reacts to capacity utilisation with a lag. When the inflation rate is above its target rate ($\dot{p}_t$) - which is the inflation rate which occur when capacity utilisation is at its desired level - the central bank reacts increasing the interest rate (i)

$$\Delta i = \alpha(\dot{p} - \dot{p}_t) \tag{37}$$

In the short run, growth is influenced by the paradox of thrift and the functional income distribution as in the Kaleckian model discussed in section 2.3.2: a decrease in the propensity to save causes an increase in both capacity utilisation and growth. This correspond to a rightward

rotation of the g^s curve in Figure 2.8 and a higher short run equilibrium growth rate (g_1). In the long run however, the mechanisms that brings capacity utilisation back to its original level kicks off. The Central Bank reacts to the increase in inflation caused by high capacity utilisation by increasing the interest rate. This causes a downward shift of the investment function in the graph in Figure 2.8. Interest rate will remain high until capacity utilisation is brought back to its normal level. At the new intersection point, the growth rate (g_2) is lower than the original one. The paradox of thrift therefore holds only in the short run, in the long run savings is positively related to growth. This model however, can be criticised for at least three strong assumptions. First, the model relies on the fact that the Central Bank has a target rate of inflation determined at the normal level of capacity utilisation. If the Central Bank does not follow this rule there would be no shift in the g^i curve and fall in the growth rate. If investment does not respond strongly enough to changes in the interest rate the shift in g^i could be small and it could not offset the positive effect of an increase in the saving rate. Moreover, investment might be influenced asymmetrically by the interest rate. Finally, as long as the desired level of utilisation is below full capacity, the marginal cost of labour does not change and therefore prices should not be influenced by demand.

Fig. 2.8: *Short-run and long-run dynamics*



Models that try to integrate demand and supply proposed by the neoclassical synthesis reach similar conclusions. Dutt (2006, 2010) summarises them as follows. The short run is modelled as in the Kaleckian models. In the long run however, since prices and wages are perfectly flexible, autonomous investment (γ in equation 13) changes with the growth rate of unemployment which equal to the growth rate of employment (l) minus the growth rate of the labour force (n).

$$\dot{\gamma} = -\partial(l - n) \tag{38}$$

This can happen for two reasons. First, an increase in unemployment causes a fall in the wage rate and therefore in prices. The decrease in price increases the real money supply and decreases the interest rate which in turn stimulates investment. Second, when unemployment increases, the government might respond with expansionary monetary policies that through a fall in the interest rate would also stimulate investment. Demand therefore has only a short term role: an increase in the wage share stimulates growth in the short run but in the long run the decrease in unemployment discourage investment through higher interest rate. The main reasons which might cause the market-adjustment to work are rigidity of prices and wages, endogeneity of the money supply, the lack of responsiveness of investment to the interest rate and the fact that policy makers might not want to respond to changes in unemployment.

As Dutt (2006, 2010) points out, in so far as growth depends on aggregate supply factors such as the growth rate of labour supply and labour productivity - which are often uncorrelated with aggregate demand in the long run – growth will not depend on aggregate demand. He therefore proposes a model in which labour productivity is determined in the short run which is, in turn, influenced by aggregate demand. In particular, labour productivity is positively influenced by the difference between growth rate of employment and the growth rate of the labour force.

$$\lambda = \varepsilon(l - n) \tag{39}$$

The assumption is that firms respond to labour shortages by adopting more efficient techniques of production. This view of technological change is similar to that of Naastepad (2006) in so far as the real wage rate and growth rate of unemployment are positively correlated. Since productivity depends positively on aggregate demand, one of the main implication of this model is that in a wage-led country an improvement in the functional distribution of income produces positive supply as well as demand effects not only in the short run. Similarly, the effect of monetary and fiscal policies is not limited to the short run.

To conclude, as Lavoie (1995) points out, the theories that allow for Keynesian or Kaleckian dynamics only in the short run assume that, in the long run, capacity utilisation is stable at its desired or natural level. This means that firms, in the long run, try to adjust their capacity utilisation to a certain optimal and given rate. This implies that, in terms of the Kaleckian model described above, the investment function (24) changes in the long run

$$g^i = \frac{I}{K} = \gamma + \beta \frac{\pi u_n}{v} \tag{40}$$

The accelerator term (δu) disappears because actual capacity utilisation is equal to its natural rate and as in the Robinson's model, the profit rate is only a function of the profit share because u_n is fixed (assuming also v remains constant). To restore the intuition of the Kaleckian model to the long run, Lavoie (1995) proposes an adjustment mechanism that endogenises capacity utilisation. In particular, he argues that, even though in the long run firms reach the desired rate of utilisation, this rate depends on the short-run actual rate of capacity utilisation. To put this with Amadeo's words:

> "*Indeed, one may argue that if the equilibrium degree is systematically different from the planned degree of utilisation, entrepreneurs will eventually revise their plans, thus altering the planned degree. If for instance, the equilibrium degree of utilisation is smaller than the planned degree ($u^* < u_n$), it is possible that the entrepreneurs will reduce u_n. The reduction of the planned degree would shift the investment function in such a way that the new equilibrium degree will be greater than the initial one. If entrepreneurs keep revising their plans, eventually both degrees of utilisation will coincide. Even if this is the case, however, the objective of this model is to show that the equilibrium degree of utilisation – be it equal or different from the planned degree – is endogenously determined.*" (Amedeo, 1986, p.155)

In terms of the analysis based on Figure 2.8, this would mean that g^i_2 would not have had to shift until g^i_2 and g^s_2 intersect at the original natural rate of utilisation. The short run increase in utilisation to u^*_1 would have caused u_n to move somewhere to the right and the new long-run equilibrium would be somewhere between the initial long-run equilibrium (g_0) and the short-run growth rate (g_1) (Lavoie 1995).

2.5 Heterodox empirical literature

This section presents the main empirical findings on the relationship between functional income distribution and economic growth with special emphasis on the Post-Keynesian tradition. As discussed in section 2.4.3, the neo-Kaleckian theoretical models – because of the Marglin's and Bhaduri's variant of the investment function - allows for both a profit and a wage-led growth regime. Therefore, whether the wage share is positively or negatively related to growth is an empirical question which might have a different answer depending on the country. For this reason, since the middle of the 1990s, many empirical works have been devoted to the analysis of the growth regimes in different countries. To simplify the exposition these studies have been divided by their estimation methodology.

2.5.1 Decomposition of aggregate demand

The first method used to estimate the effect of income distribution on economic growth is based on the analysis of the decomposed aggregate demand. The method consists in summing up the effects of an increase in the profit share on the components of aggregate demand: consumption, investment and net exports. The effect of the profit share on government spending is usually not included as government spending is assumed to be exogenous to changes in the distribution of income.

Assuming that prices do not depend on demand, the effect of a change in the profit share on growth is equal to the sum of the effects of a change in the profit share on the components of aggregate demand.

$$\frac{\partial g}{\partial \pi} = \frac{\partial AD}{\partial \pi} = \frac{\partial C}{\partial \pi} + \frac{\partial I}{\partial \pi} + \frac{\partial NX}{\partial \pi} \tag{41}$$

Bowles and Boyer (1995) are the first to test the Bhaduri and Maglin's (1990) variant of the Kaleckian model. They estimated single equations for the three components of aggregate demand as described above for USA, UK, France, Germany and Japan. The relevant finding is that all the countries in the study are domestically wage-led: the profit rate has a negative effect on consumption and investment. However, when the negative effect of redistribution on net exports is added to the domestic effect, the two European countries and Japan become profit-led. The main econometric shortfall of this study is that it fails to take into account the problem of unit root. The rest of the papers presented in this chapter explicitly tackle this problem.

The first generation of empirical works inspired by the neo-Kaleckian models - Naastepad and Storm (2006), Ederer and Stockhammer (2007), Stockhammer and Ederer (2008), Hein and Vogel (2008, 2009) - built on the work of Bowles and Boyer (1995) in order to determine the growth regimes of individual OECD countries. In particular, the countries that were analysed more often are Germany, France, The Netherlands, Austria, Japan and the United States. The main common result is that the domestic regime is usually wage-led but the overall regime is less wage-led (or profit-led) because of the negative effect of higher unit costs on net exports. It is worth pointing out that Austria, as one would expect from a relatively small and open economy, is the only country whose overall regime is always found to be profit-led (Lavoie and Stockhammer 2012). Stockhammer and Ederer (2008), moreover point out that the negative effect of redistribution on net exports in Austria increased from 1960 to 2005. The effect of a 1% increase in the wage share was -0.11% and -0.39% in 1960 and 2005 respectively.

Onaran and Yenturk (2001) use a different approach. They employ an industrial panel data to estimate the Turkish investment function. They find that the structural adjustment program wanted by the World Bank, which increased profitability of investment, did not succeed in stimulating new investment. Their analysis seems to confirm the Kaleckian hypothesis that pro-capital policies might not stimulate investment because wages are not only a cost but also a primary driver of demand.

The second generation of empirical works inspired by the neo-Kaleckian models extended the analysis by including other factors that might influence the growth regime. The three main factors that are included are the interaction between countries, the role of financialization and the non-linearity of the growth regime.

First, Stockhammer et al (2009) and Onaran and Galanis (2014), account for possible interactions between countries. In particular, Stockhammer et al (2009) analyse the effect of a change in the wage share in the Euro area as a whole because, since most countries within it trade mostly with each other, it can be considered as a relatively closed economy. They find that both the domestic regime and the overall regime are wage-led. Onaran and Galanis, in an article that we will discuss in more detail in the next chapter, analyse the effect of a contemporaneous decrease in the wage share in many OECD and developing countries. Not surprisingly, the results highlight how the world economy as a whole is wage-led.

Financialization[12] is the second element that is added to the analysis in order to extend the first generation of empirical work on growth regimes. In particular, the main argument is that financialization weakens the effect of distribution on growth because it makes investment less dependent on profits and consumption less dependent on real income. At the same time however, financialization, through financial capital flows, relaxes balance of payments constraints and allows trade imbalances to persist for longer periods. Stockhammer (2009, 2015) argues that wage stagnation gave rise to two complementary growth regimes: debt-led and export-led. In some countries, such as the United States, low real wages are compensated for by a growing household debt that fuels domestic demand. In this case, debt becomes the engine of growth. In other countries, such as Germany for example, low domestic demand caused by low wages is

[12] Financialization does not have a unique definition. Lapavitsas (2011) underlines that Marxian and post-Keynesian economist focus on different aspect of it, even though there are overlaps. Post-Keynesian empirical literature associates financialization with the rise of the rentier class. In the most empirical studies this is proxied by the amount of interest payments and dividends - see for example, Onaran et al (2011), Stockhammer (2004). Marxist approach instead underlines three aspects of financialization. Firstly, large corporations have become financially independent from banks as they can aquire external fundings on the financial marets. Secondly, Banks rather than providing credit to firms, mediate the transactions on the financial markets and have turned to providing credits to households. Workers, because of stagnating wages, are more active on the financial markets especially in regard to borrowing (Lapavitsas, 2011 and Lapavitsas and Powel, 2013).

compensated by net exports growth. While these growth regimes can persist over long periods, they are substantially unstable because they depend on the stability of the financial markets as the 2007 financial crisis demonstrated. Other studies that highlight the role of inequality as a primary cause of the 2007 financial crisis are Lysandrou (2011) and Goda and Lysandrou (2013). Regarding investment, Stockhammer (2004) and Onaran et al (2011) show how the shift towards a shareholder value orientation of firms, as predicted by Lazonick and O'Sullivan (2000), had a negative effect on accumulation in the United States and France: Interest payments and dividend have a negative effect on accumulation. Orhangazi (2008) using a panel of firm level data between 1973 and 2003 confirms the negative relationship between financialization and accumulation. Similarly, to the previous studies, he argues that increasing payments in the financial market might have diverted funds from accumulation of physical capital. When some measure of financialization is included in the empirical method used by the first generation of studies mentioned above, Onaran et al (2011) and Stockhammer and Wildauer (2015) find that the growth regime in the OECD countries analysed is wage-led even though the effect of functional income distribution is modest in size. Moreover, they find evidence that debt has a positive effect on consumption which support the hypothesis of debt-led growth.

A further extension of the first generation works concerns the inclusion of possible non-linearities or structural breaks in the growth regimes. This will be discussed in the Chapter 4.

2.5.2 System approach

Arguably, the main shortfalls of the single equation method described above is its inability of accounting for the interactions between the components of aggregate demand. To overcome this, Stockhammer and Onaran (2004) and Onaran and Stockhammer (2005, 2007) use a structural vector autoregressive model (SVAR). The advantage of using a SVAR compared to a simple VAR is that the former allows modelling the contemporaneous relationships between variables. In these works, the dependent variables of the VAR are investment, profit share, export, imports, capacity utilisation and employment. The contemporaneous effects – By_t - are describes in the following matrix

$$y = \begin{vmatrix} I/Y \\ \pi \\ X/Y \\ M/Y \\ z \\ E \end{vmatrix} \quad B = \begin{vmatrix} b_{11} & 0 & 0 & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 & b_{25} & b_{26} \\ 0 & b_{32} & b_{33} & 0 & 0 & 0 \\ 0 & b_{42} & 0 & b_{44} & b_{45} & 0 \\ b_{51} & b_{52} & b_{53} & 0 & b_{55} & 0 \\ 0 & 0 & 0 & 0 & b_{65} & b_{66} \end{vmatrix} \tag{42}$$

Where y_t is a vector of all the variables and B is the contemporaneous interaction coefficients matrix. The zeroes represent the contemporaneous effects between variables which are restricted to zero. On the other hand, as discussed in the previous sections, b_{25}, b_{32} b_{45}, b_{51} b_{53} and b_{65} are supposed to have positive values while b_{26}, b_{42}, b_{52} are expected to have a negative sign. The contemporaneous effects are defined as follows. Investment is assumed to be affected by other variables only in the future hence there are no contemporary effects. The profit share depends only by the rate of capacity utilisation (b_{25}) and employment (b_{26}) because of the labour reserve army effect on wages. Exports are determined only by the profit share (b_{32}) as it is considered to be an indicator of competitiveness. Profit share (b_{42}) - because it is negatively related with the level of demand – and capacity utilisation (b_{45}) are the contemporaneous determinants of imports. Capacity utilisation depends on all the variables (b_{51}, b_{52} and b_{53}) a part from import ad employment while employment depends only on capacity utilisation (b_{65}) because, considering that the proxy used for capacity utilisation is growth, there is no need to include investments as well.

The most important characteristic of a VAR is that, being a system of equations, it allows to check how the whole system respond to a shock of one variable. This is done through the impulse response functions which describe what is the effect of a shock in one of the variables on others considering all the between-variable interactions.

Stockhammer and Onaran (2004) analyse France, UK and USA. In this case, the impulse response functions do provide evidence in support of the Kaleckian models as a shock in the distribution of income does not have a statistically significant effect on capacity utilisation and accumulation. However, they find that employment is negatively affected by shocks in accumulation and capacity utilisation which seems to confirm the post-Keynesian hypothesis that the labour market depends on good market variables. The same authors in 2005 use a similar approach to study the growth regime of Korea and Turkey. They find that, in both countries, employment and accumulation are negatively related to the profit share and therefore the accumulation regime is wage-led - in Korea more than in Turkey. Turkish wage-led regime is confirmed also by Stockhammer and Onaran (2007).

However, using a simple VAR with only two variables (capacity utilisation and a distributional variable), Barbosa-Filho and Taylor (2006) and Carvalho and Reza (2015) find evidence that the United States is profit-led. Their impulse response functions show that an increase in the profit share leads to an increase in capacity utilisation.

From this brief summary of the empirical literature it emerges that there is mixed evidence regarding the growth regimes in most countries. Unfortunately, the results seem to depend, not

always but often, on the statistical tool used in the analysis. For this reason, in the following three chapters we will discuss in more detail the empirical methodology of some of the works mentioned above.

3 - Wage moderation in Mexico, Canada and the United States: The effect of functional income distribution on trade and aggregate demand

3.1 Introduction

Whether increasing income inequality is a natural result of capitalist economies caused – among other things - by the higher returns of capital compared to labour and by technological progress or whether, instead it is the result of policies aimed at reducing the cost of labour, the rise in income inequality in western countries, in the past thirty years, is largely undisputed. Smeeding (2002) for example, pointed out, using the data of the Luxembourg income study, that since the 1980s most OECD countries experienced an increase in the polarization of income.

The advocates of wage moderation look positively at a pro capital redistribution of income for two reasons. Firstly, when wage share of income decreases, the profit share must increase and this stimulates investment. Secondly, lower labour costs allow for the reduction of domestic and export prices with the effect of improving net exports. As discussed in the previous chapter however, post-Keynesians highlight how wages are not only a cost item for firms but also a fundamental determinant of demand and in particular of consumption. Consequently, whether the final effect of wage moderation on growth is positive or negative – the growth regime is profit or wage-led, respectively - is an empirical question. In the Keleckian tradition, theoretical studies as well as early empirical works have found that individual countries become more profit-led when external demand is accounted for because of changes in competitiveness[13].

Even though these studies focused on individual countries, wage moderation is a global phenomenon. Since we live in an increasingly globalised world and wage moderation affects competitiveness, the causal relationship between income distribution and aggregate demand should be looked at including in the analysis countries that trade with each other. For this reason, this chapter will try to answer the following set of questions:

A. *Do changes in the distribution of income in a country have any impact on other countries' economic growth? If so, is this positive or negative?*

Specifically, we will compute the effect of a contemporaneous decrease in wage share among countries that are major trade partners.

[13] Blecker (1989, 2011) and Bhaduri and Marglin (1990) are among the early theoretical open economy models. On the empirical side, the main contributions come from Bowles and Boyer (1995), Naastepad and Storm (2006), Ederer and Stockhammer (2007), Stockhammer and Ederer (2008), Hein and Vogel (2008, 2009).

In order to answer these questions, we developed a methodology, based on a post-Keynesian framework, to test what is the effect on aggregate demand and foreign trade, of a contemporaneous fall in the wage share in the Country members of the North American Free Trade Agreement (NAFTA). In particular, after estimating the effect of a change in the functional distribution of income on aggregate demand, the interactions between the three countries are analysed.

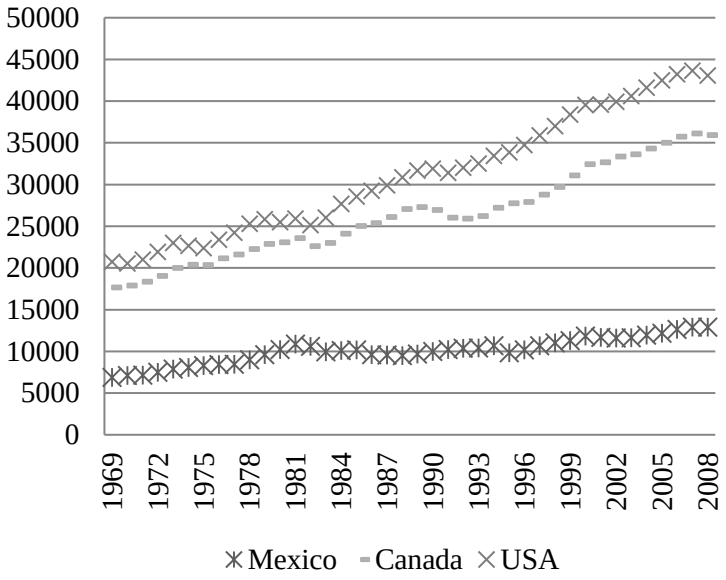
Our work belongs to a "second generation" of empirical Kaleckian papers together with Stockhammer, Onaran and Ederer (2009) and Onaran and Galanis (2014). The intuition behind this second group of studies is that the competitive advantage that a country gains by reducing its wage share is undermined by the fallacy of composition. If all countries reduce their wage share at the same time in order to reduce domestic and export prices, no one will have a relative advantage on the others. Stockhammer et al (2009) try to solve this problem by analysing the Euro area as a whole, because most European countries trade greatly with other European partners and hence the euro area can be considered as a closed system. Their main result is that Europe would benefit from a pro labour redistribution of income. The principal limitation is that even if Europe as a whole is wage-led we have no information on whether all the countries within it are wage-led as well, or not. However, knowing this is essential in order to propose some policy coordination between countries. Onaran and Galanis (2014) on the other hand, set up an empirical framework that enables studying the effect of a change in the functional distribution of income on each country assuming that the same change was to happen in all the other countries as well. They find that the competitive (country) gains of a fall in the wage share are substantially reduced when the wage share falls in all the other countries as well. Moreover, they find that the world as a whole is wage-led. The empirical analysis of this chapter is inspired by Onaran's and Galanis' work even though there are some substantial methodological difference especially regarding the interactions between countries. These differences will be discussed in detail in the following section.

Testing the effect of a contemporaneous change in the distribution of income in NAFTA is realistic because the United States, Mexico and Canada, followed the same trend in the distribution of income as the other western countries. In spite of a stable rise in real income per capita, the real hourly wage in the manufacturing industry remained steady, or decreased, from the late seventies in the United States, Mexico and Canada (Figures 3.1 and 3.2). Consequently, the wage share - that is the portion of total income received by wage earners - decreased as well. Figure 3.3 shows that the adjusted wage share[14] was constant in the US and Canada from 1960 to 1970 and then it decreased by about 10% until 2007. In Mexico instead, apart from an initial increase, the wage share fell by 30% from 1970 to 2007. This is also consistent with Blecker's finding (2003) that

[14] The adjusted wage share is the wage share augmented by the share of income earned by self-employed individuals.

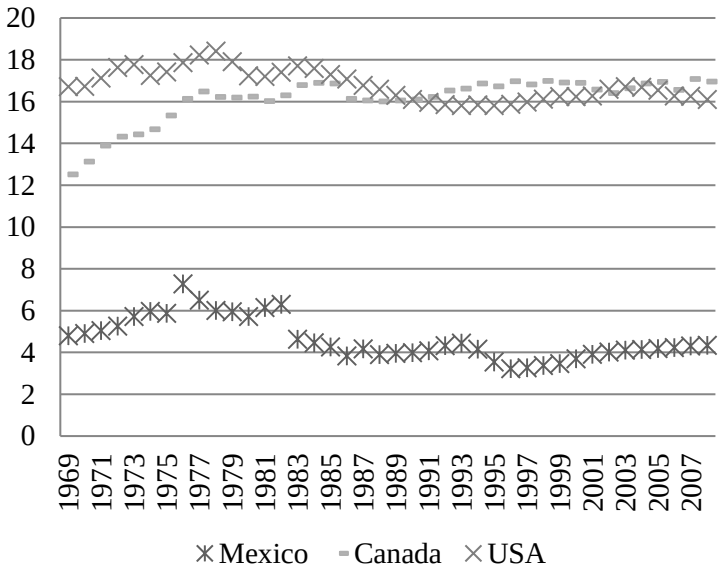
throughout NAFTA - from 1990 to at least 2003 - there has been an increasing gap between productivity of labour and labour compensation.

Fig 3.1: *Gross Domestic Product per Capita (2005 PPP $)*



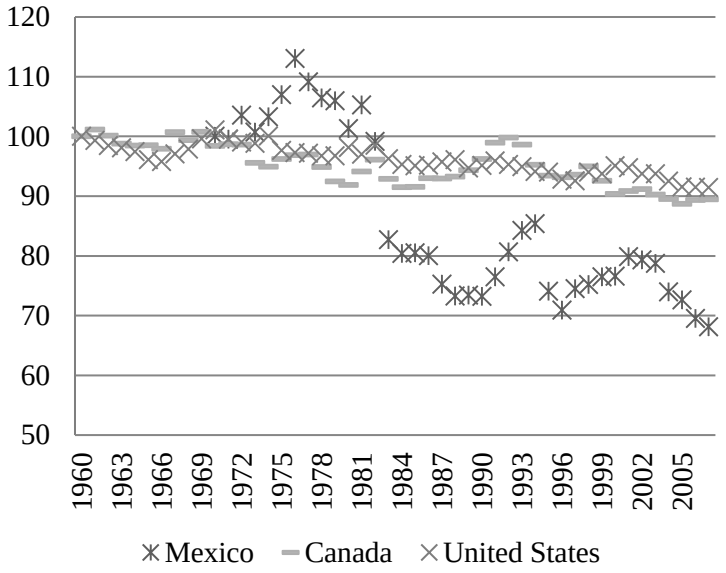
Note: Data are from the World Economic indicators

Fig. 3.2: *Hourly Wage in Industry (2005 PPP $)*



Note: Data are from LABORSTA, the database of the international labour office database.

Fig. 3.3: *Adjusted Wage Share*



Note: The adjusted wage share is transformed into an index with base year in 1960 for the United States and Canada and 1970 for Mexico.

One of the main results of the analysis is that the effect on export following a contemporaneous decrease in the wage share is negative in all countries. In other words, the competitive advantage that each country gains thanks to a reduction in its wage share (to which is associated a decrease in export prices), is offset by a contemporaneous increase in competitiveness in the other two countries. Moreover, we find that even though an increase in the profit share has an overall positive effect in Mexico and Canada and a negative effect only in the United States, NAFTA is overall wage-led. This is because the negative effect of the profit share in the United States is larger than the sum of its positive effects in Mexico and Canada. We confirm the results from Stockhammer et al (2009) and Onaran and Galanis (2014) that find that when more countries are analysed together, the overall growth regime is likely to be wage-led.

The chapter develops as follows. In the next sections, we present the theoretical foundation of our analysis, discussing how functional distribution affects each component of aggregate demand. The third section describes the empirical methodology and the sample selection while the results are shown and discussed in the fourth section. Section five concludes.

3.2 Theoretical framework

Following Stockhammer et al (2008) and Onaran and Galanis (2014) we now outline a simple and general Keynesian-Kaleckian theoretical framework upon which we based the empirical investigation. We define this framework as Keynesian-Kaleckian because it has similar characteristics to the Post-Keynesian empirical works discussed in the previous chapter. Firstly,

the subject of the analysis is the distribution of income between wages and profit earners rather than between households. A second typical feature of Kaleckian models is the presence of spare capacity utilization in the economy. Therefore, prices are not positively related to the quantity produced - because there are no diminishing returns - and we assume they depend on a mark up[15] decided by the firms as a share of total cost. Inflation then is mainly determined by the straggle between profit and wage earners to secure a higher share of income for themselves. Finally, the functional distribution of income depends on factors that we consider exogenous in our analysis such as the degree of monopoly and the sectoral composition of the economy.

The central relationship of interest is between aggregate demand and income distribution, in particular how demand (*Y*) responds to changes in the profit share of income (π) [16]

$$\frac{\frac{dY_i}{Y_{fc,i}}}{d\pi} = ? \tag{1}$$

The effect of a change in the profit share on aggregate demand can be decomposed into the sum of the effects that a change in the profit share has on the different components of aggregate demand

$$\frac{\frac{dY_i}{Y_{fc,i}}}{d\pi} = \frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial\pi} + \frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial\pi} + \frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial\pi} - \frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial\pi} = ? \tag{2}$$

Where *C* is consumption, *I* is investment, *X* is export and *M* is import[17]

In the next section, we describe how wages affect each component of aggregate demand within a country taking functional distribution of income as exogenous and constant in the other countries. Subsequently, in section *3.2.2* we discuss and model the interactions between the aggregate demand in one country and changes in the distribution of income in its trade partners.

3.2.1 The effect of the profit share on aggregate demand

Consumption is expressed as a function of wages (*W*) and profits (*R*) rather than the level of income as a whole because wage earners and profit earners have different consumption behaviours.

[15] $P = (1+m)\frac{wL}{Y}$, where prices are determined with a mark up (*m*) on unit labour cost (*w* is hourly wage, *L* is total hour worked and *Y* is GDP.

[16] The change in aggregate demand caused by an increase in the profit share is normalised by the level of income at factor cost to simplify the interpretation. Income at factor cost (Y_{fc}) is used because it is equal to the sum of the wage and the profit share.

[17] Government expenditure does not appear in the equation because it is assumed to be exogenously determined from the distribution of income.

$$C = C(W, R) \tag{3}$$

The propensity to consume out of wages should be higher than the propensity to consume out of profit not only because often profits are associated with high-income earners but also because firms reinvest most of their retained profit. If this is true, an increase in the profit share should have a negative effect on consumption.

$$\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} < 0 \tag{4}$$

Investments is specified as a function of the interest rate (*ir*) and the profit rate (*r*) that - following Bhaduri and Maglin (1990) – is decomposed into profit share (π), capacity utilization (*u*) and productivity of capital (*z*).

$$r = \frac{R}{K} = \frac{R}{Y}\frac{Y}{Y_p}\frac{Y_p}{K} \tag{5}$$

$$I = I(ir, \pi, u, v) \tag{6}$$

Where K is the stock of capital and Y_p is potential output. For a given rate of capacity utilization and productivity of capital, we expect the profit share to be positively related to investments.

$$\frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} > 0 \tag{7}$$

It follows that whether a country (*i*) domestically benefits or loses from a higher profit share - that is, the demand is domestically profit or wage-led - depends on the magnitude of the opposite effects that a pro-capital redistribution of income has on consumption and investment.

Turning to the foreign trade sector, functional distribution of income affects net exports mainly through a change in competitiveness. As mentioned in the introduction we are assuming that prices are set with a mark-up on unit labour costs. Since the real unit labour cost is closely related and moves in the same direction of the wage share[18], a decrease in the unit labour costs is always associated with an increase in the profit share. Hence, when the profit share increases a country becomes more competitive because both its domestic and export prices fall.

[18] Real unit labour costs is equal to the adjusted wage share multiplied by income at factor costs as a ratio to income at market price. This adjustment is necessary because while the wage share does not include taxes and subsides the unit labour cost must take them into account.

Import, is specified as a function of domestic prices (P), import prices (P_m), exchange rate (e), and import demand divided between consumption and investment spending[19].

$$M = M(P, Pm, \mathrm{e}, \mathrm{I}, C) \tag{6}$$

Therefore, the overall effect of a change in the functional distribution of income on import is the sum of price and demand effects

$$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_i} = \left(\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} \frac{\partial M_i}{\partial C_i} + \frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} \frac{\partial M_i}{\partial I_i} \right) + \frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial P_i} \frac{\partial P_i}{\partial \pi_i} \tag{7}$$

The first term of equation (7) illustrates how imports relate to domestic demand that is in turn determined by consumption and investment separately rather than total GDP. We use this specification to take into account the structural composition of import between capital and consumer goods that may very well vary across countries - especially if they are at different stages of economic development. Since income distribution affects consumption and investment, the effect on import - that could be either positive or negative - depends on both the marginal effect of consumption and investment on import $\left(\frac{\partial M_i}{\partial C_i} \text{ and } \frac{\partial M_i}{\partial I_i}\right)$ and the marginal effect of the profit share on consumption and investment $\left(\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} \; and \; \frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} \right)$. The second term in equation 5 instead, describes the relationship between the profit share and import. As discussed above, we expect the profit share to be negatively related to domestic prices that are in turn positively related to imports. As a result, the first term of equation (7) should be negative.

The advantage of using this import specification is its flexibility that allows us to use the same methodology for different countries and at the same time account for structural economic differences between them. The effect of a change in the functional distribution of income on import is the sum of the price and demand effect.

The last component of aggregate demand, export, is a function of export prices (Px), world prices (P_w), exchange rate and income of the rest of the world (Y_w).

$$X = X(Px, P_w, \mathrm{e}, \mathrm{Y_w}) \tag{8}$$

[19] This specification of import demand is one of the difference with the empirical work of Onaran and Galanis (2014) and it will influence the way in which we account the interaction between countries.

Since, as seen above, the wage share is directly related to export prices, an increase in the profit share has a positive effect on export because it increases competitiveness by reducing export prices.

$$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_i} \rightarrow \frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial Px_i}\frac{\partial Px_i}{\partial \pi_i} > 0 \tag{9}$$

Table 3.1: *Partial effect of profit share on aggregate demand*

Components of aggregate demand	Decomposed effect of π on Y
Consumption	$\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} < 0$
Investment	$\frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} > 0$
Export	$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_i} = \frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial Px_i}\frac{\partial Px_i}{\partial \pi_i} > 0$
Import	$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial P_i}\frac{\partial P_i}{\partial \pi_i} < 0$ $\quad$ $\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i}\frac{\partial M_i}{\partial C_i} + \frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i}\frac{\partial M_i}{\partial I_i} = ?$
Aggregate Demand	$\frac{\frac{\partial Y_i}{Y_{fc,i}}}{\partial \pi_i} = \frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} + \frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} + \frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_i} + \frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_i} = ?$

Finally, the total effect on GDP is the sum of the partial effects of a change in the distribution on consumption, investment and exports minus the effect on imports. Because these effects do not go in the same direction, whether the economy is wage or profit largely depends on the specific structural characteristic of each country such as, for example, its degree of openness, the propensity to consumer and firms' access to credit. Table 3.1 sums up the expected effects of an increase in the profit share and a consequent decrease in the wage share.

3.2.2 Interactions between countries and the fallacy of composition

The framework outlined above allows to investigate the within country effects of functional income distribution but it does not take into account the interactions between countries. Not only it does not consider the effects of a change in one country's income on its trade partners' economies, but it also assumes that the distribution in the latter is kept constant. In this section,

following the footsteps of Onaran and Galanis (2014), we delineate the main channels of interaction between components of aggregate demand among countries. As discussed above, one of the main advantages of reducing the wage share is that the country gains international competitiveness through lower domestic and export prices. If, however, its trade partners reduce their wage shares as well, this competitive advantage will decrease or be entirely offset.

Let us first consider how country *i*'s import is affected by a change in the distribution in its trade partner - country *j*. The change in price of import in country *i* (Pm_i) is equal to the change in the price of export in country *j* (Px_j) weighted by the share of country *i* imports from country *j* over country *i* total import$\left(\frac{M_{ij}}{M_i}\right)$.

$$\Delta Pm_i = \frac{M_{ij}}{M_i}\Delta Px_j \tag{10}$$

The underlining assumption behind this identity is that the change in the functional distribution of income causes the price of all exported goods to vary in the same proportion[20]. Equation (11) shows the relationship between one country's import and its trade partner's functional distribution of income.

$$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_j} = \frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial Pm_i}\frac{M_{ij}}{M_i}\frac{\partial Px_j}{\partial \pi_j} \tag{11}$$

An increase in country *j's* profit share $(\partial \pi_j)$ has a positive effect on country *i*'s import because it decreases its import price (Pm_i) through a reduction of country *j*'s export prices (Px_j). This is a typical fallacy of composition problem: country *i* gains a competitive advantage - resulting in a reduction of imports - by decreasing the wage share only if its trade partners do not reduce their wage share at the same time. If that happens, the positive effect of lower wages is offset, at least partially.

The overall effect of a contemporaneous increase in the profit share in country *i* and *j* (π_{i+j}), on country *i*'s import is equal to the sum of (7) and (11)

[20] If this assumption holds true, the change in export price in country j is distributed among its trade partners depending only on their share of imports from country *j* and not on the composition of their imports. If instead, goods are heterogeneously affected by a change in the cost of labour, the composition of trade between countries should be taken into account, as it might be the case that some countries import from country *j* products that experience a lower increase in price compared to the good imported by other countries from country *j*.

$$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_{i+j}} = \left(\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} \frac{\partial M_i}{\partial C_i} + \frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} \frac{\partial M_i}{\partial I_i} \right) + \left(\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial P_i} \frac{\partial P_i}{\partial \pi_i} \right) + \left(\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial P m_i} \frac{M_{ij}}{M_i} \frac{\partial P x_j}{\partial \pi_j} \right) \quad (12)$$

It is not possible to determine a priori what the direction of the change in import is because it depends on the magnitude of these three contrasting effects.

On the other hand, country *i*'s export to country *j* depends on country *j*'s import that, symmetrically to what shown in equation (12) for country *i*, depend on the distribution of income in both countries. However, since we already account for the effect of a change in export price in country *i* on country *i*'s export, we will now consider what is the effect (on country I's export) of a change in country *j*'s import caused by a change in country *j*'s distribution rather than the change in country *j*'s import caused by a change in the distribution of income in both countries. In other words, we use the change in import in country *j* as calculated in equation (7) rather than (12). Since the change in country *j*'s import, following a change in the profit share in both *j*, can be positive or negative, we cannot foresee what is the effect on country *i*'s export. Formally we can write the change in country *j*'s demand for country *i*'s export, caused by an increase in country *j*'s profit share, as

$$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_j} = \frac{\frac{\partial M_j}{Y_{fc,j}}}{\partial \pi_j} \frac{Y_{fc,j}}{Y_{fc,i}} \frac{\partial M_{ji}}{\partial M_j} \quad (13)$$

Where the partial change in country i's export is equal to the product of the change in country j's import - as in equation (7) - and the ratio of the two countries income $\left(\frac{Y_j}{Y_i}\right)$ weighted by the share of country *j*'s import coming from country *i* $\left(\frac{M_{ji}}{M_j}\right)$.

The total effect of a change in the functional distribution in both countries on the export of country i, is the sum of the change in demand for its goods and services from country j (13) plus the positive effect of a reduction in its export prices (9).

$$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_{i+j}} = \frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial P x_i} \frac{\partial P x_i}{\partial \pi_i} + \frac{\frac{\partial M_j}{Y_{fc,j}}}{\partial \pi_j} \frac{Y_{fc,j}}{Y_{fc,i}} \frac{\partial M_{ji}}{\partial M_j} \quad (14)$$

Also in this case whether an increase in the profit share has a positive or negative effect on export has to be determined empirically because it depends on the magnitude of the opposite effects that contribute to the total change in export.

The estimation of export demand is probably the main methodological difference between our work and Onaran and Galanis (2014). They calculate the demand for export coming from abroad as

$$\frac{\frac{dX_i}{Y_i}}{dY_j} = \frac{\partial X_i}{\partial Y_w}\frac{Y_j}{Y_w}\frac{\partial Y_j}{Y_j} \tag{15}$$

Where Country *i*'s export depends on the marginal effect of export with respect to world income (Y_w) and the increase in country *j*'s aggregate demand $\left(\frac{\partial Y_j}{Y_j}\right)$ weighted by the share of country *j*'s income in the world income $\left(\frac{Y_j}{Y_w}\right)$. The main problem of this method is that it does not take into account the share of trade between countries. The contribution of country *j*'s increase in demand to country *i*'s export depends entirely on country *j* weight on world total income independently from whether country *i* and *j* are trade partners at all. For example, Mexico and Spain have similar GDP but they do not have the same trade patterns with the US. An increase in Mexican GDP should have a larger effect on US export than a similar increase in Spanish GDP because Mexican demand for US export is higher than the Spanish one.

Finally, the total income effect of a contemporaneous change in the profit share in both countries on country i can be written as

$$\frac{\frac{\partial Y_i}{Y_{fc,i}}}{\partial \pi_{i+j}} = \frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} + \frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} - \left[\left(\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i}\frac{\partial M_i}{\partial C_i} + \frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i}\frac{\partial M_i}{\partial I_i}\right) + \left(\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial P_i}\frac{\partial P_i}{\partial \pi_i}\right) + \left(\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial Pm_i}\frac{M_{ij}}{M_i}\frac{\partial Px_j}{\partial \pi_j}\right)\right]$$
$$+ \frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial Px_i}\frac{\partial Px_i}{\partial P_i}\frac{\partial P_i}{\partial \pi_i} + \frac{\frac{\partial M_j}{Y_{fc,j}}}{\partial \pi_j}\frac{Y_{fc,j}}{Y_{fc,i}}\frac{M_{ji}}{M_j} \tag{16}$$

3.3 Empirical analysis

3.3.1 Sample selection

The selection of the sample of countries is based on two principles: How much they trade with each other and whether a political agreement already exists between them or not.

On one hand, the intuition behind this paper is that the distribution of income between wage and profit share should be treated internationally and not simply at a national level because it has an effect on each country's net exports and it consequently has an impact on its trade partners as well. The idea then is to look at the effect on a country's aggregate demand of a contemporaneous

decrease in the wage share in its principal trading partners. We decided to look at Mexico, Canada and the United States because they trade with each other a large share of their exports compared to any other group of countries.

On the other hand, our approach suggests that because wage policies have international economic spillovers, it would make sense to coordinate these policies between countries. Mexico, Canada and the United States not only trade largely with each other and are geographically close but they are also part of NAFTA. It seems reasonable to believe that some coordination between trade partners would be easier to achieve if the countries are already part of these type of agreements.

Table 3.2: *Direction of trade, NAFTA*

By main destination		By main origin	
United States			
Canada	19.4%	China	19.5%
EU (27)	18.8%	EU (27)	16.6%
Mexico	12.8%	Canada	14.2%
China	7.2%	Mexico	11.8%
Japan	4.7%	Japan	6.3%
Canada			
United States	74.9%	United States	50.4%
EU (27)	8.6%	EU (27)	11.9%
China	3.3%	China	11.0%
Japan	2.3%	Mexico	5.5%
Mexico	1.3%	Japan	3.3%
Mexico			
United States	80.1%	United States	48.2
EU (27)	4.8%	China	15.1%
Canada	3.6%	EU (27)	10.8%
China	1.4%	Japan	5.0%
Brazil	1.3%	Korea, Republic of	4.2%

Table 3.2 shows the composition of trade between the NAFTA countries using the data of the World Trade Organisation (2011). In 2011, China and the EU appear in the top five trade partners in all three countries. The reason we decided to exclude them from our analysis is mainly due to the political principle discussed above. While the coordination of the wage policy between Mexico

Canada and the United States seems already practically and politically challenging, coordinating the same policy also with all the EU countries and China is utopian to say the least.

Following the same two principles another obvious set of countries to apply our methodology on are the members of the European Union. We chose NAFTA over the EU because a common wage policy seems more feasible between three countries rather than twenty-eight.

3.3.2 Estimation Methodology

The relationship between the profit share and aggregate demand is estimated by regressing the different components of aggregate on the distribution of income. In particular, we estimate an equation for Consumption, Investment, Export, Exports prices, Imports and Domestic Prices. As the final effect on aggregate demand is the sum of the effects on all its components, we are not only interested in the sign of each effect but also in its magnitude. This and the fact that we have to estimate eighteen equations calls for some clarifications on the methodology used to select the best econometric model for each equation in order to dissipate possible suspicions of data mining.

The methodology used to select the econometric model is the general to specific[21]. The first step consists in estimating a general unrestricted statistical model that describes well the endogenous variable. This general model includes the dependent and independent variables and as many of their lags as they are needed to have a well defined model. A well defined model in this case is a model without any form of misspecification. In particular, we tested for autocorrelation (Breush-Godfrey test), heteroskedasticity (Breusch-Pagan), normality (K^2 test) and functional form misspecification (Ramsey RESET test[22]). The second step is to reduce the statistical model into a restricted, parsimonious economic model. To do this, all the variable that are not statistically significant in the statistical model are removed - provided that they are also jointly insignificant using an F test. Just like the statistical model the economic model must be well defined and hence it must pass all the misspecification tests listed above. If the removal of a statistically insignificant variable caused the economic model to suffer from some form of misspecification, we did not remove it (which is why sometimes non significant variables appear in the tables).

Year dummies[23] have been included both in the statistical and economic models to take into account outliers that were causing some form of misspecification as defined above. When one outlier distorted the relationship between two variables, a year dummy was interacted with the independent variable whose relationship with the dependent variable was being distorted. The need

[21] For a detailed explanation see Spanos (1986).
[22] For the Breush Godfrey test we used 2 lags of the residual and for the RESET test we used $\hat{y}^2$, $\hat{y}^3$ and $\hat{y}^4$
[23] The coefficient of the dummy variables are not reported on the tables but they are all significant at least 1%.

to use year dummies reveals that our empirical model is failing to take into account some unknown factors that are relevant to explain the behaviour of the dependent variable at least in those years. We use them conscious that they are a measure of our ignorance but we cannot afford to have any form of misspecifications especially because our sample size is too small to justify the use of robust standard error.

Turning to the data, they have all been collected from AMECO, the database of the European Commission, a part from the data on the direction of trade and the data on the Mexican adjusted wage share that come from respectively the database of the International Monetary Fund and the OECD's statistical database.

All the variables have been, converted in constant (2005) PPP dollars, transformed into logarithmic form[24] and tested for unit root with the Dickey-Fuller test. As expected, most of them resulted to be non-stationary, but at the same time most specification failed the Pesaran cointegration bond test.[25] Consequently, since in most cases we could not use error correction models, we estimate the equations in first difference using OLS. We are therefore not able to capture the long-run dynamics of the variables in our analysis. The elasticities of interest are calculated as the sum of the coefficients that capture the contemporaneous and lagged (if statistically significant) effect of a dependent variable on the independent variable. For example, Section *3.4.1.1* below, the elasticity of consumption with respect to profits ($e_{C,aR}$) in the United States is equal to $\beta_2 + \beta_4$. The elasticities are subsequently transformed into marginal effects using the same method as Onaran and Galanis (2014) which is discussed step by step in the following sections.

3.4 Empirical Results

3.4.1 Domestic effects

In this section, we present the estimates of the within country effects of a change in π. The interaction between countries and the effect of a contemporaneous change in π in all three countries is discussed in section *3.4.2*.

3.4.1.1Consumption

Similarly to Stockhammer and Ederer (2008), Hein and Vogel (2008, 2009), Stockhammer et al (2009) and Onaran and Galanis (2014), consumption is specified as a function of adjusted total

[24] For this reason, the coefficient resulting from the estimations have to be interpreted as elasticities.
[25] We selected this test to check for cointegration because, compared to other methods such as those based on the approach of Engle and Grange (1987) of Johansen (1991), it is applicable even if, as it is our case, not all regressors are I(1) (Pesaran et al 2001).

profit and adjusted total wages. Using the methodology described in section *3.3.2* we estimate the following models for the United States, Mexico and Canada respectively.

US: $\Delta log(C) = \beta_0 + \beta_1 \Delta\log(aW) + \beta_2 \Delta\log(aR) + \beta_3 \Delta\log(ir) + \beta_4 \Delta\log(aW_{t-1}) + \beta_5 \Delta\log(aR_{t-1})$

Mexico: $\Delta log(C) = \beta_0 + \beta_1 \Delta\log(aW) + \beta_2 \Delta\log(aR) + \beta_3 \Delta\log(aW_{t-1}) + \beta_4 \Delta\log(aR_{t-1}) + \beta_4 \Delta\log(C_{t-1})$

Canada: $\Delta log(C) = \beta_0 + \beta_1 \Delta\log(aW) + \beta_2 \Delta\log(aR) + \beta_3 \Delta\log(aW_{t-1}) + \beta_4 \Delta\log(aR_{t-1}) + \beta_4 \Delta\log(C_{t-1})$

The lending interest rate (*ir*) was only statistically significant in the United States and, therefore, it does not enter the regression for the other two countries. The negative sign of its coefficient does not necessarily support the argument that higher interest rate encourages savings. An alternative explanation very well described by Stewart Lansley (2012) is that in the US given soaring level of inequality, credit was made more readily available to the low-middle class in order to finance consumption. In other words the poorer strand of the population has to rely on credit to keep a sustained level of consumption that their salary would otherwise not allow. This is in line with the argument put forward by Stockhammer (2009, 2015), Lysandrou (2011), Lapavitsas (2011) and other authors whose work was discussed in the previous chapter.

Turning to the coefficients of interests, as we expected, the elasticity of consumption with respect to the adjusted wages ($e_{C,aW}$) is considerably higher than the elasticity of consumption with respect to adjusted profits ($e_{C,aR}$) in all three countries. We transform these elasticities into the marginal effect of an increase in the profit share on consumption as a share of total income at the sample mean using the following method

$$\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} = e_{C,aR} \frac{C}{aR} - e_{C,aW} \frac{C}{aW} \tag{17}$$

Where $\left(\frac{C}{aR}\right)$ is the share of consumption in total adjusted profits and $\left(\frac{C}{aW}\right)$ is the share of consumption in total adjusted wages both taken at the sample mean[26].

[26] For a given GDP the wage share is equal to $1 - \pi$. In order to calculate the effect on consumption of a pro-capital change in the distribution of income we have to sum the effect of an increase in π to the negative effect of a reduction in the wage share (that is a necessary consequence of an increase in π).

Table 3.3: *Regression results for the consumption function*

Dependent Variable	Δlog(C)		
Country	USA	Mexico	Canada
Δlog(aW)	0.641***	0.556***	0.669***
	(0.0566)	(0.0351)	(0.0854)
Δlog(aR)	0.173***	0.368***	0.162***
	(0.0265)	(0.0514)	(0.0261)
Δ(ir)	-0.00311***		
	(0.000490)		
$\Delta\log(aW_{t-1})$	0.0520	-0.283***	-0.293**
	(0.0486)	(0.0946)	(0.120)
$\Delta\log(aR_{t-1})$	-0.0563**	-0.162**	-0.0728*
	(0.0275)	(0.0788)	(0.0362)
$\Delta\log(C_{t-1})$		0.458***	0.400***
		(0.163)	(0.145)
Time period	1960 - 2007	1970 - 2007	1960 - 2007
Adj R^2	0.894	0.894	0.778

Note: Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Our analysis suggests that when the profit share increases by one percentage point, consumption decreases - as a percentage of income - by 0.420% in the United States, 0.119% in Mexico and 0.189% in Canada. The result for Canada is almost identical to the one of Onaran and Galanis (2014) but our marginal effect of profit share on consumption for the United States and Mexico is about one quarter smaller. This is due to small differences between our specifications.

Table 3.4: *Marginal effect of π_i on i's consumption (as % of Y_{fc})*

Marginal effect	United States	Mexico	Canada
$\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i}$	-0.420	-0.119	-0.189

3.4.1.2 Investment

Investment was initially specified as a function of the decomposed profit rate – as presented in equations (5) and (6)[27] - and the interest rate. However, since the interest rate was found to be not statistically significant in Canada and Mexico, it was removed from the regression for these two countries. We estimated the following investment functions for the United Stated, Mexico and Canada[28]

US: $\Delta\log(I) = \beta_0 + \beta_1\Delta\log(u) + \beta_2\Delta\log(\pi) + \beta_3\Delta\log(ir) + \beta_4\Delta\log(u_{t-1}) + \beta_5\Delta\log(ir_{t-1}) + \beta_6\Delta\log(I_{t-1}) + \beta_7\Delta\log(\pi) *d75 + \beta_7\Delta\log(\pi) *d98 + \beta_9 d84$

Mexico: $\Delta\log(I) = \beta_0 + \beta_1\Delta\log(u_{t-1}) + \beta_2\Delta\log(\pi_{t-1}) + \beta_3\Delta\log(\pi_{t-1})*d82 + \beta_4\Delta\log(\pi_{t-1})*d83 + \beta_6\Delta\log(\pi_{t-1})*d95 + \beta_5 d86$

Canada: $\Delta\log(I) = \beta_0 + \beta_1\Delta\log(u) + \beta_2\Delta\log(u_{t-1}) + \beta_3\Delta\log(\pi_{t-1})$

The main difference between these specifications of the investment function and the those used in the empirical studies mentioned above concerns capacity utilization. Here, the ratio of income over capital (u) is used instead of the growth rate of income as a proxy for capacity utilization. Table 3.4 and 3.5 show respectively the results of the estimations of the investment function and the marginal effect of π on I.

[27] As we have no data on potential output so the profit rate is decomposed only into two components: $\frac{R}{K} = \frac{R}{Y}\frac{Y}{K}$. Where Y/K accounts for both the productivity of capital and its rate of utilization.

[28] The dummy variables and the interaction terms have been included in the regression line following the criteria explained in Section 3.2, in particular for Mexico a dummy for year 1982, 1983 and 1995 was interacted with the profit share because in these years the change in the adjust profit share has been drastically larger than in the rest of the sample (the change in each of these three years has been of about over 10%) and this was distorting the relation between the profit share and the investment rate.

Table 3.4: *Regression results for the investment function*

Dependent Variable	Δlog(I)		
Country	USA	Mexico	Canada
$\Delta\log(u)$	2.581***		3.223***
	(0.368)		(0.437)
$\Delta\log(\pi)$	0.559**		
	(0.259)		
Δir	0.00965***		
	(0.00251)		
$\Delta\log(u_{t-1})$	-1.107*	1.044**	-1.552***
	(0.546)	(0.470)	(0.504)
$\Delta\log(\pi_{t-1})$		0.627***	0.774***
		(0.226)	(0.272)
Δir_{t-1}	-0.00771**		
	(0.00333)		
$\Delta\log(I_{t-1})$	0.221*		
	(0.120)		
Time dummies	1975 1998	1983 1995	
	1984	1986	
Time period	1960 - 2007	1970 - 2007	1960 - 2007
Adj R^2	0.895	0.795	0.580

Note: Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

As we can see from Table 3.4, the accelerator effect of capacity utilization is always substantially larger than the effects of the profit share and interest rate on investment. In addition, the magnitude of the coefficients of π is similar in the regressions for the three countries and they are statistically significant at least at 5%. Regarding the United States, our results are similar to those of Naastepad and Storm (2007) but are quite different from those of Onaran and Galanis (2014) and Hein and Vogel (2008) because they do not find a statistically significant effect of π on I. Moreover, the magnitude of our marginal effect in Canada and Mexico is double the size compared to the one estimated by Onaran and Galanis but we both find that only the coefficients

of the lagged profit shares are significant. These differences in the results were to be expected because of a substantial difference in the specification of our estimated equations[29].

The elasticities of investment with respect to the profit share ($e_{I,\pi}$) are multiplied by the share of investment over profit to obtain the marginal effect of an increase in the profit share on investment as a share of income. Table 3.5 shows that a 1% increase in the profit share, increases investment by 0.314 in the United states, by 0.324 in Mexico and 0.468 in Canada.

$$\frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} = e_{I,\pi}\frac{I}{aR} \tag{18}$$

Table 3.5: *Marginal effect of π_i on i's investment (as % of Y_{fc})*

Marginal effect	United States	Mexico	Canada
$\frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i}$	0.314	0.324	0.468

3.4.1.3 Imports

Income distribution has an effect on imports because it affects both the demand for import and its prices as shown in equation (7). To calculate the effect of a rise in a country's profit share on its imports, we use a three steps procedure. First we estimate the elasticity of imports with respect to consumption ($e_{M,C}$), investment ($e_{M,I}$) and domestic prices ($e_{M,P}$) using the following specifications – based on equation (6) - for the United States, Mexico and Canada respectively[30]

US: $\Delta\log(M) = \beta_0 + \beta_1\Delta\log(C) + \beta_2\Delta\log(I) + \beta_3\Delta\log(e) + \beta_4\Delta\log(Prel_{t-1})$

Mexico: $\Delta\log(M) = \beta_0 + \beta_1\Delta\log(Prel) + \beta_2\Delta\log(C) + \beta_3\Delta\log(I) + \beta_4\Delta\log(Prel_{t-1}) + \beta_5\Delta\log(e_{t-1}) + \beta_6\Delta\log(M_{t-1}) + \beta_7 d86 + \beta_8 d95$

Canada: $\Delta\log(M) = \beta_0 + \beta_1\Delta\log(C) + \beta_2\Delta\log(I) + \beta_3\Delta\log(Prel_{t-1}) + \beta_4\Delta\log(I_{t-1}) + \beta_5\Delta\log(M_{t-1})$

The results are shown in Table 3.6: all coefficients - except that for the exchange rate in Mexico - have the expected sign and are statistically significant.

[29] For example, our coefficient for Canada would be almost identical to the one computed by Onaran and Galanis if the lagged value of capacity utilization were to be removed from the regression. However, as discussed in Section *3.3.2* we cannot remove a significant variable from the economic model because we would be imposing a restriction to the statistical model that is not justifiable. In other words the model would be dynamically incomplete (see Wooldridge 2009)

[30] Prel – relative prices - is the ratio of domestic prices over import prices.

The second step consists in computing the effect of a change in functional income distribution on domestic prices. To do so, domestic prices are estimated as a function of unit labour cost (ulc), import prices and level of income as follows

US: $\Delta\log(P) = \beta_0 + \beta_1\Delta\log(ulc) + \beta_2\Delta\log(Pm) + \beta_3\Delta\log(Y) + \beta_4\Delta\log(ulc_{t-1}) + \beta_5\Delta\log(Pm_{t-1}) + \beta_6\Delta\log(P_{t-1})$

Mexico: $\Delta\log(P) = \beta_0 + \beta_1\Delta\log(ulc) + \beta_2\Delta\log(Pm) + \beta_3 d82 + \beta_4 d86$

Canada: $\Delta\log(P) = \beta_0 + \beta_1\Delta\log(ulc) + \beta_2\Delta\log(Pm) + \beta_3\Delta\log(Y) + \beta_4\Delta\log(P_{t-1})$

Table 3.6: *Regression results for the import function*

Dependent Variable	Δlog(M)		
Country	USA	Mexico	Canada
Δlog(Prel)		0.529***	
		(0.125)	
Δlog(C)	0.624*	1.210**	0.835*
	(0.340)	(0.440)	(0.434)
Δlog(I)	0.450***	0.858***	0.396***
	(0.0726)	(0.125)	(0.0905)
Δlog(e)	-0.0866*		
	(0.0481)		
$\Delta\log(Prel_{t-1})$	0.337***	0.290**	0.277**
	(0.0734)	(0.121)	(0.135)
$\Delta\log(I_{t-1})$			-0.218**
			(0.0927)
$\Delta\log(e_{t-1})$		0.0991**	
		(0.0412)	
$\Delta\log(M_{t-1})$		-0.205**	0.317**
		(0.0832)	(0.133)
Time dummies		1985 1995	
Time period	1960 - 2007	1970 - 2007	1960 - 2007
Adj R^2	0.823	0.940	0.675

Note: Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table 3.7: *Regression results for the domestic price function*

Dependent Variable	Δlog(P)		
Country	USA	Mexico	Canada
Δlog(ulc)	0.303***	0.760***	0.628***
	(0.0537)	(0.0383)	(0.0920)
Δlog(Pm)	0.0590***	0.300***	0.0754*
	(0.0132)	(0.0283)	(0.0398)
Δlog(Y)	0.102***		0.273***
	(0.0339)		(0.0808)
$\Delta\log(ulc_{t-1})$	0.207***		
	(0.0602)		
$\Delta\log(Pm_{t-1})$	0.0598***		
	(0.0129)		
$\Delta\log(P_{t-1})$	0.228***		0.185*
	(0.0742)		(0.108)
Time dummies		1982 1986	
Time period	1960 - 2007	1970 - 2007	1960 - 2007
Adj R^2	0.970	0.990	0.886

Note: Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

In the third step, the marginal effect of the profit share on import in proportion to GDP is computed using the following formula

$$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_i} = \left[\left(\frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i} e_{M,I} \frac{M}{I}\right) + \left(\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i} e_{M,C} \frac{M}{C}\right)\right] - \left[e_{M,P}\ e_{P,ulc}\ e_{ulc,rulc} \frac{Y}{Y_{fc}} \frac{1}{rulc} \frac{M}{Y_{fc}}\right] \quad (19)$$

In the first square bracket we calculate (see Table 3.8) how much of the marginal effect of an increase in π on investment and consumption becomes an increase in import demand, i.e. the first term in equation 8. The partial change in investment and consumption caused by an increase in the profit share is multiplied by the marginal effect of investment and consumption on import.[31] In all three countries, even though $e_{M,C}$ is larger than $e_{M,C}$, the marginal effect of investment on imports

[31] $e_{M,I} \frac{M}{I} = \frac{\partial M}{\partial I}$ and $e_{M,C} \frac{M}{C} = \frac{\partial M}{\partial C}$

(at sample mean) is always larger than the marginal effect of consumption on import. Since investment is positively related to the profit share, it follows that import demand increases when the profit rate increases.

Table 3.8: *Marginal (demand) effect of π_i on i's import (as % of Y_{fc})*

		USA	Mexico	Canada
$e_{M,C}$	A	0.620	1.21	0.835
$e_{M,I}$	B	0.45	0.858	0.178
M/C	C	0.150	0.258	0.444
M/I	D	0.598	0.665	1.391
$\partial C/Y/\partial \pi$	E	0.093	0.312	0.371
$\partial I/Y/\partial \pi$	F	0.269	0.571	0.248
$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_i}$	G=(A*C*E)+(B*D*F)	0.045	0.150	0.247

The second square bracket describes the effect of the wage share on imports through its effect on prices. $e_{M,P}$ is the elasticity of imports to domestic prices, $e_{P,ulc}$ is the elasticity of price respect to unit labour cost and $e_{ulc,rulc}$ is the elasticity of unit labour cost to real unit labour cost[32]. The product of these elasticities - the elasticity of import to real unit labour cost ($e_{M,RULC}$) - is then multiplied (see Table 3.9) by the ratio of income and income at factor costs[33] and by import over the product of GDP at factor costs and real unit labour cost. The negative sign before the square bracket is due to the fact that we are interested in an increase in the profit share (and hence a decrease in the wage share and the unit labour cost)

[32] $e_{ulc,rulc}$ is calculated as $\frac{1}{1-e_{P,ulc}}$

[33] This adjustment is necessary because the wage share is equal to the real unit labour costs minus net taxes.

Table 3.9: *Marginal (price) effect of π_i on i's import (as % of Y_{fc})*

		USA	Mexico	Canada
$e_{P,\ ULC}$	A	0.51	0.76	0.628
$e_{ULC,\ rulc}$	B = 1/(1-A)	2.041	4.167	2.688
$e_{M,\ P}$	C	0.337	0.819	0.277
$e_{M,\ rulc}$	D= A*B*C	0.351	2.593	0.468
Y/Y_{fc}	E	1.078	1.085	1.132
$M/(Y_{fc}*rulc)$	F	0.171	0.386	0.472
$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_i}$	G=D*E*F	-0.064	-1.085	-0.250

The marginal effect the profit share on import as a fraction of GDP $\left(\frac{\frac{\partial M_i}{Y_i}}{\partial \pi_i}\right)$, shown in Table 3.10, is the sum of the demand and price effect (first and second square parenthesis respectively).

Table 3.10: *Marginal effect of π_i on i's import (as % of Y_{fc})*

Marginal effect	United States	Mexico	Canada
$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_i}$	-0.019	-0.937	-0.204

The comparison with the literature is, in this case, trivial because other studies only take into account the change prices without considering the change in demand. Our results show that imports in Mexico and Canada fall – by respectively 0.937 and 0.204 as a percentage of GDP at factor costs - when their profit shares increase by 1%. On the other hand, in the United States the effect is still negative but very small (-0.019% of GDP). The fact that in the United States a change in competitiveness has a much smaller effect than in Canada or Mexico is not surprising given the different size of their economies. Moreover, the difference in the sign of the effect confirms, as discussed in Section 2, that whether a change in the distribution of income has a positive or negative effect on import it is not defined a priori but it is an empirical question and the answer might very well vary from country to country.

3.4.1.4 Exports

To calculate the effect of an increase in the profit share on exports, we use a method that is symmetric to the one used in the previous section to calculate the price effect on imports. We only

discuss the price effect of a change in the profit share on export because the demand effect depends on other countries and will be discussed in the next section.

The first step consists in estimating the sensitivity of export to prices with the following regressions for the United States, Mexico and Canada, respectively.

US: $\Delta\log(X) = \beta_0 + \beta_1\Delta\log(Pxrel) + \beta_2\Delta\log(Yw) + \beta_3\Delta\log(e) + \beta_4\Delta\log(Yw_{t-1}) + \beta_5\Delta\log(X_{t-1})$

Mexico: $\Delta\log(X) = \beta_0 + \beta_1\Delta\log(Pxrel) + \beta_2\Delta\log(Yw) + \beta_3\Delta\log(e) + \beta_4\Delta\log(Yw_{t-1}) + \beta_5\Delta\log(e_{t-1}) + \beta_6\Delta\log(X_{t-1}) + \beta_7 d85$

Canada: $\Delta\log(X) = \beta_0 + \beta_1\Delta\log(Pxrel) + \beta_2\Delta\log(Yw) + \beta_3\Delta\log(e) + \beta_4\Delta\log(Pxrel_{t-1}) + \beta_5\Delta\log(Yw_{t-1}) + \beta_6\Delta\log(X_{t-1}) + \beta_7\Delta\log(e_{t-2}) + \beta_8 d67 + \beta_9 d70$

Where Y_w is the income of the rest of the world and Pxrel is a proxy for relative prices calculated as the ratio between export and import prices. The coefficient of interest - β_1 - represents the elasticity of import with respect to export prices ($e_{X,Px}$). Table 3.10 reports the results of the regressions. As expected the price elasticity of export in United Stated and Canada is negative and significant. Unfortunately instead, in the regression for Mexico, the coefficient is not statistically significant and its magnitude is very small.

In the second step, the elasticity to export prices to unit labour cost is calculated using the following specifications

US: $\Delta\log(Px) = \beta_0 + \beta_1\Delta\log(ulc) + \beta_2\Delta\log(Pm) + \beta_3\Delta\log(Pm_{t-1}) + \beta_4 d80$

Mexico: $\Delta\log(Px) = \beta_0 + \beta_1\Delta\log(ulc) + \beta_2\Delta\log(Pm) + \beta_1\Delta\log(ulc_{t-1}) + \beta_2\Delta\log(Pm_{t-1}) + \beta_3\Delta\log(Yw_{t-1}) + \beta_4\Delta\log(Px_{t-1}) + \beta_5 d80 + \beta_6 d86$

Canada: $\Delta\log(Px) = \beta_0 + \beta_1\Delta\log(ulc) + \beta_2\Delta\log(Pm) + \beta_3\Delta\log(Yw) + \beta_4\Delta\log(Px_{t-1}) + \beta_5 d73 + \beta_6 d74 + \beta_7 d79$[34]

The only difference with the specifications used in the domestic prices regression is that the income of the rest of the world (Y_w) is used to control for demand pressures on prices rather than the income of the country (Y).

[34] Without dummies the model is misspecified and has heteroskedasticity.

Table 3.11: *Regression results for the export function*

Dependent Variable	Δlog(X)		
Country	USA	Mexico	Canada
Δlog(Pxrel)	-0.419***	0.186*	-0.421**
	(0.146)	(0.109)	(0.174)
$\Delta\log(Y_w)$	2.939***	3.400***	3.264***
	(0.441)	(0.632)	(0.336)
Δlog(e)	0.171***	0.199***	0.467***
	(0.0593)	(0.0410)	(0.105)
$\Delta\log(Pxrel_{t-1})$			-0.523**
			(0.198)
$\Delta\log(Y_{w\,t-1})$	-2.316***	-2.384***	-2.148***
	(0.504)	(0.661)	(0.428)
$\Delta\log(e_{t-1})$		-0.167***	
		(0.0369)	
$\Delta\log(X_{t-1})$	0.500***	0.555***	0.214*
	(0.118)	(0.116)	(0.121)
$\Delta\log(e_{t-2})$			-0.253*
			(0.130)
Time dummies		1985	1967 1970
Time period	1960 - 2007	1970 - 2007	1960 - 2007
Adj R^2	0.625	0.628	0.736

Note: Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table 3.12: *Regression results for the export prices function*

Dependent Variable	Δlog(Px)		
Country	USA	Mexico	Canada
Δlog(ulc)	0.189*	0.420***	-0.0441
	(0.103)	(0.0988)	(0.125)
Δlog(Pm)	0.486***	0.712***	0.512***
	(0.0336)	(0.0453)	(0.0909)
Δlog(Y_w)			0.392*
			(0.213)
Δlog(ulc_{t-1})		-0.104	
		(0.0812)	
Δlog(Pm_{t-1})	0.132***	0.136	
	(0.0312)	(0.0824)	
Δlog($Y_{w\,t-1}$)		0.905*	
		(0.500)	
Δlog(Px_{t-1})		-0.206*	0.218**
		(0.102)	(0.0948)
Time dummies	1980	1980 1986	1973 1974 1979
Time period	1960 - 2007	1970 - 2007	1960 - 2007
Adj R^2	0.932	0.974	0.893

Note: Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

The results in Table 3.11 show that the unit labour cost has a positive and significant relationship with the export prices only in the United States and in Mexico. The elasticity of export prices respect to unit labour costs ($e_{X,Px}$) in these two countries is respectively 0.189 and 0.420. On the other hand, in Canada, the relationship is not statistically significant and it has the wrong sign. This result for Canada is probably due to a structural break in 1980/1981[35]. Before 1981 the relationship between export prices and unit labour costs is positive as in the other two countries but from 1981 to 2007 the relationship is horizontal and non significant.

[35] We tested for structural breaks using the Chow test. Until 1980 both *ulc* and pm had an effect on *px* but *Yw* had no effect. After 1980 *ulc* has no effect on *px* but both pm and *Yw* do.

Finally, the marginal effect of profit share on export is calculated as

$$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_i} = -\, e_{X,Px}\, e_{Px,ulc}\, e_{ulc,rulc} \frac{Y}{Y_{fc}} \frac{1}{rulc_i} \frac{X_i}{Y_{fc,i}} \tag{20}$$

Symmetrically to what was done above for import, the product of the three elasticities, the elasticity of export respect to real unit labour cost ($e_{X,rulc} = e_{X,Px}\, e_{Px,ulc}\, e_{ulc,rulc}$) is first adjusted by the ratio of income at market prices and income at factor cost and then multiplied by export over the product of real unit labour cost and GDP at factor costs.

Table 3.13: *Marginal (price) effect of π_i on i's export (as % of Y_{fc})*

		USA	Mexico	Canada
$e_{Px,\ ULC}$	A	0.189	0.42	0
$e_{ULC,\ rulc}$	B	2.041	4.167	2.688
$e_{X,\ Px}$	C	-0.419	0	-0.523
$e_{X,\ rulc}$	D= A*B*C	-0.141	0	-0
Y/Y_{fc}	E	1.078	1.085	1.132
$X/(Y_{fc}*rulc)$	F	0.131	0.396	0.549
$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_i}$	G=- D*E*F	0.023	0	0

The last row of Table 3.13 presents the result of this calculation. In the United States, the marginal effect on the profit share on export as a ratio to income at factor cost is positive but quite small (0.023) while it is zero in Mexico and Canada even if for different reasons. In Mexico, the final effect is null because of the irresponsiveness of Mexican export to relative prices - which is surprising, but Onaran and Galanis reached a similar result. On the other hand, in Canada, it is caused by the lack of response of export prices to changes in the unit labour cost. Onaran and Galanis (2014) instead, find always a positive effect of the profit share on export but its magnitude so small that in practice it is not very different from our result.

3.4.2 Interactions between countries

In this section we present the estimates of the interactions between the United States, Mexico and Canada as a result of a contemporaneous decrease in their wage shares. In particular, we calculate how an increase in the profit share in one country affects its trade partners thorough changes in their import prices and export demand.

3.4.2.1 Import

The marginal effect of an increase in the profit share in country j on country i's import is calculated – following equation (11) - as

$$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_j} = \left(-\mathrm{e}_{\mathrm{Px,rulc(j)}} \frac{Y}{Y_{fc}} \frac{\mathrm{Px_j}}{\mathrm{rulc_j}}\right) \frac{M_{ij}}{M_i} \left(e_{M,Pm(i)} \frac{1}{Pm_i} \frac{M_i}{Y_{fc,i}}\right) \tag{21}$$

Where the result of the first parenthesis, the marginal effect of the profit rate on export prices in country j $\left(\frac{\partial Px_j}{\partial \pi_j} = -\mathrm{e}_{\mathrm{Px,rulc(j)}} \frac{Y}{Y_{fc}} \frac{\mathrm{Px_j}}{\mathrm{rulc_j}}\right)$ is first weighted by the share of country i's import coming from country j $\left(\frac{M_{ij}}{M_i}\right)$ and then multiplied by the result of the second parenthesis that is the marginal effect of import prices on import as a proportion of GDP in country i $\left(\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial Pm_i} = e_{M,Pm(i)} \frac{1}{Pm_i} \frac{M_i}{Y_{fc,i}}\right)$.

Table 3.14: *Marginal effect of foreign π_j on i's import, through import prices*

	USA	Mexico	Canada
USA	//	0.126	0.036
Mexico	0.005	//	0.003
Canada	0	0	//
$\frac{\frac{\partial M_i}{Y_{fc,i}}}{\partial \pi_j}$	0.005	0.126	0.039

The results (Table 3.14) show how an increase in the profit share in one country causes its trade partners' imports to rise. The different magnitude of the effects reflect the different size of the economies and the direction of trade in NAFTA: The effect on the United States of an increased in the profit share in the other two countries is ten times smaller than in Mexico and Canada. Moreover, Table 3.14 shows that an increase in the Canadian profit share does not cause American or Mexican imports to rise. This is because, as reported in Table 3.13, Canadian export prices seem to be inelastic to unit labour cost.

In Table 3.15 we sum the effect on import of a domestic redistribution of income towards profits (Table 3.10) and of a contemporaneous increase in the profit share in the other two countries (Table 3.14). Part of the improvement in competitiveness due to a reduction in domestic prices is offset by a contemporaneous decrease in the price of import. The marginal effect on import respect to

GDP becomes -0.014%, -0.811% and -0.165% respectively in the United States, Mexico and Canada.

Table 3.15: *Marginal effect of a contemporaneous change in π_i and π_j on i's import*

	USA	Mexico	Canada
Domestic Effect	-0.019	-0.937	-0.204
Foreign effect	0.005	0.126	0.039
$\frac{\frac{dM_u}{Y_{fc,u}}}{d\pi_{u+m+c}}$	-0.014	-0.811	-0.165

3.4.2.2 Exports

Export demand in each country depends on the demand for imports in its trade partners and on its price competitiveness compared to the other countries.

Firstly, using equation (13), we compute the marginal effect of a contemporaneous change in the distribution of income on the demand for export.

Table 3.16: *Marginal effect of π_j on i's export, through changes in demand*

	USA	Mexico	Canada
USA	//	-0.011	-0.044
Mexico	-0.074	//	-0.030
Canada	-0.012	-0.002	//
$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_j}$	-0.085	-0.013	-0.074

Table 3.16 shows that, in each country, an increase in the other two countries' profit share causes exports demand to fall. This happens because, as shown in Table 3.10, import demand falls in each country after an increase in their profit share.

Finally we have to calculate how exports in each country are affected by changes in export prices in the other two countries. This is the exports counterpart of what we calculated in Table 3.14 for imports: For example, Mexican' export prices which correspond to a share of American import prices have a negative effect on American import but a positive effect on American export. When Mexican export prices fall, American import prices decrease and the United States becomes less competitive compared to the rest of the world, i.e. their export should fall[36]. Using the same method

[36] Note that relative prices (*Pxrel*) in the export equation was the ratio of export and import prices.

that it was used to compute the effect of the change in import prices on import, we now compute the effect of the change in import prices on export[37]. The only difference between equation (21) and (22) is that in the second parenthesis, the elasticity of export respect to import prices ($e_{X,Pm}$) is used as opposed to the elasticity of import to import prices($e_{M,Pm}$).

$$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_j} = \left(-\mathrm{e}_{\mathrm{Px,rulc(j)}} \frac{Y}{Y_{fc}} \frac{\mathrm{Px_j}}{\mathrm{rulc_j}}\right) \frac{M_{ij}}{M_i} \left(e_{X,Pm(i)} \frac{1}{Pm_i} \frac{X_i}{Y_{fc,i}}\right) \tag{22}$$

Table 3.17: *Marginal effect of π_j on i's export, through import prices*

	USA	Mexico	Canada
USA	//	0	-0.079
Mexico	-0.005	//	-0.006
Canada	0	0	//
$\frac{\frac{\partial X_i}{Y_{fc,i}}}{\partial \pi_j}$	-0.005	0	-0.085

The results presented in Tables 3.17 confirm that when the labour cost decrease in a country, export demand in other countries decrease because they become less competitive. This effect however is very small especially in the United States – because of the size of its export – and in Mexico where export seems not to respond to relative prices as shown in Table 3.11.

Table 3.18: *Marginal effect of a contemporaneous change in π_i and π_j on i's export*

	USA	Mexico	Canada
Domestic Effect	0.023	0	0
Foreign demand effect	-0.085	-0.013	-0.074
Foreign price effect	-0.005	0	-0.085
$\frac{\frac{dX_u}{Y_{fc,u}}}{d\pi_{u+m+c}}$	-0.067	-0.013	-0.159

The overall effect on export of an increase in the profit share in the United States, Mexico and Canada is the sum of the effect of a domestic redistribution of income towards profit in each country (Table 3.13) and the effect of a contemporaneous change in the distribution in the other two countries (Tables 3.16 and 3.17).

[37] Since export and import prices entered the regression for export respectively at the nominator and denominator of *Pxrel*, $\mathrm{e_{X,Pm}}$ – the elasticity of export to import prices - has the same magnitude but opposite sign compared to $\mathrm{e_{X,Px}}$.

The fallacy of composition discussed in Section 3.2 is confirmed by the results in Table 3.18. In the United States, Mexico and Canada, the relative advantage of a less equal distribution of income is more than offset by an equal change in the distribution of income in the other two countries. It should be noted however that the negative foreign demand and price effects take into account only changes in imports and import prices from the other two NAFTA countries. If we were to consider all the other trade partners, the negative effect would be higher.

3.4.3 Aggregate demand

Table 3.19 shows the effect of a pro-capital change in the functional distribution of income in NAFTA on aggregate demand: the sum of the effects on consumption, investment and export minus the effect on import in each country. A contemporaneous 1% increase in the profit share - in the US, Mexico and Canada - causes the aggregate demand to decrease by 0.159% in the United States and while in Mexico and Canada aggregate demand seems to increase by 1% and 0.285% respectively. The overall demand regime hence is wage-led in the former country and profit-led in the other two.

Table 3.19: *Marginal effect of a contemporaneous increase in π_i and π_j on i's aggregate demand*

Aggregate Demand	United States	Mexico	Canada
$\frac{\frac{\partial C_i}{Y_{fc,i}}}{\partial \pi_i}$	-0.420	-0.119	-0.189
$\frac{\frac{\partial I_i}{Y_{fc,i}}}{\partial \pi_i}$	0.314	0.324	0.468
$-\frac{\frac{dM_i}{Y_{fc,i}}}{d\pi_{all}}$	-(-0.014)	-(-0.811)	-(-0.165)
$\frac{\frac{dX_i}{Y_{fc,i}}}{d\pi_{all}}$	-0.067	-0.013	-0.159
$\frac{\frac{dY_i}{Y_{fc,i}}}{d\pi_{all}}$	-0.159	1.003	0.285

For the sake of comparison, Table 3.20 shows the effect on aggregate demand of an increase in the profit share in each country without a similar increase in the other two.

Table 3.20: *Effect of an increase in π_i on i's aggregate demand (without between countries interactions)*

Aggregate Demand	United States	Mexico	Canada
$\frac{\frac{dY_i}{Y_{fc,i}}}{d\pi_i}$	-0.064	1.142	0.483

As expected and discussed in the second section, when a country lowers its cost of labour and its trade partners do not, the positive effect on aggregate demand is larger than when its trade partner adopt the same strategy of wage reduction.

The main difference between this result and Onaran and Galanis' one is that they find that Canada is wage-led rather than profit-led. Moreover, the magnitude of the change in aggregate demand in the United States is larger while in Mexico is smaller compared to the result shown in Table 3.19. These differences are mainly driven by the diverse methodology used to analyse the investment and import functions and the interactions between countries. The different sample size also plays an important role because the interactions between countries are larger when the number of countries increases (in their sample there are thirteen countries).

3.5 Conclusion and Policy Implications

Being that the United States, Mexico and Canada are part of the same trade agreement and given that the main argument in favour of wage moderation is that countries become internationally more competitive, let us start these final remarks with a summary of the findings on the effect of redistribution on trade. The results seem to confirm the fallacy of composition problem highlighted in the second section. When the members of NAFTA decrease their wage share contemporaneously, the gain in competitiveness is reduced compared to a scenario in which only one of the three countries decreases its wage share.

It is interesting to compare our results with the data on the direction of trade in NAFTA during the same period. Tables 3.21 and 3.22 show, respectively, the estimated marginal effect of a contemporaneous increase in the profit share on net exports and the change - which actually occurred - in net exports, as a share of total trade, among the members of the trade agreement. From Table 3.21 we can see that when the profit share increases contemporaneously in all the members of NAFTA, our estimated effect on net exports is negative in the United States, positive in Mexico and positive but very small in Canada. On the other hand, it is possible to notice from Table 3.22 that, from 1960 to 2007, the United States worsened its trade balance with both Mexico

and Canada; Mexico has improved its trade balance with both the United States and Canada and Canada has improved its trade balance with the United States but not with Mexico. Overall, the United States is the country whose trade balance suffered the most, while Mexico is the country that improved it the most. The evolution of the trade balances in NAFTA therefore is compatible with our results regarding a contemporaneous fall in the wage share. Even though this is not necessarily a proof that our analysis is correct, we can say that the historical evolution of trade in this area is compatible with our analysis.

Table 3.21: Marginal *effect of a contemporaneous increase in π_i and π_j on i's net exports*

	USA	Mexico	Canada
$\frac{\frac{dNX_i}{Y_i}}{d\pi_{all}}$	-0.053	0.798	0.005

Table 3.22: *Difference between net exports in 2007 and 1960*

		USA	Mexico	Canada
	USA	//	0.325734	0.209922
To	Mexico	-0.03324	//	-0.01689
	Canada	-0.03159	0.009464	//

Turning to the total effect on aggregate demand, similarly to the finding regarding net exports, the overall effect of a pro capital redistribution of income has an overall negative effect in United States and a positive one in Mexico and Canada. However, as shown in Tables 3.19 and 3.20, the effect on aggregate demand is always lower when the three countries increase their profit share of income at the same time, rather than when this increase happens in one country alone. It is reasonable to suppose that, analysing an increase in the profit share in more than three countries at the same time, the final effect on Mexico and Canada would be smaller and may even be entirely offset by the increase in competitiveness in the other countries.

The policy implications of the analysis carried out so far are not trivial. In terms of increasing or decreasing the labour cost there is not a common policy that would be ideal for the three countries. An increase in the wage share has a positive effect in the United States but not in Canada and Mexico and vice versa. Proposing an adequate common policy for the members of NAFTA is beyond the scope of this chapter, however there is a general point that can be made: NAFTA is overall wage-led. When we multiply the semi-elasticity of an increase in the profit share on income with the average income from 1960 to 2007 for each country, we find that the negative effect in the United States is larger than the sum of the positive effects in Mexico and Canada (Table 3.23).

Table 3.23: *Overall growth regime in NAFTA*

	$\frac{\frac{dY_i}{Y_{fc,i}}}{d\pi_{all}}$	Average Y_{fc}	$\frac{dY_i}{d\pi_{all}}$
United States	-0.159	6530	-1044.6
Mexico	1.003	789	791.9
Canada	0.285	569	162.1
NAFTA			-90.6

Notes: the average Y_{fc} is in millions of PPP $ (2005)

Therefore, a pro-wage redistribution would be possible if the United States somehow compensates Mexico and Canada for the economic loss of a contemporaneous fall in the profit share. Moreover, we should point out that the adjusted wage share in our estimates includes the salary of high executives as well as the salary of employees and workers. A pro wage redistribution of income should try to raise the income of the poorest part of the wage earners. This will have a higher effect on the propensity to consume with positive effects in all countries.

The main contribution of this work to the neo-Kaleckian literature is the geographical change of focus of the empirical analysis. We make the argument that, to design a wage policy, it is not enough, in an increasingly globalised world, knowing whether an individual country[38] is wage led or profit led or whether a group of countries as a whole (i.e. the EU) is wage led or profit led[39]. Indeed, we need to know both aspects. For example, had we analysed Mexico on its own, the policy conclusion should have been that Mexico should pursue a policy of wage moderation even though we have seen that, in coordination with Canada and the US, it could pursue a redistributive policy. Had we instead analysed NAFTA as a whole, we would have reached the conclusion that a redistributive policy would be beneficial for NAFTA but we would not know if all countries within NAFTA would individually benefit from it and therefore agree to implement a common policy. Moreover, our analysis is different from Onaran's and Galanis' work (2014) in that, even if they analyse both the interactions between countries and the growth regime of the sample as a whole, they select a mix of developed and developing countries (thirteen in total) without any political relationship between them. We believe that in order to reach realistic policy conclusions regarding a possible wage policy coordination across countries, the sample of countries analysed

[38] See for example Bowles and Boyer (1995), Naastepad and Storm (2006), Ederer and Stockhammer (2007), Stockhammer and Ederer (2008), Hein and Vogel (2008, 2009).
[39] See for example Stockhammer et al 2009.

should be made of countries that trade mainly with each other and among which there is some sort of political agreement that would allow the implementation of a common policy.

On the methodological side, this chapter proposed an improvement and an extension of the usual Post-Keynesian empirical approach to study the relationship between functional distribution of income and aggregate demand. Firstly, we expanded the preceding empirical works - excluding Onaran and Galanis (2014) – by taking into account and calculating the spillover effects between countries. This is particularly important in an increasingly globalised world with rising trade shares because the functional distribution of income affects competitiveness. Secondly, we modified the investment function using the capital-income ratio, rather than the growth of income, as a proxy for capacity utilization. Thirdly, we decomposed the import function so that we can account for the structural composition of imports between investment and consumer goods and services. This allows us to study the effect of income distribution on import demand in countries with different import structures. Finally, regarding the interactions between countries, while Onaran and Galanis (2014) make exports demand depend on the weight of each importer country in the world income, we calculate the change in export demand using the average destination of export between trade partners.

Econometrically, the main limitation of this work is the small number of observations for each country. It is indeed difficult to find data prior to 1960 - in particular about employment and total wage bills - that are necessary to compute the wage share. A larger number of observations would not only deliver more precise coefficients but also allow for more sophisticated estimation techniques. Another empirical problem is that the share of trade between Mexico, Canada and the United States changed substantially over time while our estimation of the interactions between countries is based on its average value during the selected time period. Moreover, this work could be enhanced by the estimation of the multiplier effect – that is present in Onaran and Galanis (2014).

Finally, the theoretical framework can be extended to take into account other relevant aspects. Governments - whose behaviour could be endogenous to income distribution – the financial sector and the supply side of the economy are some of the main factors that should be included in this analysis.

Appendix A Variables names, definitions and sources

Table A3.1: *Data sources and definition*

Variable	Description	Source	Notes
aWS	Adjusted wage share as a % of gross domestic product at factor cost	AMECO (US and Canada), OECD STAT online (Mexico)	
π	Adjusted Profit Share		$\pi = 1 - aWS$
Y	GDP, real (2005 PPP)	AMECO	
aW	Adjusted wage bill		$aW = aWS \times Y_{fc}$
aR	Adjusted gross operating surplus		$aR = \pi \times Y_{fc}$
C	Consumption, real (2005 PPP)	AMECO	
I	Investment, real (2005 PPP)	AMECO	
X	Export, real (2005 PPP)	AMECO	
M	Import, real (2005 PPP)	AMECO	
K	Net capital stock (2005 PPP)	AMECO	
ir	Real interest rate	WB: World development indicators	
M_{ij}	Import from country j	IMF: Direction of trade statistics	
P	Domestic Price	AMECO	GDP deplator
Pm	Import price	AMECO	Import deflator
Px	Export prices	AMECO	Export deflator
Prel	Relative prices		$Prel = Pm/P$
Pxrel	Export relative prices		$Pxrel = Px/PX$
rulc	Real Unit Labour Cost		$rulc = aWS\left(\frac{Y_{fc}}{Y}\right)$
ulc	Unit Labour Cost		$ulc = rulc \times P$

Appendix B: *Average values*

Table B3.2: *Sample mean values*

	USA	Mexico	Canada
C	4720.00	547.00	360.00
aW	4430.00	379.00	378.00
aR	2100.00	410.00	190.00
I	1180.00	212.00	115.00
M	706.00	141.00	160.00
X	540.00	135.00	186.00
Y	7040.00	856.00	644.00
Yfc	6530.00	789.00	569.00
rulc	0.63	0.46	0.60
pm	66.08	34.93	65.55
px	70.29	33.97	59.97

Note: C, I, M, X, Y, aW and aR are in millions.

Table B3.3: *Average import shares* $\left(\frac{M_{ij}}{M_i}\right)$

		USA	Mexico	Canada
From (j)	USA	//	0.65	0.658
From (j)	Mex	0.067	//	0.017
From (j)	Can	0.202	0.023	//

4 - Short and long run growth regimes in the United States

4.1 Introduction

In the previous chapter, we have expanded the traditional empirical neo-Kaleckian analysis on growth regimes by examining the effects of a contemporaneous decrease in the wage share among trade partners. We now turn to a different issue: does the growth regime change over the long run compared to the short run?

The difference between the long and the short run effect of functional income distribution and aggregate demand has had only a marginal place in the neo-Kaleckian empirical literature. In 2014 however, Robert Blecker published a working paper in which he argued that it is plausible that the growth regime is more wage-led in the long run than in the short run. This is because of how the components of aggregate demand behave in the long run.

Some post-Keynesian authors have argued that, especially in recent years, consumption - together with other parts of demand - has been more and more driven by debt (Stockhammer 2009, 2015). If debt relaxes the constraint of current income on consumption, the elasticity to consume out of wages decreases and therefore consumption becomes less wage-led. However, Blecker points out that, in the long run, when the interest on debt increases and debt must be repaid, consumption is more likely to be driven by income. Moreover, since consumption out of wages is larger than consumption out of profits, consumption should become more wage-led in the long run.

On the contrary, investment is probably less constrained by the profit share in the long run, which makes investment less profit-led. In the short run, the profit share is an indicator of profitability and a measure of internal as well as external funding. At firm level, in fact, a large cash flow - proxied by profits - reveals to potential investors the firm's ability to pay interest on its debt. Consequently, an increase in the profit share can have two positive effects on investment. Firstly, it signals an increase in profitability, which could enhance "animal spirits" and secondly, it relaxes financial constraints. In the long run however, as discussed in Chapter 2, firms want to keep capacity at a certain desired level in order to respond quickly to demand shocks and to create an entry barrier for new firms. Therefore, they are less likely to invest beyond that point even if they are gaining high profits from current production or they have large availability of funds.

Finally, while net exports is considered to be profit-led - because a lower unit labour cost would enhance competitiveness - in the long run two issues could arise. First, it is possible that an increase in competitiveness is offset by an automatic adjustment – for example, currency appreciation - that would make exports more expensive. Secondly, it is possible that, as discussed in the previous

chapter, other countries will start decreasing their unit labour cost as well in order not to lose export shares.

Following the intuition of Blecker (2014), we analyse the relationship between function income distribution and internal demand[40] in the short and in the long run in the United States between 1950 and 2014. We estimate the determinants of consumption and investment and test how they change from the short to the long run using error corrections models. An element of novelty, compared to other studies on similar topics, is the disaggregation of consumption and investment. We carry out the empirical analysis using consumption and investment spending as well as their components. In particular, consumption is disaggregated into goods and services while investment is disaggregated into residential and non-residential. This decomposition not only serves as a robustness check, but also sheds some light on the functioning of different types of industries. We argue that the determinants of residential and non-residential investment can be profoundly different.

Net exports is not included in the analysis for two reasons. Firstly, the United States is, because of its size, a relatively closed economy with exports playing a minor role in determining aggregate demand. Consumption and investment amounted, on average, to 80% of GDP during the period under examination while exports accounted for about 8% of GDP. Secondly, as highlighted in the previous chapter, the effect of the decrease in unit labour cost has been offset by a similar decrease in the unit labour cost in Mexico and Canada in the same period. Onaran and Galanis' (2014) analysis of the G20 countries also confirm this.

Our results substantiate Bleker's hypothesis of the plausibility that growth regime is more wage-led in the long run than in the short run. It certainly seems to be the case in the United States between 1950 and 2014 as both consumption and investment are less sensitive to profits in the long run compared to the short run.

This chapter is organised as follows: The next section briefly summarizes the relevant literature. Section 3 discusses the nature of the data and empirical model. Section 4 presents the main results and Section 5 concludes.

4.2 Literature review

4.2.1 Empirical studies on the overall growth regimes

As discussed in Chapter 2, most neo-Kaleckian empirical works were inspired by the Bhaduri's

[40] Government expenditure is, in line with the relevant literature, excluded by the analysis because it is only marginally determined by the functional distribution of income.

and Marglin's model (1990). The attractiveness of this model derives from its ability to allow for both a profit-led and a wage-led growth regime. Aggregate demand (Y) is said to be profit-led if an increase in the profit share (π) has a positive effect on income ($\partial Y/\partial \pi<0$) and wage-led if an increase in the profit share has a negative effect on income.

The econometric evidence on the growth regime in the United States is mixed. We can divide the empirical studies by the two main methodologies used to estimate the growth regime: the single equations approach and the VAR approach. The single equation approach consists in estimating the components of aggregate demand individually - as a function of functional income distribution - and then summing up the partial effects of a change in the distribution of income on each of them. Using this method Bowles and Boyer (1995), Hein and Vogel (2008), Onaran et al (2011), Onaran and Galanis (2014), Stockhammer and Wildauer (2015) and Chapter 3 of this thesis, find that the United States in the second half of the twentieth century, was characterised by a wage-led regime. Only Naastepad and Storm (2006) found evidence of a profit-led regime. On the other hand, using the VAR approach, capacity utilization (or growth) is estimated directly as a function of its past values, the past values of functional distribution of income and, often, other control variables. Using a VAR with data from 1948 to 2002, Barbosa-Filho and Taylor (2006) find that demand is profit-led. Carvalho and Rezai (2015) confirm Barbosa-Filho and Taylor's results. Moreover, they add that, since the increase in personal income inequality weakened the effect of the wage share on consumption (because high inequality among wage earners causes the average propensity to consume to fall), the regime became more profit-led in the last decades of the twentieth century. Finally, also Nikiforous and Foley (2012) - even though they do not use a VAR but instead estimate the capacity utilization function with a two stages least square method - find that the wage share has a negative effect on aggregate demand.

All of these studies however, estimate only the short-run relationship between functional distribution and growth. To our knowledge, no study empirically analyses the difference between the long and the short-run growth regime - except Blecker (2014) - and the effect of functional distribution of income on the components of consumption and investment. Blecker argues in favour of the plausibility of his hypothesis using a preliminary graphical analysis. Using scatter plots, he shows that the correlation between the wage share and different measures of economic activity is positive from 1948 to 2013 but mostly negative when the sample is divided into smaller sub-periods. He concludes that the change in the sign of the correlation between the wage share and economic activity suggests that the demand regime is profit-led during the business cycle but it becomes wage-led in the long run.

In the following two sections, we discuss the main theoretical and empirical works on the

consumption and investment functions.

4.2.2 Consumption

One of the most famous consumption theories is Friedman's (1956) "permanent income" hypothesis. According to this hypothesis, consumption does not depend principally on current income because, since individuals are rational and want to maximise their lifetime utility, consumption depends on the income that individuals expect to gain over their life time. Post-Keynesian works on the consumption function, however, are more influenced by Duesenberry's (1949) "relative income" hypothesis according to which consumption is not only influenced by current income but by past levels of consumption and by the consumption standards achieved by those around us. Cynamon and Fazzari (2008) explain how the increase in income inequality combined with the relative income hypothesis can explain the rise in household debt. The desire to keep up with previous levels of consumption (as well as with the Joneses) and the boom in advertisement in the 1980s due to the increased use of mass media, caused a sharp rise in household debt which was needed to fuel consumption in the presence of stagnating wages. Barba and Pivetti (2009) who analyse the plausibility of this hypothesis in the United States make a similar point. Kim et al. (2014) however, point out that consumer debt and debt service can have different effects on consumption. They propose two scenarios. First, let us consider a situation in which the propensity to consume depends on disposable income and disposable income depends on the stock of debt because the higher the stock of debt, the higher is the debt service that has to be repaid. In this case, borrowing has a positive effect on consumption, but debt service will have a negative effect on consumption because it makes disposable income fall. In the second scenario instead, disposable income does not depend on debt service because the interest on debt is paid out of savings. Up to a certain level therefore, borrowing has only a positive effect on consumption because the debt service is repaid by decreasing savings. Both of the scenarios are compatible with the hypothesis that, over long periods, consumption depends more on income than on debt.

Empirically, Kim et al. (2015), even though they do not include the distribution of income in the consumption function, find that the marginal propensity to consume increases from the short to the long run. Moreover they find robust evidence of a positive short-run effect of borrowing on consumption in the United States between 1950 and 2011.The long-run effect instead is less robust: the long-run coefficient of borrowing on consumption is mostly non significant across different specifications and estimation methodologies. They also find that accumulation of debt, has both a short and a long-run negative effect on consumption but this result is not very robust to different specifications either. The role of debt on consumption is further analysed by Caldentey and Vernango (2013). They find, using spectral analysis on low and high frequency data, that in

the United States "debt has rendered consumption independent, to a certain extent and for a given period of time, of income".

4.2.3 Investment

Most of the theory behind the investment function has already been discussed in Chapter 2. We will now briefly summarise the main arguments and present some relevant empirical work.

In the exogenous and endogenous growth models, investment is positively determined by savings, which represent the availability of funds, and not by demand. In fact, demand always follows supply and producers do not have to worry about shortages of demand. A second important determinant of investment is the interest rate, which is used as a proxy for the cost of capital. When capital becomes relatively cheaper compared to labour, investment will increase because there will be a shift towards more capital-intensive production techniques. Obviously, this implies that workers and productive capital can be a perfect substitute in the production process.

In the traditional Marxian investment function, the rate of capital accumulation depends principally on the profit rate, because it represents both profitability and availability of internal funding (Dumenil and Levi 2004). In the Goodwin (1967) cycle, an increase in the labour cost decreases investments: a lower profit rate causes a fall in accumulation, which in turn increases the level of unemployment. When the reserve army increases and workers lose contractual power, the profit rate can increase again and with it, the accumulation rate. High accumulation and growth then make unemployment fall and the reserve army shrink. This causes the wage rate to increase again and the profit rate to decrease, starting a new cycle. However, Crotty (1993) explains how this interpretation of the investment function stands on assumptions of Volume I of Marx's Capital. He expands the argument by relaxing such assumptions: when firms face the possibility of not selling all of their product and are allowed to borrow funds in the financial markets, it is possible, for short periods of time, that excessive competition among firms leads to increased capital accumulation, even when firms face decreasing profits. Both the Marxist and Neoclassical schools therefore agree that in the long run, investment depends on supply factors such as the availability of funds and profitability.

The main difference between the supply side investment functions described above and post-Keynesian investment function is that, in the latter, not only supply but also demand factors contribute to determine investment. Steindl (1952 and 1979) suggested that output adjusts to a natural "desired" level of capacity utilization. This level is below full capacity because it serves as entry barrier to new firms and allows firms to respond quickly to demand shocks. When demand is high and capital utilization is above its desired rate, firms will invest more to reduce the

utilization of capital until it reaches its desired level. The investment function introduced by Bahduri and Marglin (1990) expresses investment as a function of the decomposed profit rate[41]. As discussed in the previous chapter, investment therefore depends on the profit share, capacity utilization and the productivity of capital. An increase in the wages and unit labour cost corresponds to a decrease in the profit share, which in turn reduces the profit rate and investment. A higher wage share however, stimulates consumption and therefore capacity utilization, the profit rate and investment increase. Whether investment is positively or negatively affected by a decrease in the profit share, depends on how strongly consumption responds to higher wages, how much capacity utilization increases because of higher consumption and how strong (and quickly) investment increases to bring capacity utilization back to its desired level which, as discussed before, could very well be endogenous.[42] Another post-Keynesian feature of the investment function is that financialization plays an important role in it. The main argument is centred on the role of rentier capitalist and the shareholder value orientation of firms. As Lazonick and O'Sulivan (2000) pointed out in their seminal paper, in the 1980s, most firms switched from a "retain and reinvest" to a "downsize and distribute" strategy. This meant that, since the 1980s, an increasing part of profits were diverted from production and to be distributed in the form of dividends or interest payments. Similarly, Lazonick and Mazzucato (2013) argues that firms use a growing share of their profits to repurchase their own stock or carry out financial operations at the expenses of investment and particularly investments in innovation.

From an empirical point of view, all of the studies that find that the growth regime is wage-led in the United States, also find that, in the short run, the effect of the proxy for capacity utilization has a larger effect on investment than the profit share. Regarding the long run, Onaran et al (2011) find that while capacity utilization has a strong positive long-run effect on investment as a share of income, the effect of the profit share is substantially smaller. In particular, they estimate a small long-run negative effect of the rentier profit share on investment and a small long-run positive effect of non-rentier profit share on the investment[43]. This is in line with Stockhammer and Wildauer (2015) who find, using a panel of countries, that while output has a strong long-run effect on investment, the long-run effect of the wage share is approximately zero. Moreover, a long-run relationship between investment and capacity utilization is also found by Chiriko et al (2011) using a panel of American firms. Regarding financialization, the results from Onaran at al (2011) are consistent with the findings of Stockhammer (2004) and Orhangazi (2008). Using macroeconomic

[41] As discussed in Chapter 2, previous Kaleckian models would express consumption as a function of the profit rate and capacity utilization.
[42] We are in this case considering a simple closed economy scenario.
[43] Capacity utilization is significant in all their specifications, while the rentier share of income and the non-rentier share of income are significant only if they enter the regression individually.

data on the United States the former and a panel of firm level data the latter, they both find that the shift towards a shareholder value orientation of firms, as predicted by Lazonick and O'Sullivan (2000), had a negative effect on accumulation in the United States: interest payments and dividends have a negative effect on accumulation. Similarly, from a Marxist perspective, Dumenil and Levi (2004) defend the primary role of the profit rate in investment function. They argue that reason why investment did not keep up with the surge in the profit rate, in the last decades of twentieth century in the United States, was the large increase in rentier profits. Since accumulation depends on retained profits rather than overall profits and a great part of profits was diverted from firms to shareholders, the rise in the overall profit rate was not associated with an equivalent increase in investment.

4.3 Empirical method

Since we are interested in estimating the evolution of the consumption and investment function separately, similarly to the previous chapter, we use the single equation approach rather than the system (VAR) approach. The two main methodologies that allow for the estimation of both short and long-run effects are the Autoregressive Distributed Lag (ADL) model and the Error Correction Model (ECM). The choice between the two methods depends on the nature of the data. If the data have unit root, it is standard econometric practice to use an ECM[44]. In order to choose the most appropriate methodology, it is first essential study the characteristics of the data.

4.3.1 Consumption and investment functions

Consumption (*C*) is specified as a function of the wage bill (*W*), gross operating surplus (*R*) and house wealth (*HW*), consumer debt (*D*).

$$C = c(W, R, HW, D) \tag{1}$$

It is common, in neo-Kaleckian empirical works that study the different effects of wages and profits on consumption[45], to express consumption as a function of income, split between total wages and total profit. If our hypothesis is correct, not only the elasticity of consumption respect to wages is higher than the elasticity of consumption respect to profits in the short run, but the difference between them should increase in the long run. Following Onaran et al (2011), house wealth enters the regression to control for the wealth effect and therefore it is supposed to have a positive effect on consumption. Household debt is controlled for by consumer debt (excluded

[44] Pesaran and Shin (1998) however argue that it would be possible to use an ADL model even if data have a unit root.

[45] Other studies with a similar specification are Stockhammer and Ederer (2008), Hein and Vogel (2008, 2009), Stockhammer et al (2009) and Onaran and Galanis (2014).

mortgages), which as discussed in the previous section, we expect to be positive and significant only in the short run.

As a robustness check, we use the same independent variables to estimate the two components of consumption: consumption of goods (C_G), and consumption of services (C_S). This further division is important because the components of consumption might differ in their determinants and in their short and long-run dynamics which should lead to different industrial policies. For example, we expect debt to have a larger effect on consumption of goods rather than consumption of services. This is because we expect households to use credit instruments to buy especially durable goods. Furthermore, we repeat the estimations dividing profits into rentier profits (R_r) and non rentier profits (R_{nr})[46]. Onarn et al (2011) already used this distinction to test the effects of the change in the distribution of profits between corporations and rentiers brought about by financialization. In particular, R_r equals dividends and interest payments while R_{nr} is a measure of firms' retained profits and it equals total profits minus R_r.

Regarding the investment function, following the literature, we first estimate it as a function of capacity utilization[47] (Z), the interest rate (i) and the profit share divided between rentier share (π_r) and non-rentier share (π_{nr}).

$$I = i(Z, i, \pi_r, \pi_{nr}) \tag{2}$$

Subsequently we depart from the standard approach and estimate residential investment (I_R) and non-residential investment (I_{nR}) separately. The rationale for this is that the determinants of investment in new houses are probably substantially different from those of non-residential investment required for production such as investment in new equipments, structures and intellectual property. We believe the determinants of investment that appear in equation (2) are more fitted to explain the behaviour of non-residential investment than that of residential investment. We therefore estimate non-residential investment as

$$I_R = i(Z, i, \pi_r, \pi_{nr}) \tag{3}$$

We expect capacity utilization to be positively related to investment both in the long and in the short run. The profit shares on the other hand should be more relevant in the short run than in the

[46] Rentier profit equals dividends and interest payments while non-rentier profit is a measure firms' retained profits and it equals gross operating surplus minus rentier profits.

[47] We use capacity utilization of manufacturing as a proxy for capacity utilization in total industry because the former is only available from 1967. The two series are almost identical in the period in which they overlap and the correlation between the two series is 0.994.

long run. Moreover, we expect π_r to have a negative effect, or at least a smaller positive effect, than π_{nr}.

On the other hand, the different nature of residential investment requires a different specification. The NIPA handbook (Chapter 6, 2014) explains that

> "*Residential structures consists of new construction of permanent-site single-family and multifamily housing units, improvements (additions, alterations, and major structural replacements) to housing units, expenditures on manufactured homes, brokers' commissions and other ownership transfer costs on the sale of residential property, and net purchases of used structures from government agencies. Residential structures also include some types of equipment (such as heating and air conditioning equipment) that are built into the structure. Residential equipment consists of equipment, such as furniture or household appliances, that is purchased by landlords for rental to tenants*."

It seems reasonable that construction and purchase of new and old houses or alteration of existing houses such as remodelling of kitchens and bathrooms depends on determinants similar to those of consumption expenditures rather than on capacity utilization. In this chapter, we specify non-residential investment as a function of the wage bill (W), rentier profits (R_r), non-rentier profits (R_{nr}) and the level of mortgages (M).

$$I_R = i(W, R_r, R_{nr}, M) \tag{4}$$

4.3.2 Time series properties of the data

At a first glance, we can say that all of these variables, excluding capacity utilization and the interest rate, have an upward, often quadratic, deterministic trend. For most variables, the estimated coefficients of equation (5) are always extremely statistically significant. In most series, $\beta_1 \approx 1$ and $\beta_4 < 0$. This indicates that most variables could have a unit root and a concave time trend[48].

$$\log(Y) = c + \beta_1 Log(Y_{t-1}) + \beta_2 Log(Y_{t-2}) + \beta_3 t + \beta_4 t^2 \tag{5}$$

Since we are interested in the long-run and short-run relationships between our variables, we should be very cautious about the nature of our series for both econometric and theoretical reasons. Whether macroeconomic series are actually stationary or non-stationary around their deterministic

[48] The concave time trend of a variable expressed in logarithmic form implies that the average growth rate of the variable decreased over time. This describes well what happened in the United States over the period under examination.

trend is an issue on which there is not broad consensus in the literature. Nelson and Plosser (1982) famously argued that most macroeconomic data are characterised by a stochastic as well as a deterministic trend[49] and most econometric textbooks support this idea. Perron (1989 and 1997) however, found that after controlling for structural breaks, many macroeconomic series are actually trend stationary. The main cause of this debate is well explained by Campbell and Perron (1991) in their seventh and ninth rules:

> "*Rule 7: In finite samples, any trend stationary process can be approximated arbitrarily well by a unit root process.*
>
> *Rule 9: In a finite sample, any unit root process can be approximated arbitrarily well by a trend stationary process.*"

Whether the data generating process of a series is trend stationary or it is characterised by a stochastic trend (unit root) carries also important theoretical implications. One of the main characteristics of post-Keynesian theory is the use of historical time as opposed to logical time (Robinson 1962). The concept of historical time implies that time is irreversible and a decision cannot simply be undo in the next period. Regarding the relationship between business cycle and time trend, Kalecki (1971, p.165) points out that

> "*The long-run trend is but a slowly changing component of a chain of short period situations; it has no independent entity.*"

By definition however, a deterministic trend is only function of time and therefore, the long-run evolution of the series does not depend on the short-run movements around the trend but on time alone. Equation (6) describe a trend stationary process

$$Y_t = \alpha + \beta_1 Y_{t-1} + \beta_2 t + \varepsilon_t, \quad |\beta_1| < 1 \tag{6}$$

Since $|\beta_1| < 1$, past values of Y and past shocks (ε) do not have a permanent effect on the series. That is, the long-run average of a series has its own identity, which is independent of the short run. On the other hand, the concept of historical time is better described by a stochastic trend. Let us consider for example a random walk, the simplest stochastic process

$$Y_t = Y_{t-1} + \varepsilon_t = Y_0 + \sum_{j=0}^{t-1} \varepsilon_{t-j} \tag{7}$$

As we can see in equation (7) each year's value is equal to the value the year before plus a random

[49] Note that if a series has both a stochastic and a deterministic trend it means that it is not trend stationary.

shock. In other words, the series is the sum of its original value (Y_0) and the sum of all the random shocks which therefore have a permanent effect. In this case, the long-run average does not depend on time alone but on its own "history".

As discussed above, it is often argued that most macroeconomic time series data have both a stochastic and a deterministic trend such as

$$Y_t = Y_0 + \beta_1 t + \sum_{j=0}^{t-1} \varepsilon_{t-j} \quad (8)$$

Equation (8) carries two technical hitches. First, when the dependent variable in a regression follows a time trend, we should include a time trend among the control variables or de-trend the dependent variable. This is done to avoid spurious results because, by definition, the deterministic component of a variable is not a function of other variables but of time alone. The second problem, however, is that separating the deterministic trend from the stochastic trend is practically challenging because as pointed out by Campbell and Perron (1991), in finite samples the deterministic trend can be approximated by a stochastic trend and vice versa. The two trends are therefore difficult to separate. To illustrate this problem let us consider the logarithm of GDP from 1950 to 2014 in the United States. We estimated it as a function of its past values (*Log(Y_{t-1})*), of a quadratic deterministic trend (*Trend*) or as a combination of both (Table 4.1).

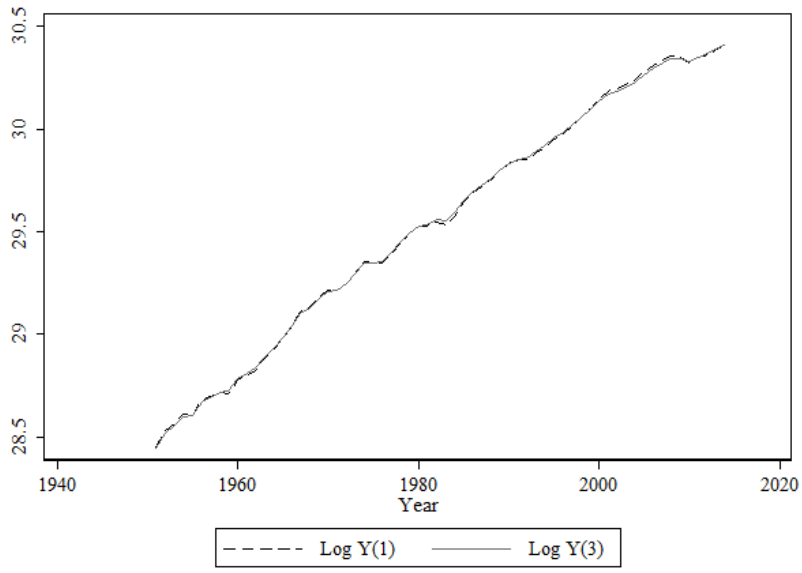
The fact that in the first two columns the Adjusted R^2 is respectively 0.999 and 0.997 indicates that the series can be "explained" by either a stochastic trend or a deterministic trend. Interestingly, when we control for both Log(Y_{t-1}) and T*rend* (column 3) the coefficient of the stochastic trend decrease by only 18% while the effect of the deterministic trend falls by 78%. This proves that, in column (2), the coefficient of *Trend* did not capture only the effect on *Y* of the deterministic trend but also the effect of the stochastic one. Moreover, Figure 4.1 shows the predicted values of *Log(Y)* from the estimates in column (1) and (3). As we can see, the two series of predicted values almost entirely overlap. Therefore, if a time trend exists, it can be well approximated by the stochastic trend because, when we remove it, the remaining stochastic trend can "explain" the series just as precisely (column 1).

Table 4.1: *Regression results for GDP*

VARIABLES	(1) Log(*Y*)	(2) Log(*Y*)	(3) Log(*Y*)
Log(Y_{t-1})	0.989***		0.808***
	(0.00455)		(0.0796)
Trend		0.578***	0.127**
		(0.0558)	(0.0560)
Trend^2		-0.000138***	-3.06e-05**
		(1.41e-05)	(1.36e-05)
Constant	0.358***	-574.6***	-126.2**
	(0.134)	(55.35)	(55.66)
Observations	64	64	64
Adj R^2	0.999	0.997	0.999

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Fig 4.1: *Fitted values of Log (Y)*



To determine whether our series have a stochastic trend we use the Augmented Dickey-Fuller (ADF) test. Tables B4.1 and B4.2 in Appendix B show that when we use a linear trend in the test, only total profits and capacity utilization seem to be stationary around their deterministic trend (as in equation 6). All other variables have also a stochastic trend (as in equation 8). Despite the fact

that the test suggests that most series are characterised by both a stochastic and a deterministic trend, in the following estimates we will not remove the deterministic trend from our dependent variables, nor control for it in our regressions as standard econometric practice would require. We will instead assume, using Campbell's and Perron's (1991) Rule 7, that the deterministic trend, if it exists, can be well approximated by the stochastic trend present in the series. Not removing the possible deterministic trend allows us to respect the concept of historic time and take into account the complete long-run variation of our variables. In other words, the evolution of investment and consumption will be explained either by their past values or by the independent variables, not by time alone.

4.3.2 The empirical model

Given the presence of unit root in our data, we chose to carry out our estimations with an ECM in conjunction with the bound test for cointegration developed by Pesaran et al (2001). Given the generic ECM model

$$\Delta Y = c + \vartheta \Delta X + \varphi X_{t-1} + \psi Y_{t-1} \tag{9}$$

The short-run relationship between X and Y is given by the coefficients of the variables in differences (ϑ) while the long-run relationship is given by

$$\sigma = -\frac{\varphi}{\psi} \tag{10}$$

However, we can say that there exists a level (long-run) relationship between X and Y only if the F value of $\vartheta = 0$, $\psi = 0$ is above the (appropriate) upper bond critical value in the table in Pesaran et al (2001)[50].

The models to be estimated have been selected using the general to specific approach. In the general model, that is used as staring point to estimate the consumption and investment functions, all variables enter the regression in levels and in first difference as shown in equation (11)

$$\Delta Y = c + \beta_1 \mathbf{X}_{t-1} + \beta_2 Y_{t-1} + \beta_3 \Delta \boldsymbol{X} + \beta_4 \sum_{n=1}^{2} \Delta \mathbf{X}_{t-n} + \beta_5 \sum_{n=1}^{2} \Delta Y_{t-n} \tag{11}$$

Where, *Y* is the dependent variable, *c* is a constant and $\boldsymbol{X}$ is a vector of control variables. The general model was then restricted into a more parsimonious model by removing the variables that

[50] See Bahmani-Oskooee and Oyolola (2007) for a detailed explanation of the application of the bound testing approach.

were individually and jointly non statistically significant[51]. Both the general and the specific model successfully passed the tests for autocorrelation (Breush-Godfrey test), heteroskedasticity (Breusch-Pagan test), normality of the error term (K^2 test) and functional form misspecification (Ramsey RESET test[52]).

As in the previous chapter, year dummies have been included both in the general and the specific models to take into account outliers or observations that were causing some one of the forms of misspecification for which the model was tested[53]. The need to use year dummies reveals that our empirical model is failing to take into account some unknown factors that are relevant, to explain the behaviour of the dependent variable at least in those years. We use them, conscious that they are a measure of our ignorance. They are however necessary, as our sample size is too small to justify the use of robust standard error to cope with any form of misspecifications.

Finally, all the variables are expressed in logarithmic from and consequently the coefficients must be interpreted as elasticities.

4.4 Regression results

4.4.1 Consumption

The consumption function was estimated twice. Table 4.2 shows the results of the estimates of regressions (a) and (b) in which, similarly to the previous chapter, we control for total profits without distinguishing between rentier and non-rentier profits. Only the results for overall consumption and for consumption of services appear in the table because we could not find evidence of cointegration between consumption of goods and any of its determinants.

a) $\Delta\log(C) = c + \beta_1\log(W_{t-1}) + \beta_2\log(R_{t-1}) + \beta_3\log(C_{t-1}) + \beta_4\Delta\log(W) + \beta_5\Delta\log(R) + \beta_6\Delta\log(HW) + \beta_7\Delta\log(D) + \beta_8\Delta\log(W_{t-1})$

b) $\Delta\log(Cs) = c + \beta_1\log(W_{t-1}) + \beta_2\log(R_{t-1}) + \beta_3\log(Cs_{t-1}) + \beta_4\Delta\log(W) + \beta_5\Delta\log(R) + \beta_6\Delta\log(HW) + \beta_7\Delta\log(D) + \beta_8 d75 + \beta_8 d83$

Table 4.3 reports the estimated short and long-run effects of equation (a) and (b). In the short run, all variables in regression (a) have the expected effect.

[51] See Spanos (1986) for a detailed explanation of the general to specific approach.
[52] We used two lags of the residual for the Breusch-Godfrey test and ŷ2, ŷ3 and ŷ4 for the RESET test.

[53] The coefficient of the dummy variables are not reported on the main tables.

Table 4.2: Determinants of Consumption

VARIABLES	(a) ΔLog(*C*)	(b) ΔLog(*Cs*)
Log(W_{t-1})	0.253***	0.0750**
	(0.0372)	(0.0335)
Log(R_{t-1})	0.113***	-0.0294**
	(0.0318)	(0.0125)
Log(*dependent* $_{t-1}$)	-0.347***	-0.0471
	(0.0591)	(0.0311)
ΔLog(*W*)	0.371***	0.355***
	(0.0527)	(0.0410)
ΔLog(*R*)	0.153***	0.00644
	(0.0501)	(0.0355)
ΔLog(*HW*)	0.0429*	0.0399**
	(0.0220)	(0.0175)
ΔLog(*D*)	0.0977***	0.0135
	(0.0234)	(0.0190)
ΔLog(W_{t-1})	-0.247***	
	(0.0465)	
Time dummies		1975 1983
Sample	1950 - 2014	1950 - 2014
Adj R^2	0.857	0.836

Notes: The constant term is not reported in the table but it is included in the regression. The variable Log(dependent) is the dependent variable in each regression. Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

The elasticity of *HW* and *D* on *C* - e_{HW} and e_{CD} respectively - is positive and significant, confirming the role of debt as an important determinant of consumption in the United States. The short-run elasticities of *W* and *R* with respect to *C* - e_W and e_R respectively - are strangely similar and take the value of 0.12 and 0.15. We would have expected wages to have a larger effect on consumption even in the short run. This could be explained by the fact that in the short run, wage earners use relatively more credit instruments to finance their consumption. Turning to the third column of Table 4.3, we can see how the results substantiate our hypothesis regarding the long run. First, *HW*

and *D* do not have a long-run effect on *C*. Second, both e_W and e_R are larger in the long run compared to the short run. This seems to confirm that in the long run when debt must be paid off, consumption will depend more on current income. Third, the ratio between e_W and e_R increases from the short run to the long run. While in the short run the e_W is equal to 4/5 of e_R, in the long run the effect of wages on consumption is more than double the effect of profits on consumption. Therefore, we can say that overall consumption becomes more wage-led in the long run.

As we can see from regression (b), the role of house wealth and consumer debt does not drastically change when we consider consumption of services instead of overall consumption. The only difference is in the size of the short-run elasticity, which is sensibly reduced. On the contrary, e_W is larger both in the short and in the long run. The only effect that changes substantially compared to regression (a) is that of profits. Not only does e_R falls to 0.01 in the short run but, in the long run, it even becomes negative. For these reasons, consumption of services would seem to be substantially more wage-led in the long run compared to the short run. However, the negative long-run effect of profits on consumption is difficult to explain and it undermines the credibility of the whole regression.

Table 4.3: Short-run and long-run elasticities, from (a) and (b)

Equation (a)	Short run	Long run
e_W	0.12	0.73
e_R	0.15	0.33
e_{HW}	0.04	//
e_{CD}	0.10	//
e_W / e_R	0.8	2.21
Equation (b)	Short run	Long run
e_W	0.35	1.60
e_R	0.01	-0.62
e_{HW}	0.04	//
e_{CD}	0.01	//
e_W / e_R	35	

Notes: all values are rounded to the second decimal place.

Table 4.4 shows the regression results for the consumption functions in which we control for rentier and non-rentier profits separately. This specification is better fitted to explain the evolution of consumption because as Onaran et al (2011) pointed out, dividends and interest earners have a substantially different consumption behaviour compared to that of firms. Therefore, we expect the elasticity of rentier income to be higher than the elasticity of non-rentier income because most of

firms' retained profits are supposed to be invested rather than consumed. The estimated equations for overall consumption, consumption of goods and consumption of services are as follows

c) $\Delta\log(C) = c + \beta_1\log(W_{t-1}) + \beta_2\log(R_{nrt-1}) + \beta_3\log(HW_{t-1}) + \beta_4\log(C_{t-1}) + \beta_5\Delta\log(W) + \beta_6\Delta\log(R_r) + \beta_7\Delta\log(R_{nr}) + \beta_8\Delta\log(HW) + \beta_9\Delta\log(D) + \beta_{10}\Delta\log(W_{t-1}) + \beta_{11}d75 + \beta_{10}d83$

d) $\Delta\log(Cg) = c + \beta_1\log(W_{t-1}) + \beta_2\log(R_{nrt-1}) + \beta_3\log(Cg_{t-1}) + \beta_4\Delta\log(W) + \beta_5\Delta\log(R_r) + \beta_6\Delta\log(R_{nr}) + \beta_7\Delta\log(HW) + \beta_8\Delta\log(D) + \beta_9\Delta\log(W_{t-1}) + \beta_{10}d07$

e) $\Delta\log(Cs) = c + \beta_1\log(R_{rt-1}) + \beta_2\log(R_{nrt-1}) + \beta_3\log(Cs_{t-1}) + \beta_4\Delta\log(W) + \beta_5\Delta\log(R_r) + \beta_6\Delta\log(R_{nr}) + \beta_7\Delta\log(HW) + \beta_8d83$

f) $\Delta\log(Cs) = c + \beta_1\log(W_{t-1}) + \beta_2\log(R_{rt-1}) + \beta_3\log(Cs_{t-1}) + \beta_4\Delta\log(W) + \beta_5\Delta\log(R_r) + \beta_6\Delta\log(R_{nr}) + \beta_7\Delta\log(HW) + \beta_8d83$

As we can see from Table 4.4, regression (c) – for overall consumption - carries similar results to regression (a) but it reinforces the previous results. As before, consumer debt has only a short-run effect on consumption. House wealth instead, has both a short and a long-run effect but they are both very modest (0.05 and 0.1 respectively). Regarding profits, the results are counterintuitive: In the short run, $e_{Rr} < e_{Rnr}$ while in the long run rentier income does not seem to have an effect on consumption while non-rentier profit does. One possible explanation for this result is that the income of self-employed individuals is also included in the non-rentier profits and since they have a similar propensity to consume as wage earners, they increase the magnitude of e_{Rnr}. The relationship between profits and wages however is as we expected: Not only the e_W is larger than both e_{Rr} and e_{Rnr} in the short run, but the ratio between e_W and e_{Rnr} increases from the short to the long run. In the short run, e_W is about twice as big as e_{Rnr} while in the long run e_W is thirteen times bigger than e_{Rnr}.

Table 4.4: Determinants of Consumption (c) – (f)

	(c)	(d)	(e)	(f)
VARIABLES	ΔLog(*C*)	ΔLog(*Cg*)	ΔLog(*Cs*)	ΔLog(*Cs*)
Log(W_{t-1})	0.180***	0.122***		0.0895**
	(0.0267)	(0.0253)		(0.0353)
Log(Rr_{t-1})			0.0223***	0.0158***
			(0.00675)	(0.00552)
Log(Rnr_{t-1})	0.0128**	0.0278***	0.0166**	
	(0.00541)	(0.0101)	(0.00670)	
Log(HW_{t-1})	0.0192**			
	(0.00901)			
Log($dependent_{t-1}$)	-0.188***	-0.106***	-0.0358***	-0.110***
	(0.0277)	(0.0234)	(0.00879)	(0.0344)
ΔLog(*W*)	0.427***	0.384***	0.244***	0.286***
	(0.0428)	(0.0785)	(0.0392)	(0.0393)
ΔLog(*Rr*)	0.0210	0.0513**	0.0191	0.0224*
	(0.0129)	(0.0241)	(0.0122)	(0.0124)
ΔLog(*Rnr*)	0.111***	0.216***	0.0432*	0.0471*
	(0.0270)	(0.0527)	(0.0234)	(0.0239)
ΔLog(*HW*)	0.0534***	0.137***	0.0508***	0.0428**
	(0.0183)	(0.0342)	(0.0171)	(0.0176)
ΔLog(*D*)	0.0949***	0.150***		
	(0.0234)	(0.0439)		
ΔLog(W_{t-1})	-0.168***	-0.327***		
	(0.0382)	(0.0707)		
Time dummies	1975 1983	2007	1983	1983
Sample	1950 - 2014	1950 - 2014	1950 - 2014	1950 - 2014
Adj R^2	0.912	0.836	0.812	0.813

Notes: The constant term is not reported in the table and it is always non significant. The variable Log(dependent) is the dependent variable in each regression. Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 4.5: Short-run and long-run elasticities, from (c) - (f)

Equation (c)	Short run	Long run	Equation (e)	Short run	Long run
e_W	0.26	0.96	e_W	0.24	//
e_{Rr}	0.02	//	e_{Rr}	0.02	0.62
e_{Rnr}	0.11	0.07	e_{Rnr}	0.04	0.46
e_{HW}	0.05	0.10	e_{HW}	0.05	//
e_{CD}	0.10	//	e_{CD}	//	//
e_W /e_{Rnr}	2.36	13.7	e_W /e_{Rnr}	6	//
Equation (d)	Short run	Long run	Equation (f)	Short run	Long run
e_W	0.06	1.15	e_W	0.29	0.81
e_{Rr}	0.05	//	e_{Rr}	0.02	0.14
e_{Rnr}	0.22	0.26	e_{Rnr}	0.05	//
e_{HW}	0.14	//	e_{HW}	0.04	//
e_{CD}	0.15	//	e_{CD}	//	//
e_W /e_{Rnr}	0.22	4.42	e_W /e_{Rnr}	5.8	//

Notes: all values are rounded to the second decimal place.

In regressions (d), (e) and (f) we look at the determinants of consumption of goods and consumption of services. Consumption of services was estimated twice because W and R_{nr} seem to have a long-run relationship with C only if they do not enter the regression together. Overall, the results confirm the results of regression (a) and (c). Consumer debt and house wealth never have a long-run effect, e_{Rr} is always smaller than e_{Rnr} in the short run and, with the exception of equation (d) in the short run, e_W is always bigger than both e_{Rr} and e_{Rnr}. Regression (d), confirms that the long run is more wage-led than the short run also because the ratio between e_W and e_{Rnr} increases greatly from the short to the long run. This would happen even if we were not to consider the (negative) lagged short-run coefficient of W. Without taking into account β_9 in regression (d), e_W would be equal to 0.38 which implies that in the short run e_W would be about 2/3 bigger than e_{Rnr} while in the long run e_W would be four times bigger than e_{Rnr}. Finally, in specifications (e) and (f), we do not find a significant short-run relationship between consumer debt and consumption of services. This is consistent with the results from regression (b) in which e_{CD} is extremely small and equal to 0.01. The lack of a short-run relationship between consumer debt and consumption of services suggests that most consumer debt in the United States is used to purchase durable and non-durable goods.

Even though a small part of our results are not what we expected, they are robust evidence in support of Bleckers' claim that consumption becomes more wage-led in the long run. Consumer

debt has only a short-run effect on consumption or on its components. This is consistent with the fact that debt and debt service over long periods have to be repaid. Consequently, in the long run, consumption depends relatively more on current income. Secondly, even though both wages and profits increase their effect on consumption in the long run, the effect of wages increases more than the effect of profits. For both these reasons, consumption in the United States becomes more wage-led in the long run.

4.4.2 Investment

Similarly to what we did for the consumption function, we first estimate overall investment and subsequently its components: non residential investment and residential investment. Investment and non residential investment – equations (g), (h) and (i) – are estimated as a function of capacity utilization, profit share divided between rentier share of income and non-rentier profit share, interest rate and a deterministic trend that we use as a proxy for capital productivity. In the short run, we expect capacity utilization and the non-rentier profit share to have a positive impact on investment while the interest rate should have a negative effect. The role of the rentier profit share is ambiguous. On the one hand, when rentier profits increase, the firms' availability of internal funds decreases and this would have a negative effect on investment. On the other hand, dividends and interest payments could be considered as indicators of firms' ability to pay its debt service and therefore it would allow firms to have access to external funds: the effect on investment would be positive. In any case, since most retained profits are assumed to be reinvested, the elasticity of rentier profit on investment ($e_{\pi r}$) is supposed to be smaller than the elasticity of non-rentier profits on investment (e_{π}). Our hypothesis for the long run is that capacity utilization keeps having a positive effect on investment while the effects of the non-rentier profit share fades. As discussed above, in the long run firms should not want to increase productive capacity just because they have the means to do so, if they have already reached their desired level of utilization. Regarding the effect of the rentier profit share, if it is only considered as a proxy for availability of funds, in the long run it should have only a marginal role on investment, similar to that of the non-rentier profit share. If instead the negative effect of diversion of funds prevails, the effect might very well persist in the long run: if firms have limited access to external funding, a fall in retained profits might constrain investment even if firms would be willing to invest to reach the desired level of capacity.

Table 4.6 reports the results of regressions (g), (h) and (i) and Table 4.8 the derived short and long-run elasticities. The overall investment function is estimated twice because, consistently with the results from Onaran et al, π_{nr} and π_r only have a long run relationship with I when they enter the regression individually.

g) $\Delta\log(I) = c + \beta_1\log(\pi_{nr\,t-1}) + \beta_2\log(Z_{t-1}) + \beta_3\log(i_{t-1}) + \beta_4\log(I_{t-1}) + \beta_5\Delta\log(\pi_r) + \beta_6\Delta\log(\pi_{nr}) + \beta_7\Delta\log(Z) + \beta_8\Delta\log(i) + \beta_9\Delta\log(\pi_{nr\,t-1}) + \beta_{10}\Delta\log(Z_{t-1}) + \beta_{11}\Delta\log(i_{t-1}) + \beta_{12}\Delta\log(I_{t-1}) + \beta_{13}\text{Trend} + \beta_{14}\text{d2009}$

h) $\Delta\log(I) = c + \beta_1\log(\pi_{r\,t-1}) + \beta_2\log(Z_{t-1}) + \beta_3\log(i_{t-1}) + \beta_4\log(I_{t-1}) + \beta_5\Delta\log(\pi_r) + \beta_6\Delta\log(\pi_{nr}) + \beta_7\Delta\log(Z) + \beta_8\Delta\log(\pi_{r\,t-1}) + \beta_9\Delta\log(Z_{t-1}) + \beta_{10}\Delta\log(i_{t-1}) + \beta_{11}\Delta\log(I_{t-1}) + \beta_{12}\text{Trend} + \beta_{13}\text{d2009}$

i) $\Delta\log(Inr) = c + \beta_1\log(\pi_{r\,t-1}) + \beta_2\log(Z_{t-1}) + \beta_3\log(i_{t-1}) + \beta_4\log(Inr_{t-1}) + \beta_5\Delta\log(\pi_r) + \beta_6\Delta\log(\pi_{nr}) + \beta_7\Delta\log(Z) + \beta_8\Delta\log(i) + \beta_9\Delta\log(i_{t-1}) + \beta_{10}\Delta\log(Inr_{t-1}) + \beta_{11}\text{Trend}$

In the short run, all the coefficient have the expected signs and magnitude in all three specifications. The elasticity of capacity utilization is always positive and larger than the elasticity of the two profit shares and interest rate. The interest rate has a robust, yet small, negative effect on both overall investment and non-residential investment. Finally, $e_{\pi nr}$ is positive and always larger than $e_{\pi r}$. The positive sign of $e_{\pi r}$ indicates that in the short run the positive effect of the availability of external funds seems to prevail on the negative effect of smaller internal funds.

Among the long-run elasticities, the only unexpected result is the positive elasticity of interest rate (e_i) respect to both investment and non residential investment. If e_i is capturing a feedback effect from investment to interest rate, an explanation could be that an increase in investment puts upward pressure on inflation and the central bank responds by increasing the interest rate. This increase in interest rate, however, might not have a negative effect on investment because in the long run investment might depend principally upon demand. Most post-Keynesians would not accept the first part of this explanation because - since the economy is supposed to work below full capacity - an increase in demand does not cause an increase in prices. Turning to the variables of interest, the elasticity of capacity utilization (e_Z), as expected, increases in all regressions. On the contrary, we found evidence of a long-run relationship between π_{nr} and I only in regression (g). However, as the increase in the ratio between e_Z and $e_{\pi nr}$ indicates, the elasticity of capacity utilization increases proportionally more than the elasticity of the non-rentier profit share. Moreover, the fact that in regression (i) we do not find any long-run relationship between π_{nr} and Inr strongly supports our hypothesis. Regarding the rentier share, we find a robust negative effect on both investment and non residential investment. This result is much larger compared to that of Onaran et al (2011) and it confirms that in the long run financialization has a negative effect on investment as it diverts funds from production.

Table 4.6: *Determinants of non-residential investment*

	(g)	(h)	(i)
VARIABLES	ΔLog(I)	ΔLog(I)	ΔLog(Inr)
Log($\pi_{r\ t-1}$)		-0.159**	-0.165***
		(0.0726)	(0.0445)
Log($\pi_{nr\ t-1}$)	0.381**		
	(0.157)		
Log(Z_{t-1})	0.535***	0.555***	0.321***
	(0.141)	(0.133)	(0.0990)
Log(i_{t-1})	0.0819***	0.0786**	0.0888***
	(0.0303)	(0.0345)	(0.0212)
Log($dependent_{t-1}$)	-0.169***	-0.140**	-0.120**
	(0.0518)	(0.0524)	(0.0450)
ΔLog(π_r)	0.280***	0.222**	0.00262
	(0.0893)	(0.106)	(0.0702)
ΔLog(π_{nr})	0.914***	0.678***	0.0452
	(0.226)	(0.215)	(0.146)
ΔLog(Z)	1.371***	1.537***	1.125***
	(0.158)	(0.131)	(0.103)
ΔLog(i)	0.0749**		0.0439*
	(0.0361)		(0.0236)
ΔLog($\pi_{r\ t-1}$)		0.166**	
		(0.0693)	
ΔLog($\pi_{nr\ t-1}$)	-0.436**		
	(0.182)		
ΔLog(Z_{t-1})	-0.619***	-0.422**	
	(0.190)	(0.206)	
ΔLog(i_{t-1})	-0.177***	-0.155***	-0.0560*
	(0.0457)	(0.0435)	(0.0296)
ΔLog($dependent_{t-1}$)	0.304***	0.241**	0.389***
	(0.0974)	(0.0971)	(0.0755)
Trend	0.00784***	0.00858***	0.00838***
	(0.00214)	(0.00250)	(0.00228)
Time dummies	2009	2009	
Sample	1950 - 2014	1950 - 2014	1950 - 2014
Adj R^2	0.863	0.858	0.852

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

As explained in the previous section, the other component of overall investment, residential investment, is estimated using a similar specification (j) to the consumption function. The main difference is that we do not control for consumer debt and house wealth but rather for the total amount of mortgages (M). The expected results are similar to the consumption function. Wages are supposed to have the largest positive effect both in the short and in the long run. The effect of

profits on residential investments is supposed to be positive but smaller than that of wages, and mortgages should have a positive short-run effect but not a long-run one. Similarly to consumer debt for consumption, mortgages allow to increase house expenditures in the short run but, since debt has to be repaid in the long run, families take on mortgages based on their current and expected income. Therefore, in the long run, the main determinant of expenditures in new houses should be income rather than debt.

j) $\Delta\log(Ir) = c + \beta_1\log(W_{t-1}) + \beta_2\log(R_{rt-1}) + \beta_3\log(R_{nrt-1}) + \beta_4\log(Ir_{t-1}) + \beta_5\log(W) + \beta_6\Delta\log(R_r) + \beta_7\Delta\log(R_{nr}) + \beta_8\Delta\log(M) + \beta_9\Delta\log(R_{nrt-1}) + \beta_{10}\Delta\log(M_{t-1}) + \beta_{11}\Delta\log(Ir_{t-1}) + \beta_{12}\Delta\log(R_{nrt-2}) + \beta_{13}d55 + \beta_{14}d83$

The results for the residential investment function reported in Table 4.7 and Table 4.9, show the corresponding short and long-run elasticities. Strikingly, while wages and mortgages behave as expected, the elasticities of the rentier and non-rentier profits are more problematic. In the short run, the elasticities of wages (e_W) and of mortgages (e_W) are positive and equal to 1.93 and 1.68 respectively. Moreover, in the long run, as expected, while e_W increases to 3.24, we could not find a relationship between *M* and *Inr*. On the other hand, in the short run the elasticity of rentier profits (e_{Rr}) and of non-rentier profits (e_{Rnr}) are respectively 0.12 and 0.46 and therefore $e_{Rr} < e_{Rnr}$. This result is similar to that of the consumption functions reported in Table 4.5 but it is counterintuitive: rentier earners should spend more on new houses compared to non-rentier profit earners. As for consumption, one possible explanation is that the magnitude of e_{Rnr} is large because the income of the self-employed is included in R_{nr}. In the long run the relationship between profits and residential investment becomes even more puzzling as e_{Rr} and e_{Rnr} turn negative. Even though this implies that in the long run the residential investment becomes more wage-led, we do not find a reasonable ex-post explanation for these negative signs. The results do not change if we control for total profit rather than for R_r and R_{nr} individually.

Table 4.7: *Determinants of residential investment*

	(j)
VARIABLES	ΔLog(*Ir*)
Log(W_{t-1})	1.677***
	(0.267)
Log($R_{r\ t-1}$)	-0.413***
	(0.0700)
Log($R_{nr\ t-1}$)	-0.687***
	(0.137)
Log(Ir_{t-1})	-0.518***
	(0.0783)
ΔLog(*W*)	1.927***
	(0.408)
ΔLog(R_r)	0.117
	(0.114)
ΔLog(R_{nr})	0.526**
	(0.241)
ΔLog(*M*)	3.099***
	(0.374)
ΔLog($R_{nr\ t-1}$)	-0.421*
	(0.210)
ΔLog(M_{t-1})	-1.416***
	(0.411)
ΔLog(Ir_{t-1})	0.143*
	(0.0788)
ΔLog($R_{nr\ t-2}$)	0.357*
	(0.178)
Time dummies	1955 1983
Sample	1950 - 2014
R-squared	0.857

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4.8: *Short-run and long-run elasticities, from (g) and (i)*

Equation (g)	Short run	Long run
$e_{\pi r}$	0.28	//
$e_{\pi nr}$	0.48	1.94
e_i	-0.10	0.48
e_Z	0.75	3.16
$e_Z/e_{\pi nr}$	1.56	1.63
Equation (h)	Short run	Long run
$e_{\pi r}$	0.39	-1.14
$e_{\pi nr}$	0.68	//
e_i	-0.16	0.56
e_Z	1.11	3.96
Equation (i)	Short run	Long run
$e_{\pi r}$	0.002	-1.38
$e_{\pi nr}$	0.05	//
e_i	-0.06	0.74
e_Z	1.125	2.68

Table 4.9: *Short-run and long-run elasticities, from (j)*

Equation (j)	Short run	Long run
e_W	1.93	3.24
e_{Rr}	0.12	-0.80
e_{Rnr}	0.46	-1.33
e_M	1.68	//

To summarize, all our results point in the direction that in the long run investment is less profit-led than in the short run because the effect of profits on investment is either weakened or it turns negative. Firstly, π_{nr} and R_{nr} have only a short-run effect on non-residential and residential investments respectively[54]. Secondly, π_r has a positive short-run effect but a negative long-run effect on non-residential investment and R_{nr} has only a positive effect on residential investment. Third, Z's positive effect on non-residential investment increases from the short to the long run.

[54] We discard the negative long run effect of R_r and R_r on residential investment - even though it would make investment less profit led - because a negative effect is implausible.

Similarly, the effect of W on residential investment increases form the short to the long run.

4.5 Conclusions

The analysis carried out in this Chapter was inspired by Robert Blecker's (2014) paper in which he argues, without providing much statistical evidence to support his theory, that growth regimes are likely to be more wage led in the long run compared to the short run. For this reason, we proposed an econometric analysis to study whether it is plausible that the growth regime changes depending on the time span taken into consideration. Using error correction models, we found evidence that supports Blecker's hypothesis that, in the long run the demand regime is more wage-led (or less profit-led) than in the short run. This happens because, in the long run, both consumption and investment becomes more wage-led or less profit-led.

Regarding consumption, our results are in line with Kim et al's (2014 and 2015) findings which reveal that, in the US, the marginal propensity to consume increases from the short to the long run and that the effect of borrowing on consumption is larger and more robust in the short run compared to the long run. Our work, however, expands the analysis carried out by Kim et al (2014 and 2015) by including, among the determinants of consumption, the distribution of income between wage earners and profit earners and by estimating a separate consumption function for goods and services. Our results showed that, from the long run to the short run, the elasticity of wages on consumption increases more than proportionally compared to the elasticity of profit on consumption. Consequently, consumption becomes more wage led in the long run. Moreover, consumer debt (excluded mortgages) only has a short-run effect on consumption. This is consistent with the argument that debt over long periods has to be repaid and therefore a negative effect on consumption must be added to the positive, short run, one. Therefore, income (and particularly the wage share) is the main determinant of consumption in the long run. These results do not change much when we use consumption of goods and consumption of services as dependent variables of the consumption function in specifications (b), (d), (e), (f). They are also robust to the use of rentier and non-rentier profits instead of overall profits as control variables.

Our estimates for the overall investment function reveal that - in line with previous studies such as Onaran et al (2011), Chiriko et al (2011) and Sockhammer and Wildauer (2015) - the capacity utilization has the largest effect on investment in the long run. On the other hand, the non-rentier profit share has a positive long-run effect only if the rentier profit share does not enter the regression. However, the increase in the positive effect of the rentier profit share, from the short to the long run, is proportionally smaller than the increase in the positive effect of capacity utilization. The long-run effect of the rentier profit share on investment is negative and

consequently, it makes investment less profit-led. Our analysis expand the studies mentioned above not only because of its specific focus on the difference between long and short run effects on investment but also because of a new method to estimate the investment function. In particular, we suggested that it makes sense to distinguish between residential and non-residential investment because their determinants are likely to be very different and, therefore, when possible, should be estimated separately[55]. We find that, in the long run, non-residential investment is not profit-led because of the large negative effect of the rentier profit share and the absence of any significant positive effect of the non-rentier profit share. Moreover, similarly to consumption, the determinant of residential investment that has the largest effect on the long run is the total wage bill because mortgages play a role only in the short run. Consistently with our hypothesis, the distinction between residential and non-residential investment makes our overall investment function more wage led compared to previous studies because residential investment is predominantly determined by the wage share rather than profits.

Our analysis does not determine whether the demand regime in the United States is profit-led or wage-led because we only estimate internal demand and do not consider net exports. As we discussed, the nature of the growth regime, in the studies published so far, seems to be sensitive to econometric technique. Therefore, our analysis contributes to this debate only in so far as it suggests that, independently from the nature of the short-run growth regime, in the United States the long-run regime should be more wage-led (or less profit-led).

One of the main limitations of our study is the relatively high frequency of the data. As suggested by Caldentey and Vernango (2013), to capture long-run relationships it would have been better to use data with lower frequency (five years averages for example), which we did not use because it would make our sample too small. Had we opted to use lower frequency data for a panel of countries we would have had to accept a shorter time span and a smaller availability of variables (in particular most countries do not have available data on decomposed consumption, investment and profits). Failing to account for possible endogeneity problems is a second shortcoming of our analysis. As discussed in Chapter 2, there could very well be feedback effect from aggregate demand to functional income distribution, which would make endogenous most of our control variables. On this regard for example, Stockhammer (2012) finds a negative effect of growth on the wage share. Nevertheless, since we analyse the individual components of aggregate demand separately, the bias caused by a possible endogeneity problem should be smaller than if we were to regress the overall aggregate demand on the functional distribution of income. In the next

[55] We do not estimate them separately in Chapter 3 and 5 because we only have data for residential investment in the United States.

chapter we will try to deal with this problem.

Unfortunately, this study does not have important policy implications because it does not determine whether demand is, in the long run in the United States, wage-led or profit-led. Rather it opens at the *possibility* that other growth regimes, not only in the United States, become more wage-led (or less profit-led) in the long run. Therefore, it is possible that some of the study that finds a short-run profit-led regime in a certain country would find that in the long run, the same country is actually characterised by a wage-led regime.

Appendix A: Variables names, definitions and sources

Table A4.1: *Data sources and definition*

Variable	Description	Source	Notes
Y	GDP	NIPA	
C	Consumption	NIPA	
Cg	Consumption of goods	NIPA	
Cs	Consumption of services	NIPA	
I	Gross capital formation	NIPA	
Inr	Non-residential investment	NIPA	
Ir	Residential investment	NIPA	
W	Wage bill	NIPA	
R	Grow operating surplus	NIPA	
R_r	Rentier profits	NIPA	Dividends + net interest payments
R_{nr}	Non-rentier profits	NIPA	$R_{nr} = R - R_r$
π_r	Rentier profit share	NIPA	$\pi_r = R_r / Y$
π_{nr}	Non-rentier profit share	NIPA	$\pi_{nr} = R_{nr} / Y$
Z	Capacity utilization in manufactoring	FRED	
i	Bank Prime Loan Rate	FRED	
D	Consumer credit, liabilities (excluded mortgages)	Statistical Release,Financial Accounts, Federal Reserve	
HW	Households and and NPO; real estate at market value	Statistical Release,Financial Accounts, Federal Reserve	
M	Mortgages	Statistical Release,Financial Accounts, Federal Reserve	

Notes: All data are in real US Dollars (2009)

Appendix B: Augmented Dickey Fuller test

The Augmented Dickey Fuller test with a trend, is carried out using the following regression line

$$\Delta Y = \theta Y + \sum_{n=1}^{4} \Delta Y_{t-n} + \delta_1 trend$$

We use up to four lagged values of the dependent variable in first difference to control for autocorrelations. The series have a stochastic trend (unit root) if we cannot reject the null of $\theta = 0$ using the critical values from Fuller (1996).

Table B4.1: *Augmented Dickey Fuller test*

Variables	n=1	n=2	n=3	n=4
C	-0.023	-0.035	-0.033	-0.059
	(0.984)	(0.973)	(0.979)	(0.95)
Cg	-0.199	-0.212	-0.233	-0.279*
	(0.168)	(0.179)	(0.171)	(0.087)
Cs	0.018	0.014	0.027	0.028
	(0.999)	(0.997)	(0.999)	(0.999)
R	-0.397**	-0.387*	-0.491**	-0.384
	(0.012)	(0.066)	(0.017)	(0.27)
R_r	-0.026	-0.014	0.019	0.042
	(0.977)	(0.989)	(0.997)	(0.999)
R_{nr}	-0.066	-0.059	-0.058	-0.062
	(0.713)	(0.819)	(0.846)	(0.919)
W	-0.062	-0.057	-0.07	-0.04
	(0.806)	(0.887)	(0.839)	(0.966)
HW	-0.162**	-0.137	-0.185*	-0.193
	(0.01)	(0.196)	(0.0619)	(0.191)
CC	-0.179**	-0.151	-0.126	-0.175*
	(0.012)	(0.155)	(0.469)	(0.096)
I	-0.294	-0.345*	-0.223	-0.343
	(0.146)	(0.095)	(0.762)	(0.236)
Ir	-0.182	-0.226	-0.21	-0.23
	(0.236)	(0.108)	(0.278)	(0.336)
Inr	-0.256**	-0.219	-0.201	-0.268
	(0.047)	(0.278)	(0.522)	(0.259)
i	-0.123	-0.059	-0.054	-0.033
	(0.315)	(0.9)	(0.935)	(0.978)
π_r	-0.054	-0.040	-0.01	0.009
	(0.927)	(0.968)	(0.992)	(0.996)
π_{nr}	-0.06	-0.024	-0.016	-0.005
	(0.903)	(0.984)	(0.989)	(0.993)
Z	-0.546***	-0.553***	-0.568**	-0.563*
	(0.001)	(0.009)	(0.034)	(0.095)
D	-0.096***	-0.08	-0.07	-0.093
	(0.007)	(0.142)	(0.384)	(0.127)

Note: MacKinnon approximate p-value in parenthesis, *** p<0.01, ** p<0.05, * p<0.1

5 - Demand regime switch in Italy (1960 – 2007)

5.1 Introduction

The so-called "Wage-led" literature is growing rapidly. For over a decade, using Bhaduri and Marglin's (1990 a, b) model as the main theoretical foundation, post-Keynesian scholars have tried to determine the effect of the functional distribution of income on economic growth. While initially - starting from Bowles and Boyer (1995) - the main goal was to find a robust methodology to establish how income distribution affects aggregate demand[56], more recently the focus has switched to the factors that could influence this relationship such as debt (Stockhammer and Wildauer 2015), trade (Onaran and Galanis 2014) and financialisation (Onaran et al 2011).

This chapter contributes to this branch of literature by exploring the dynamics between cooperative and conflictual growth regimes and the possibility that the effect of income distribution on growth (and consequently the growth regime) changes over time. According to Bhaduri and Marglin, a demand regime is defined as cooperative if a change in the functional distribution of income is favourable to both social classes or conflictual otherwise. In particular, a wage-led cooperative regime is one in which an increase in the wage *share* stimulates enough growth to allow for an increase in *total* profit, in spite of a decrease in the profit *share.* On the other hand, a profit-led regime is cooperative if the increase in the profit *share* causes an increase in growth that is large enough to cause, in spite of a decrease in the wage *share*, an increase in the wage *bill* – through higher employment for example. Similarly, a conflictual regime is one in which an increase in the profit (wage) *share* does not stimulate the economy enough to allow the *total* level of wages (profits) to grow.

Our work analyses the evolution of the macroeconomic conditions that are necessary to achieve cooperation between social classes – wage and profit earners – rather than conflict. These conditions, following the intuition of the Bahduri and Marglin model (1990 a, b), depend on whether the growth regime is Wage-led or profit-led. However, as originally highlighted in the model[57], regimes *can* switch over time either because of structural breaks or because of a non-linear relationship between growth and distribution. Consequently, as the growth regime changes, the requirements to achieve cooperation will also change. The main argument is that the relationship between the functional income distribution and growth depends on determinants that

[56] Most scholars estimate the effect of functional income distribution on the components of aggregate demand and then sum them up. However, other methods have been proposed in the past such as the structural vector autoregressive models and panel analysis of firm level data. Lavoie and Stockammer (2012) and Blecker (2014) survey the literature on "Wage-led growth".

[57] Tailor (1990) and Palley (2013) propose a similar non-linear relationship between functional distribution of income and capacity utilization.

can vary over time, even within the same country. Some of these variables, as we will discuss in Section 5.3, are the sensitivity of investments to profits, the sensitivity of investment to capacity utilization, the level of capacity utilization and profits and the elasticity of capacity utilization respect to the profit share. As a result, in different periods the profit share can be either positively or negatively related to demand depending on the evolution of the above variables.

The analysis of dynamics between cooperative and conflictual regimes is carried out on Italy (1960 – 2007) because, as we will show in Section 5.2, during the 1980s there was a remarkable switch from cooperative to conflictual regime. During the 1960s and the 1970s, on average, a change in the profit share was associated with a change in the same direction of both the wage bill and total profits. In the following two decades however, the profit share increased tremendously and while the growth of profits remained high, the growth of the wage bill decreased continuously. Our hypothesis is that Italy is slowly switching from a profit-led regime to a Wage-led one. We argue that, from the 1980s, the combination of increasing financialisation and reduced net exports due to the European exchange rate agreements weakened the effect of profits on demand. In a weak profit-led regime, the profit share does not manage to stimulate enough growth to allow the total wage bill to increase and therefore while total profits increase, the wage bill stagnates: the profit-led regime becomes conflictual.

The structure of the chapter is as follows. Section 5.2 describes the evolution from cooperative to conflictual growth regime in Italy from 1960 to 2008. Section 5.3 outlines in some detail the Bhaduri and Marglin's model (1990) upon which our empirical investigation will be based. Once the theoretical framework has been clearly outlined, in Section 5.4, we will discuss our hypothesis and the motivation of our work and we will make the argument that the Bhaduri and Marglin's model is a useful tool to explain the evolution of the relationship between functional distribution of income and growth in Italy. The main stylised facts will also be presented to support our argument. Section 5.6 describes the result of the empirical analysis of the determinants of cooperative and conflictual demand regimes. Section 5.7 concludes.

5.2 Cooperative and Conflictual regimes

A cooperative regime implies that any change in the functional distribution of income, will cause the total amount of profits and the wage bill to vary in the same direction, i.e., they both increase or they both decrease.

Table 5.1 reports the level and growth rate (between decades) of the profit share (h) and of income divided between total profits (aR) and the wage bill (aW)[58] in Italy (1960 – 2007). Figure 5.1 instead shows graphically the difference between the growth rate of the wage bill and of total profit, in real terms, from one decade to the next.

As we can see, during the 1960s and the 1970s, the growth of the wage bill and the total profits has been balanced: total wages and total profits improved at similar rates during the first two decades independently of whether the wage share (1960s) or the profit share (1970s) was increasing. The demand regime was cooperative. On the other hand, from the 1980s, while the profit share increased continuously, the wage bill started to lag behind the growth rate of profits to the point that in the 1990s the regime was conflictual. In fact, while the profit share soared by 14% in the 1980s and 23% in the 1990s, the growth rate of the wage bill decreased by approximately two thirds in the 1980s, and in the 1990s it did not grow at all. Finally, the first seven years of the new millennium were characterised by stagnation and the functional distribution of income remains substantially stable.

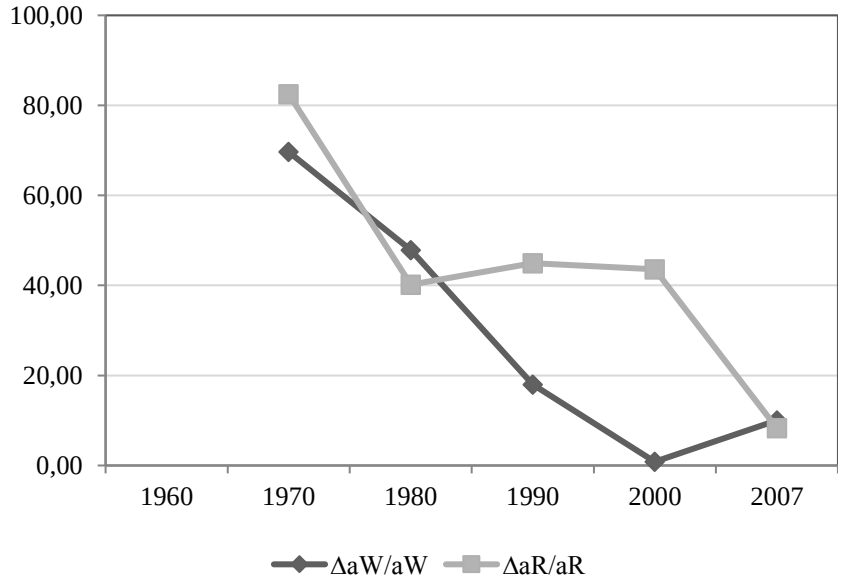
Table 5.1: *Adjusted wage bill and total profit and profit share at the beginning of each decade.*

Year	aW	aR	h	ΔaW/aW	ΔaR/aR	Δh/h
1960	244	120	32.9%			
1970	414	219	34.6%	0.70	0.82	0.05
1980	612	307	33.4%	0.48	0.40	-0.03
1990	722	445	38.1%	0.18	0.45	0.14
2000	728	639	46.7%	0.008	0.44	0.23
2007	801	692	46.3%	0.01	0.08	-0.01

Note: aW and aR are in (real) billions of Euros.

[58] aW is the adjusted wage bill and aR is the adjusted gross operating surplus at constant prices. The adjustment refers to the self-employed workers whose income is included in the wage bill (this is done by assuming that the average wage of self-employed workers is equal to the one of employed workers).

Fig. 5.1: *Percentage change in the adjusted wage bill and adjusted total profits from the previous decade*



5.3 The Bhaduri and Marglin model

In this section, we present the main features of the closed economy model[59] developed by Bhaduri and Marglin (1990). Their aim was to develop a Keynesian framework of analysis in which aggregate demand was expressed as a function of the functional distribution of income. They do this by presenting both the saving and investment functions as depending from the profit share and then equating them to find the IS curve.

We denote output by Y and potential output by Y^*. The profit rate (r) is defined as the ratio of total profit (R) over capital stock (K). By multiplying by Y/Y and Y^*/Y^*, this can be rearranged into the product of profit share (h = R/Y), capacity utilization ($z = Y/Y^*$) and the inverse of capital/output ratio at full capacity ($v^{-1} = Y^*/K$)

$$r = \frac{R}{K} = \frac{R}{Y}\frac{Y}{Y^*}\frac{Y^*}{K} = hzv^{-1} \tag{1}$$

Since there are only two social classes in the model and workers are assumed to consume all their income, savings (S) are simply equal to a proportion (s) of total profits. Therefore, using the

[59] In the original article, the authors extend these results to an open economy by expressing the profit share as a function of the exchange rate and adding export and import to equation 4. The conclusion are similar to the closed economy model and for the purpose of this study, the closed economy model is sufficient to highlight the relationship between the main variables.

decomposition of the profit rate and normalising by the potential level of output to one, savings can be rearranged as the product of saving rate, profit share and level of capacity utilization.

$$S = sR = s\frac{R}{Y}\frac{Y}{Y^*}Y^* = shz. \tag{2}$$

Moreover, assuming constant capital productivity (a^{-1}), investment (I) is a function of the profit rate that in the short run depends on the profit share and capacity utilization

$$I = I(h; z). \tag{3}$$

Therefore, by equating saving and investment, S=I, we obtain

$$shz = I(h; z). \tag{4}$$

By taking the total derivative and rearranging terms[60], we get the slope of the IS function in the (z,h) space

$$\frac{dz}{dh} = \frac{(I_h - sz)}{(sh - I_z)}, \tag{5}$$

With $I_h = \partial I/\partial h$, $I_z = \partial I/\partial z$ and . Hence, whether the profit share has a positive effect on capacity utilization depends on the sensitivity of investment to the profit share (I_h), the sensitivity of investment to capacity utilization (I_z), the saving rate and the level of profit share and capacity utilization. The slope of the IS determines whether the economy is in a Wage-led or profit-led regime. A negative slope indicates that the regime is Wage-led because a higher profit share is associated with a lower level of economic activity. Symmetrically, a positive slope indicates that the regime is profit-led because a higher profit share is associated with a higher level of economic activity.

So far, we have formalised how the functional distribution of income affect aggregate demand and growth. The demand (IS) curve describes how the profit share influences aggregate demand. The distributive curve (DC) on the other hand, represents the other side of the coin: how growth affects the distribution of income between wage and profit earners. As in most post-Keynesian models described in Chapter 2, prices (p) are determined as a function of a mark-up (t) on wage cost

$$p = (1 + t)wa \tag{6}$$

[60] *ds* = 0 by assumption. This is realistic because from 1960 to 2008, in Italy, savings mostly remained within the 0.20% - 0.25% of GDP interval.

Where w is the nominal wage rate and a is equal to the inverse of labour productivity. Moreover, in the chapter version of their model, Marglin and Bhaduri (1990) express the profit margin as a linear positive function of capacity utilization[61]

$$t = t_0 + b(z)\,, \qquad b'(u) > 0 \tag{7}$$

Since - as shown in Section 2.4.2 - the profit share is a positive function of the profit margin, profit is also a positive function of capacity utilization.

$$\pi = \frac{t(u)}{1 + t(u)} \tag{8}$$

The distributive curve therefore has, in this model, a positive slope in the (h, z) space.

Fig. 5.2: *Non-linear IS curves in the (h, z) space*

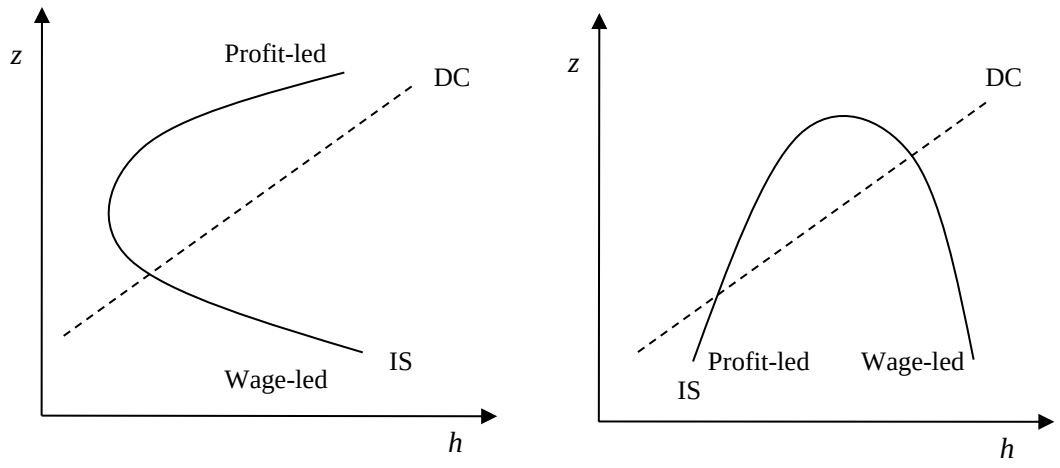


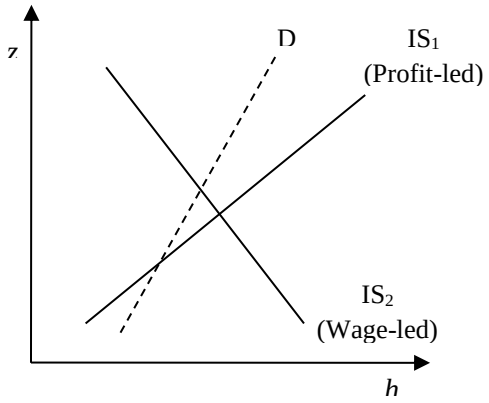
Figure 5.2 shows two possible shapes of the IS curve. On the left, the curve is C shaped: for high levels of capacity utilization, the regime is profit-led while at low levels of capacity utilization (and demand) the regime becomes Wage-led. On the right, instead, the curve has an inverted U shape: when the profit share is low, the regime is profit-led while the economy becomes Wage-led when the profit share is high. In both cases, the non linear IS curve can intersect the distributive curve twice giving rise to two possible equilibrium points.

As shown in Figure 5.3, a second possibility is that the shape of the IS curve changes with time rather than with the level of the profit share of capacity utilization. As we will discuss in the remainder of the chapter, if investment becomes less sensitive to the profit share (I_h falls) due to

[61] The distributive curve does not need to be linear. Nikiforos and Foley (2012) for example allow the following a non-linear distributive curve $\frac{d\varphi}{dz} = -\frac{\frac{\partial w}{\partial z} - \frac{\partial x}{\partial z}}{\frac{\partial w}{\partial \varphi} - \frac{\partial x}{\partial \varphi}}$ in which φ and x are the wage share and labour productivity respectively.

some institutional change - such as financialisation - the slope of the IS curve will tend to become negative (from IS_1 to IS_2). As we can see from Figure 5.3, if the distributive curve does not change a structural break will have an effect both on capacity utilization and the profit share.

Fig. 5.3: *IS curves in the (h, z) space*



We now explain under which conditions a profit or Wage-led regime can be cooperative. A Wage-led regime is said to be cooperative if a decrease in the profit share is associated with an increase in the total level of profit caused by a larger increase in capacity utilization. Therefore, a Wage-led regime is cooperative if the negative elasticity of capacity utilization respect to the profit share is larger than one

$$-\frac{dz}{dh}\frac{h}{z} > 1 \tag{9}$$

This is true when the following condition must hold

$$hI_h < zI_z \tag{10}$$

Hence, a Wage-led regime is cooperative if the semi-elasticity of investment to the profit share is smaller than the semi-elasticity of investment to capacity utilization.

On the other hand, a profit-led regime is cooperative if an increase in the profit share is accompanied by an increase in the wage bill caused by a large enough increase in employment.

The wage bill (Ω) can be rearranged in order to be expressed as a function of the wage share (1-h), the level of capacity utilization, the inverse of capital productivity and the capital stock

$$\Omega = \frac{\Omega}{Y}\frac{Y}{Y^*}\frac{Y^*}{K}K = (1-h)za^{-1}K \tag{11}$$

Therefore, a profit-led regime is cooperative if there is a positive relationship between the profit share and the wage bill, $\frac{d\Omega}{dh} > 0$. This is true when the following condition must hold

$$\frac{dz}{dh}\frac{h}{z} > \frac{R}{\Omega} \tag{12}$$

Hence, a profit-led regime is cooperative if the elasticity of capacity utilization with respect to the profit share is greater that the ratio between total profit and total wage bill.

Independently from the form that the IS function takes, the main intuition of the framework proposed by Bhaduri and Marglin is that the curve can change over time depending on the conditions discussed above.

Consequently, the model does not suggest specific policy implications but rather a policy methodology. In different times, depending on certain conditions, the economy might benefit from very different redistributive policies. In a profit-led situation, economic growth is not going to be stimulated by higher wages - that also represent higher costs for firms - just like in a Wage-led regime, wage moderation in favour of profits is not going to stimulate economic growth. Instead, what policy maker should do is, once understood in which regime their country is in, to find a way to transform the regime into a cooperative one. Independently whether it is a profit-led or a Wage-led regime, cooperation guarantees stable growth and allows both classes to enjoy the fruits of economic growth.

5.4 Our hypothesis: a slow change in regime

5.4.1 Theoretical motivation

Now that we have a described our theoretical reference we can present our hypothesis of a slow change in regime. Figure 5.4 shows the evolution of the profit share and a measure of capacity utilization (z* = Y/K) in Italy from 1960 to 2007[62]. As we can see, capacity utilization initially increased and remained high until the 1980s when it started to fall slightly until it reached, in 2007, the same level from which it had started in 1960. The profit share, on the other hand, was initially relatively low (less than 35% of GDP) but from the beginning of the 1980s, it increased sharply to over 45% of GDP in 2007.

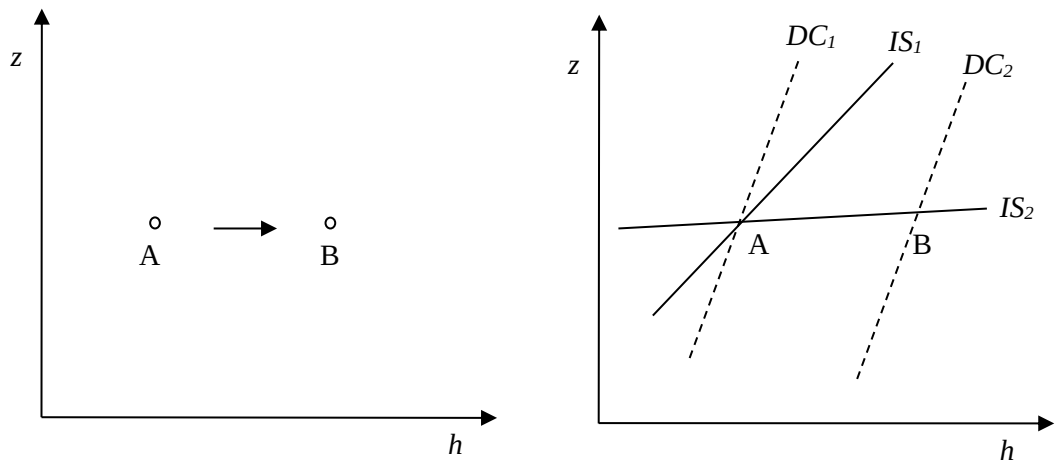
We can represent evolution of capacity utilization and profit rate in the second half of the twenties century as a movement from point A to point B in the (h, z) space (Figure 5.5). While capacity utilization has a similar value at the beginning and at the end of the sample, the profit share

[62] We will discuss this proxy for capacity utilization in more detail in Section 6.

increases greatly after the 1980s. Based on the Bhaduri and Marglin's model, many explanations could depict the movement from point A to point B: a shift in both the distributive and the IS curve, a stable distributive cure and a non-linear IS curve or a non-linear IS curve and a stable distributive curve. Given the institutional changes that we will describe below, our hypothesis is that during the 1980s the distributive curve shifted rightwards (from DC_1 to DC_1) and the positive IS curve (IS_1) rotated towards the right and became much flatter (IS_2). In other words, the demand regime, which was initially strongly profit-led, became progressively less and less profit-led while exogenous factors changed the functional distribution of income in favour of profits.

Fig. 5.4: *Evolution of the adjusted total profit and adjusted capacity utilization (income capital ratio) from 1960 to 2007*

Fig. 5.5: *Structural break and change in regime*



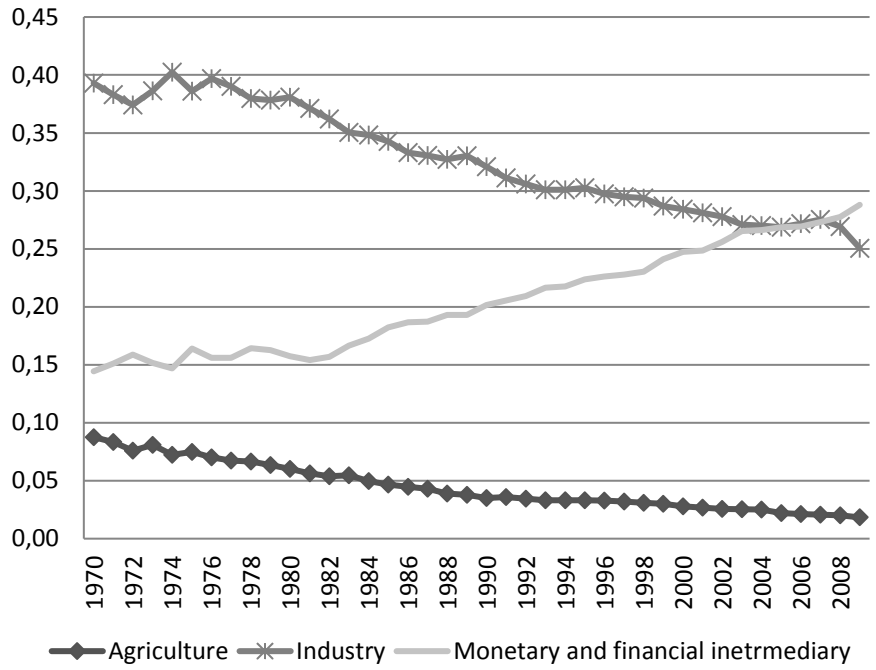
We believe that in the 1960s and in the 1970s the demand regime was cooperative and strongly profit-led. This is consistent with the stylised fact shown in Table 5.1. During the 1960s, the

increase in the profit share was associated with very high growth rates of both the wage bill and total profits. Similarly in the 1970s, the profit squeeze, was associated with a fall of both the wage bill and total profits. Had the demand regime been Wage-led during the 1970s, the profit squeeze would have been accompanied by, at least, an increase in the growth rate of the wage bill. As we will substantiate in the next section however, from the 1980s the demand regime became less and less profit-led and therefore the regime became conflictual: the effect of growth caused by an increase in the profit share became too small to stimulate enough employment to raise the wage bill. We have identified three institutional factors that can explain this gradual change in the IS curve.

First, financialisation weakened the responsiveness of investment to the profit share. It seems established in the literature (see for example, Stockhammer (2004), Dumenill and Levy (2004), Orhangazi (2008), Onaran et al (2011) and the previous chapter) that the (growing) rentier share of profits has a negative on investment because it diverts funds from production and therefore it decreases the sensitivity of investment to the overall profit share. As we show in Figure 5.6, while the value added of agriculture and industry decreased steadily (as a ratio to total value added), the value added of the monetary and financial intermediation sector increased from the beginning of the 1980s. The growing importance of financial markets in the Italian economy is also well described by the increased market capitalization. In 1988, the market capitalization of listed companies was about 15% of GDP while by 2007 it rose to 49% of GDP, an increase of about 230%.

Second, the other component of aggregate demand that is positively related to the profit share, net exports, played only a minor role in Italy in the last decades of the twentieth century. From 1970 to 1992 (the year in which Italy left the European Monetary System and was able to devaluate the Lira) the contribution of net exports to growth was mostly negative or below 0.5%. Only from 1993 until 1996 the net exports contribution to GDP increased to 4%. From 1997 (when Italy had to appreciate its currency in order to join the Euro system) to 2008, net exports has steadily decreased from about 3% to -1%. Many argue that, since the European countries carried out monetary integration before real economy integration, the least competitive countries were negatively affected by high exchange rates (Carlucci 2008).

Fig. 5.6: *Value added of agriculture, industry and financial sector*



Note: the series are divided by total value added

Third, while the profit share started to play an increasingly small role in determining aggregate demand through investment and net exports, the effect of wages of consumption probably did not decrease because of financialisation. As we have discussed in the second chapter, Lapavitsas (2011) and Lapavitsas and Powel (2013) point out that two of the main characteristics of financialisation are related to consumer debt. In fact, banks, rather than providing credit to firms, started to mediate the transactions on the financial markets and provide credits to households. Moreover, because of stagnating wages, workers are more active on the financial markets especially concerning borrowing[63]. Debt relaxes the constraint of current income on consumption and therefore decreases the elasticity of consumption with respect to wages. As discussed in the previous chapter, the positive and significant effect on debt and consumption is confirmed empirically by Stockhammer and Wildauer (2015) for a panel of countries and Kim et al (2015) for the United States. Unlike in the United States and the United Kingdom however, Italian households did not use debt to finance their consumption expenditures – or at least not to the extent of those countries (Giraund et al. 2009). For this reason, Hein and Mundt (2012) classify the Italian economy, during the period 2000 - 2008, as "domestic-demand led". According to their definition, in domestic-demand led countries while net exports negatively contributes to GDP growth, consumption is the component of demand that contributes the most to growth. However, unlike

[63] Cynamon and Fazzari (2008), Barba and Pivetti (2009), Kim et al. (2014) and Stockhammer (2015) make similar points.

the “debt led” economies such as the United States and the United Kingdom in which consumption is financed by debt, consumption is financed mainly by income and therefore wages.

To sum up, we support our hypothesis of a change in slope of the IS curve towards a less profit-led (or more Wage-led) regime with three “institutional” arguments. Firstly, financialisation probably caused a fall in the elasticity of investment respect to the profit share. Secondly, the elasticity of consumption with respect to wages did not change much because Italian households did not increase much their use of credit instruments. Thirdly, the exchange rate agreements reduced the contribution of net exports to growth and therefore reduced the weight of the positive effect of the profit share on exports.

Regarding the distributive curve, there are two main institutional changes that make its rightward shift plausible. The first, once more, is financialisation. Following Hein (2015), financialisation has an effect on the profit share because it has an effect on the sectoral composition of the economy and on the mark-up (*t* in equation 6). On the one hand, the sectoral composition of the economy has an impact on the profit share because there are certain sectors in which the profit margin is traditionally higher than in other sectors. It is not a coincidence that the increase in the finance sector and the decrease in agriculture and industry (Figure 5.6) is perfectly timed with the increase in the profit share shown in Figure 5.4: the profit margin is usually higher in the former sector compared to the latter two. On the other hand, financialisation influences the mark up. Firstly, the mark up is negatively related to the strength of trade unions which are traditionally weaker in the financial sector compared to the manufacturing and overall industry. Secondly, firms often consider interest payments and dividends as overhead costs. Since the profit share comprises both profits and overhead costs, an increase in the overhead cost, keeping the profit share constant, would decrease retained profits. Therefore firms, when facing high overheads costs, might be induced to increase the mark-up in order to keep profits constant.

The second institutional change that can explain the shift in the distributive curve is the labour market deregulation. In spite of an increasing lack of internal and external demand, wage moderation has been a constant element of economic policies since the late 1980s (Acocella, 2006). As an example, in July 1993, government, trade unions and the Italian chamber of commerce signed an agreement that set the rules for public and private employment contracts with the aim of controlling inflation in order to comply with the limits of the Maastricht Treaty. Moreover, it articulated three long term goals: the extension of social safety nets, the increase in the flexibility of work contracts and the implementation of policies in support of the production system such as R&D and infrastructures (Banca d’Italia, 1993). In the following years however, it

was mainly the second goal that was achieved by means of increasing the range of fix-term contracts (Acocella 2008).

In our opinion therefore, financialisation and deregulation of the labour market are the exogenous factors that caused a shift towards the right of the distributive curve. In Figure 5.5, DC's shift is parallel but it does not need to be: Our argument is not affected by a change in the slope of the distributive curve provided that it remains positive.

5.4.2 Graphical analysis

The two most common methods used to classify a growth regime are the single equation approach and the VAR approach. The former consists in estimating the effect of an increase in the profit share on each component of aggregate demand and summing them up. If the result is positive, the economy is profit-led, while if it is negative, the economy is said to be Wage-led[64]. The main drawback of this method is that the result depends strongly on the magnitude of the individual estimated effects of distribution on the different components of aggregate demand, and not simply on their sign. Small changes in the estimated coefficients - that might happen using different data or a different econometric model - can very well lead to contrasting results. In contrast, the other estimation method - the VAR - overcomes both the above problem and possible endogeneity issues but it does not allow for the estimation of the individual effect of distribution on consumption, investment and net export[65].

Here we propose a graphical approach that should overcome the problem mentioned above for the single equation approach. Bhaduri and Marglin, in the short run, define a profit-led (wage-led) regime as one in which - keeping constant the productivity of capital and the saving rate - there is a positive (negative) relationship between capacity utilization and the profit share. Since the rate of capital utilization is an indicator of the level of demand[66], if the profit share has a positive effect on demand, and hence the regime is profit-led, we should observe an increase in the rate of capital utilization. Consequently, if a positive relationship between capacity utilization and the profit share is detected, we can deduce that the regime is profit-led.

[64] Representative "structural" studies are Bowles and Boyer (1995), Naastepad and Storm (2006), Stockhammer and Ederer (2008), Stockhammer et al. (2009), Onaran and Yenturk (2001), Hein and Vogel (2008, 2009) and Onaran and Galanis (2014).

[65] As already discussed in the second chapter, some of the studies that use the VAR approach are Stockhammer and Onaran (2004), Onaran and Stockhammer (2005 and 2007), Barbosa-Filho and Taylor (2006) and Carvalho and Reza (2015).

[66] Capacity utilization is an indicator of demand because in order to cope with higher the demand, capital has to be use more intensively.

One technical difficulty however, is the lack of precise data on capacity utilisation. Hence, in the rest of the paper, we will use two proxies for capacity utilization: the income capital ratio (z*) and the acceleration of growth (z**).

The first proxy, the ratio between income and capital, does not simply quantify how intensely capital is used but also how productive it is. This problem is partially mitigated by the Italian industrial structure. In fact, after the Second World War, Italy specialised its production in low technology and low capital intensity sectors populated mainly by small and medium sized enterprises (Carlucci 2008). Moreover, capital utilization will mainly be used in differences and the change in productivity is unluckily to change significantly from one year to the other. As Onaran and Stockhammer (2005) acknowledge, the income capital ratio is a better proxy for capacity utilization compared to the growth rate. The main reason for which the growth rate is more commonly used is that data on the capital stock are not available for most countries.

The second proxy (z**) is the change in the growth rate of GDP. The rationale behind this choice is that an acceleration of growth should be strongly related to an increase in the intensity with which capital is used.

The bar graphs in Figures 5.7 and 5.8 depict the evolution of the responsiveness of capacity utilisation to the profit share. The average and median values of the ratio between the change in capacity utilization and the change in the profit share have been plotted in the graphs using, respectively, the first and second proxy for capacity utilization[67].

While changes in the profit share are positively associated with changes in capacity utilization in the first two decades, from the 1980s to 2007 the relationship becomes weaker and often negative. This is consistent with our hypothesis that, while until the end of the 1970s, the regime was strongly profit-led, from the 1980s the regime became weakly profit-led and it is slowly becoming weakly Wage-led.

[67] In order to remove significant outliers, values that fell outside ten times the 95% confidence interval have been excluded from the graph.

Fig. 5.7: *Change of the responsiveness of capacity utilization to the profit share. $z^{*}=Y/K$*

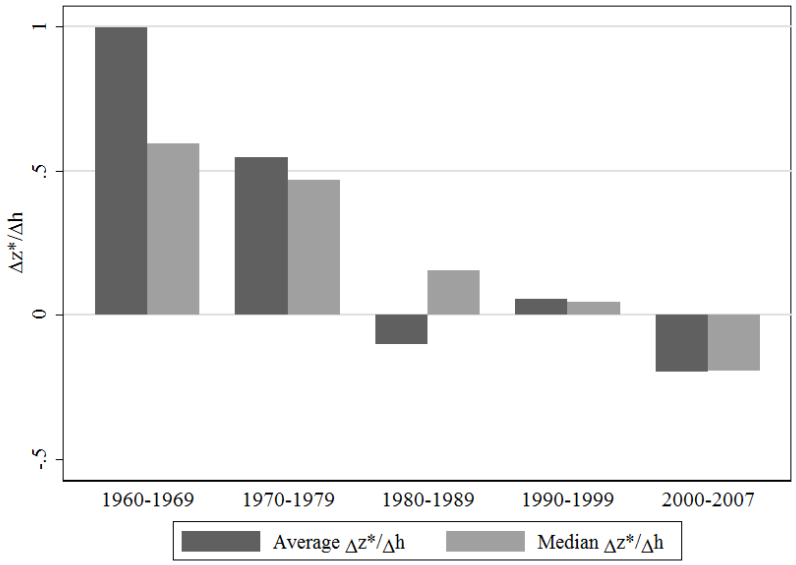
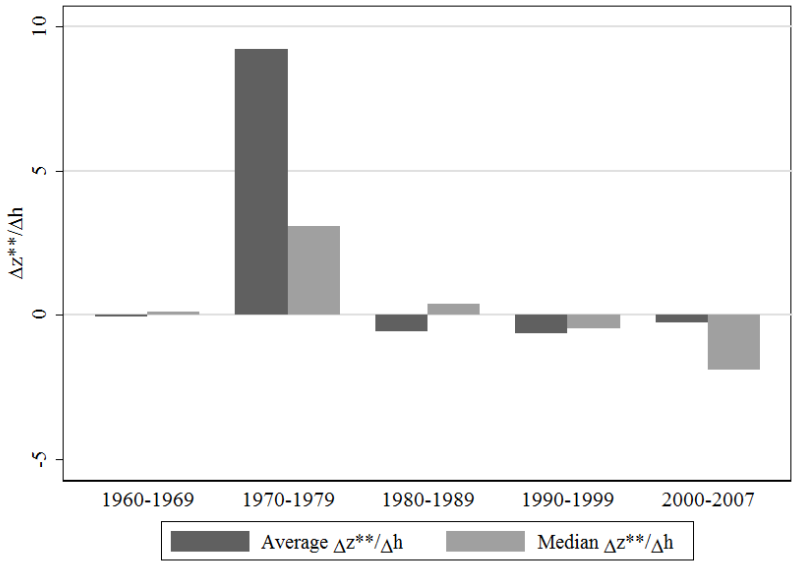


Fig. 5.8: *Change of the responsiveness of capacity utilization to the profit share. $z^{**}=\Delta$(growth rate)*



5.5 Cooperative and conflictual demand regimes

5.5.1 Regime shift: from cooperative to conflictual profit-led

So far, we have made the case that the demand regime in Italy became progressively less profit-led and less cooperative from the beginning of the 1980s. We now turn to the analysis of the conditions, as highlighted in the model, that would guarantee a cooperative regime and their evolution over time.

The model predicts that, in the presence of a profit-led regime, condition (12) must hold in order to achieve a cooperative situation between workers and entrepreneurs

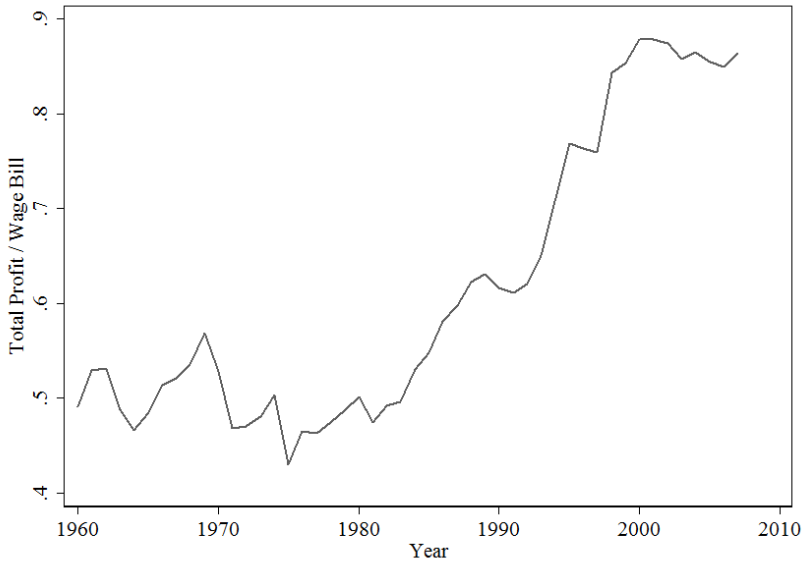
$$\frac{dz}{dh}\frac{h}{z} > \frac{R}{\Omega} \tag{12}$$

That is, the elasticity of capacity utilization with respect to the profit share has to be larger than the ratio between total profits and the wage bill. Hence, if the prediction of the model is accurate, we expect this condition to hold only until the end of the 1970s or the beginning of the following decade.

5.5.1.1 The evolution of the total profit/total wage ratio

Starting from the right hand side of the formula, we can notice, from Figure 5.9, that the ratio between total profits and wage bill (R/Ω) slightly decreased from 1960 to 1980 and rapidly increased afterwards. Hence, because R/Ω grew by 75% from 1980 to 2000 unless the elasticity of capacity utilisation with respect to the profit share increased substantially during the same years, it is reasonable to believe that the condition was not respected after the 1980s.

Fig. 5.9: *Evolution of the total profit/adjusted wage bill ratio (1960 – 2007)*



5.5.1.2 The evolution of the elasticity of capacity utilization respect to the profit share

The first method that we use to investigate whether this elasticity changed over time and in which manner, is a test for structural change. In particular, we first split the sample into two periods and create a time dummy (i) that takes values of one in the first period and zero in the second. Secondly, we regress capacity utilization on the profit share interacted with the dummy and the profit share interacted with one minus the dummy.

$$z = \beta_1 h * i + \beta_2 h * (1 - i) + \varepsilon \quad (13)$$

The two coefficients represent the effects of the profit share on the capacity utilization in the first and second period respectively. Since we are arguing that the regime in the second period is less profit-led that in the first period, we expect β_1 to be significant and positive and β_2 to be smaller than β_1 and possibly non significant. The final step is to test whether the coefficients for the two different periods are statistically different from each other; we do this using an F test and the following null hypothesis: $H0: \beta_1 = \beta_2$

To estimate the relationship between capacity utilization and the profit share we have to address first the problem of endogeneity. Since these two variables have feedback effects on each other, i.e., both the demand curve and the distributive curve exist, we will use a Two Stages Least Squares (TSLS) with the lag of an adjusted measure of unemployment as an instrument for the profit share. Past unemployment is strongly positively correlated with the profit share both before and after the 1980s[68] and it explains about 30% of its variation. The main limitation of unemployment as an IV is that, as shown the Appendix[69], it can very well be correlated with past levels of capacity utilization. If we were to use the lagged value of unemployment as an IV for the profit share, our regressor would not be strictly exogenous. For this reason rather than using unemployment as an instrument, we use the residual of the regression of unemployment on past and present capacity utilization. Hence, the instrument for the profit share is all the variation in unemployment that is not explained by changes in past levels of capacity utilization. Moreover, the Hausman test for endogeneity rejected the hypothesis of an omitted variable bias[70]. Once endogeneity is removed from the regression, β_1 and β_2 represent the effect of a change on the profit share on capacity utilization and therefore they are the slope of the IS curve in the first and in the second period respectively. Regarding the distributive curve we are implying a negative slope, because, since unemployment is positively correlated with capacity utilization but negatively correlated with the profit share, there is a negative causal relationship between capacity utilization and the profit share. This is different from the CD curve specified in the model and depicted in Figure 5.5 but it does not change the argument of the chapter as long as our assumption about its shift is correct.

The specifications are designed using the specific to general approach and they are dynamically complete (Wooldridge, 2009). Moreover, each regression successfully passed the tests for

[68] There is more than one explanation for this correlation. For example, more employment in one year could be associated with a lower profit share in the following year either because labour becomes a more scarce recourse or because lower unemployment increases the contractual power of workers.

[69] A more detailed discussion of endogeneity and the validity of the instrument can be found in the Appendix.

[70] The test always rejects the hypothesis of an omitted variable bias except in equation 4 but the bias would occur only before 1980.

heteroskedasticity, autocorrelation, misspecification and normality of the error term. Finally, throughout this section, the profit share and the income capital ratio are expressed in logarithmic form and in first difference, in order to remove the unit root present in the series. The second proxy for capacity utilization instead, the acceleration of growth, is used in levels as it is already stationary.

Regarding the structural change, we know that the change in the regime from cooperative to conflictual happened during the 1980s but it is likely that it did not happen in a single year. Hence, for each proxy we test the magnitude of the coefficient before and after 1985 (equation (a) and (c) and before and after the 1980s (equations (b) and (d)).

a) $\Delta\log(z^{*}) = \mathrm{c} + \Delta\log(h_{IV})i_{60-84} + \Delta\log(h_{IV})(1 - i_{60-84})$

b) $\Delta\log(z^{*}) = \mathrm{c} + \Delta\log(h_{IV})i_{60-79} + \Delta\log(h_{IV})(1 - i_{60-79})$

c) $z^{**} = \mathrm{c} + \Delta\log(h_{IV})i_{60-84} + \Delta\log(h_{IV})(1 - i_{60-84}) + {z^{**}}_{t-1}$

d) $z^{**} = \mathrm{c} + \Delta\log(h_{IV})i_{60-79} + \Delta\log(h_{IV})(1 - i_{60-79}) + {z^{**}}_{t-1} + {z^{**}}_{t-2}$

The results in Table 5.2 indicate that the magnitude of the elasticity of capacity utilization with respect to the profit share is always larger in the first part of the sample independently from the proxy used to account for capacity utilization and the breakpoint year. The coefficient of $\Delta\log(h_{IV})i$ is always greater than the coefficient of $\Delta\log(h_{IV})(1- i)$. In particular, the magnitude of the elasticity in the first period - that is always statistically significant at 1% - fluctuates from 0.495 to 0.717. In the second period, instead, the elasticity is strongly non significant, except in equation 3, and its magnitude oscillate between -0.181 and 0.441. In conclusion, the average value of the coefficient in the second period is at least half the magnitude compared to the coefficient in the first period[71] in equations (1), (2) and (3) and about one third smaller in equation (3). The positive and significant coefficient (slope) of the IS curve in the first period indicates that the regime was profit-led. In the second period instead, the smaller coefficient - which is statistically non-distinguishable from zero - indicates that the IS curve became flat.

[71] Note that the p-value is unsurprisingly high given the exceptionally small sample size and the use of instrumental variables that increases the variance of the estimator.

Table 5.2: *Regression output: the elasticity of capacity utilization with respect to the profit share*

	(a)	(b)	(c)	(d)
VARIABLES	$\Delta\log(z^{*})$	$\Delta\log(z^{*})$	z^{**}	z^{**}
c	-0.002	0.001	-0.005*	-0.003
	(0.002)	(0.002)	(0.002)	(0.003)
$\Delta\log(h_{IV})i_{60\text{-}84}$	0.505***		0.705***	
	(0.108)		(0.118)	
$\Delta\log(h_{IV})(1 - i_{60\text{-}84})$	0.209		0.441*	
	(0.230)		(0.242)	
$\Delta\log(h_{IV})i_{60\text{-}79}$		0.495***		0.717***
		(0.0988)		(0.113)
$\Delta\log(h_{IV})(1 - i_{60\text{-}79})$		-0.181		0.315
		(0.296)		(0.293)
z^{**}_{t-1}			-0.456***	-0.495***
			(0.106)	(0.112)
z^{**}_{t-2}			-0.267**	-0.272**
			(0.108)	(0.113)
Time period	1960-2007	1960-1979 1990-2007	1960-2007	1960-1979 1990-2007
R^2	0.351	0.441	0.640	0.726
H0: $(\hat{h}*i) = \hat{h}*(1-i)$	0.251	0.0405	0.332	0.214

Note*: i60-84* = 1 ∀ year<1985 and *i60-84* = 0 ∀ year>1984. *i60-79* = 1 ∀ year<1980 and *i60-79* = 0 ∀ year>1979. $z^{*} = \Delta\ln(Y/K)$ and $z^{**} = \Delta[\Delta\ln(Y)]$. Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

The test however (last line in Table 5.2) rejects the equality of the coefficients only in regression (b). Hence as a robustness check, we employ the Chow breakpoint test on the following IV estimation[72]

e) $\Delta\log(z^{*}) = -0.004^{*} + 0.56^{***}\Delta\log(h_{IV}) + 0.27^{*}\Delta\log(z^{*}{}_{t-1})$

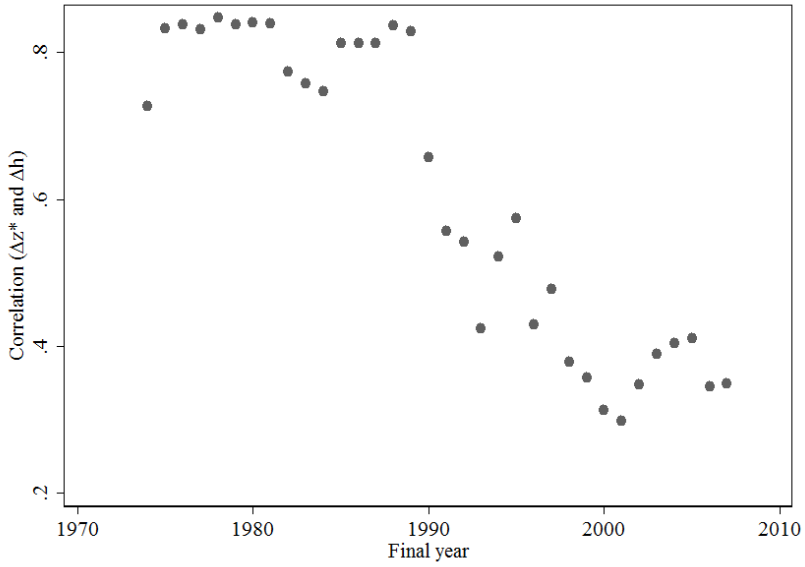
f) $z^{**} = -0.006^{**} + 0.67^{***}\Delta\log(h_{IV}) - 0.52^{***}z^{**}{}_{t-1} - 0.24^{**}z^{**}{}_{t-2}$

For both equations (e) and (d), the test rejects at 1% the null hypothesis that the coefficient of the profit share was the same before and after 1985.

The second method used to check the evolution of the elasticity between capacity utilisation and profit share is a rolling correlation analysis. Figures 5.10 and 5.11 show the evolution of the correlation coefficient calculated using a rolling fifteen year window. The horizontal axis indicates the last year of the window, so that the first point in 1975 represents the correlation coefficient calculated for the interval 1960-1975.

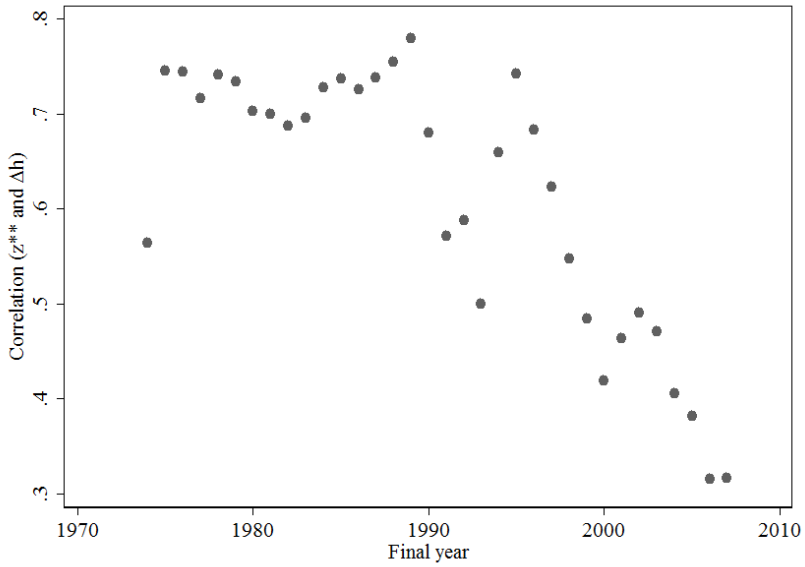
The results are consistent with the structural break analysis. Independently from the proxy used, the correlation is high in the first part of the sample and drops in the second half. In particular, it is possible to notice that the correlation coefficient starts to decrease from the subsamples that begin in the late 1970s and finish in the early 1990s.

Fig. 5.10: *Coefficients of the rolling correlation, with a 15 years window, between Δz* and Δh*



[72] Both specifications are dynamically complete and have been tested for autocorrelations, heteroskedasticity and normality of the error term. The instrument for the profit share is the same as in the previous specifications.

Fig. 5.11: *Coefficients of the rolling correlation, with a 15 years window, between z** and Δh*



In Table 5.3, we compute equation (12) using the elasticities estimated in regressions (a), (b), (c) and (d). the condition necessary to achieve cooperation holds only in the first part of the sample. In fact, in the upper half of Table 5.3, the elasticity of capacity utilization respect to the profit share (third column) is always larger than the (average) ratio between total profit and the wage bill (fourth column) - except equation (b) in which they are equal. The opposite is true in the second part of the sample (bottom half of Table 5.3).

The results in Table 5.3 are confirmed by Table 5.4 in which we compute equation (12) using the average coefficients of the rolling correlation analysis. In the upper part of the table, $\frac{dz}{dh}\frac{h}{z}$ is calculated as the average of the correlation coefficients estimated with the sub-samples whose final year was between 1975 and 1990. Giving that the rolling window is 15 years, the initial year of the sub-sample that finishes in 1975 is 1960 while the initial year of the sub-sample that finishes in 1990 is 1975. Similarly, the bottom half of Table 5.4 shows the average correlation estimated in with the sub-samples whose final year was between 1991 and 2008. As we can notice from column 4, also in this case the condition for cooperation holds only the first part of the sample.

Overall, therefore, the evidence supports our hypothesis based on the Bhaduri and Marglin's model: the demand regime was initially strongly profit-led and cooperative until the beginning of the1980s and weakly profit-led (or Wage-led) and conflictual in the last part of the sample.

Table 5.3: *Estimated cooperative and conflictual regimes (from 2SLQ)*

Time period	Regression	$\frac{dz}{dh}\frac{h}{z}$	$\frac{R}{\Omega}$	$\frac{dz}{dh}\frac{h}{z} > \frac{R}{\Omega}$
1960 - 1984	(a)	0.505	0.496	✓
	(b)	0.495		=
1960 - 1979	(c)	0.705	0.495	✓
	(d)	0.717		✓
1985 - 2007	(a)	0.209	0.743	×
	(b)	-0.181		×
1990 - 2007	(c)	0.441	0.794	×
	(d)	0.313		×

Note: In column 4, we report the average value of $\frac{R}{\Omega}$ in each period

Table 5.4: *Estimated cooperative and conflictual regimes (from rolling correlation)*

Final year	Regression	$\frac{dz}{dh}\frac{h}{z}$	$\frac{R}{\Omega}$	$\frac{dz}{dh}\frac{h}{z} > \frac{R}{\Omega}$
1975 – 1990	(Figure 5.10)	0.811	0.496	✓
	(Figure 5.11)	0.718	0.495	✓
1991 - 2008	(Figure 5.10)	0.487	0.743	×
	(Figure 5.10)	0.501	0.794	×

Note: In column 4, we report the average value of $\frac{R}{\Omega}$ in each period

5.5.2 Robustness check: from cooperative profit-led to conflictual wage-led

The empirical evidence shown so far in Figures 5.7, 5.8, 5.10 and 5.11 and in Tables 5.1 and 5.2 support the our hypothesis of an initial profit-led regime which is becoming less and less profit-led. While it is apparent that the slope of the IS curve became almost flat, there are some signals that open to the possibility that the slope was slightly negative in the last few decades of the sample. In Figures 5.7 and 5.8 for example, some of the final columns are negative which indicate a slightly negative relationship between the profit share and capacity utilization at the end of the sample.

Similarly, in regression (b) the effect of the profit share on capacity utilization becomes negative (-0.181) - even though it is not statistically significant - in the second part of the sample.

The condition necessary to achieve a cooperative regime however, changes depending on the type of regime. If the demand regime was Wage-led in the second part of the sample, the model predicts that a the regime is cooperative if condition (10) holds

$$hI_h < zI_z \tag{10}$$

That is, the product of the profit share and sensitivity of investment to the profit share has to be smaller than the product of capacity utilization and the sensitivity of investment to capacity utilization. If the prediction of the model is accurate, we expect this not to hold from the 1980s.

In what follows, similarly to what we did in Section 5.5.1, we will estimate equation (10) but only for the period 1985 - 2007. Before, since the regime was surely profit-led, the condition that had to hold in order to achieve a cooperative regime was represented by equation (12).

5.5.2.1 The evolution of the profit share and capacity utilization

Figure 4.4 showed the evolution of capacity utilization and the profit share. While the share of income allocated to the entrepreneurs rose greatly from 1980 until the beginning of the new millennium, the capital income ratio (z*) decreased from the 1980s. In particular, it is worth pointing out that the Italian profit share of income rose by 40% from 1980 to 2000. Hence, we can conclude that unless, during the same years, I_h decreased substantially and I_z increased, the condition necessary to have a cooperative regime probably did not hold in the last part of the sample.

5.5.2.2 The evolution of the elasticity of investment respect to capacity utilization and profit share

In order to estimate the sensitivity of investment to the profit share and capacity utilization, we cannot employ a 2SLQ method as in section 5.5.1.2 because we could not find an appropriate instrument for capacity utilization. Even though most of the empirical papers referenced above (including the previous two chapters) do not take into account the endogeneity problem in the investment function, it seems reasonable that both capacity utilization and profit share are affected by past levels of investment. For this reason, using z* as proxy for capacity utilization we estimate the investment function after 1985 with a Structural Vector Autoregressive model. Given the exceptionally small sample, each variable is a function of only one lag of the other dependant

variables[73] as in specification (g). The SVAR was successfully tested for autocorrelation, heteroskedasticity, normality of the residual and system stability.

g) $$\begin{cases} \Delta\log(\mathrm{I}) = \Delta\log(\mathrm{I}_{t-1}) + \Delta\log(\mathrm{z}_{t-1}) + \Delta\log(\mathrm{h}_{t-1}) + \mathrm{d93} \\ \Delta\log(\mathrm{z}) = \Delta\log(\mathrm{I}_{t-1}) + \Delta\log(\mathrm{z}_{t-1}) + \Delta\log(\mathrm{h}_{t-1}) + \mathrm{d93} \\ \Delta\log(\mathrm{h}) = \Delta\log(\mathrm{I}_{t-1}) + \Delta\log(\mathrm{z}_{t-1}) + \Delta\log(\mathrm{h}_{t-1}) + \mathrm{d93} \end{cases}$$

The advantage of a Structural VAR compared to a simple VAR is that the former allows to impose restrictions on the contemporaneous relationships between variables according to economic theory. In particular, we use the following matrix, B, to model the contemporaneous effects between our dependent variables (vector *y*).

h) $$y = \begin{vmatrix} I \\ z \\ h \end{vmatrix};\ B = \begin{vmatrix} b_{11} & 0 & 0 \\ b_{21} & b_{22} & b_{23} \\ 0 & 0 & b_{33} \end{vmatrix}$$

b_{11}, b_{21}, b_{22}, b_{23}, b_{33} are the contemporaneous effects that are estimated in the system while the zeros are the restrictions that we have imposed on the system. At time t, it is imposed that capacity utilization and the profit share do not have an effect on investment because it can take time for firm to react to changes in demand and profitability. Moreover, there can be a lag between investment decision and spending. Capacity utilization instead is contemporaneously affected by investment - new capital immediately lowers capacity utilization – and by the profit share, because, as shown in Table 5.3, the distribution of income has a rapid effect on capacity utilization through changes in demand. In the third row, it is imposed that neither investment nor capacity utilization has a contemporaneous effect on the profit share since, as discussed above and in Appendix C, there is a lag with which unemployment respond to changes in capacity utilization and growth and there is a further lag with which unemployment affect the profit share. This restrictions are similar to those imposed in Stockhammer and Onaran (2004) and Onaran and Stockhammer (2005) even though there is a difference in the definition of some of the variables.

As a robustness check, we repeat the analysis using the following matrix to model the effects between variables. The only difference with matrix B in (h) is that, as it is normally the case in the estimations of the investment function, we allow for a contemporaneous effect of the profit share on investment. Naturally we expect b_{13} to be positively related to invesment

[73] A time dummy for 1993 is added as exogenous variables in the regression because 1993 is an outlier in the relationship between profit share and investment.

i) $$y = \begin{vmatrix} I \\ z \\ h \end{vmatrix};\ B = \begin{vmatrix} b_{11} & 0 & b_{13} \\ b_{21} & b_{22} & b_{23} \\ 0 & 0 & b_{33} \end{vmatrix}$$

As we can see from Figures 5.12 to 5.13, the response of investment to changes in capacity utilization and the profit share[74] does not change when we use restrictions in (i) instead of those in (g). However, both the response of investment to a shock in profit (I_h) and response of investment to a shock in capacity utilizations (I_z) are very small and equal to about 0.1 and 0.06 respectively.

Fig. 5.12: R*esponse of Δlog(I) to one standard deviation innovation in Δlog(z*) and in Δlog(h), Using (h)*

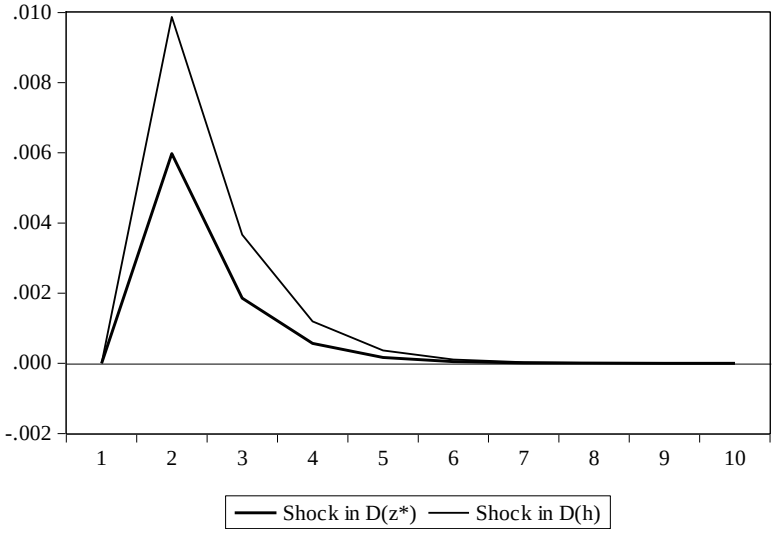
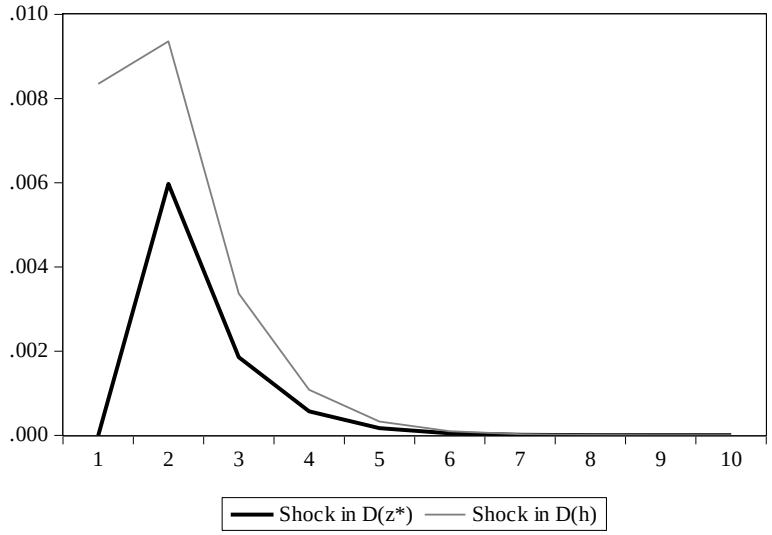


Fig. 5.13: *Response of Δlog(I) to one standard deviation innovation in Δlog(z*) and in Δlog(h), Using (i)*



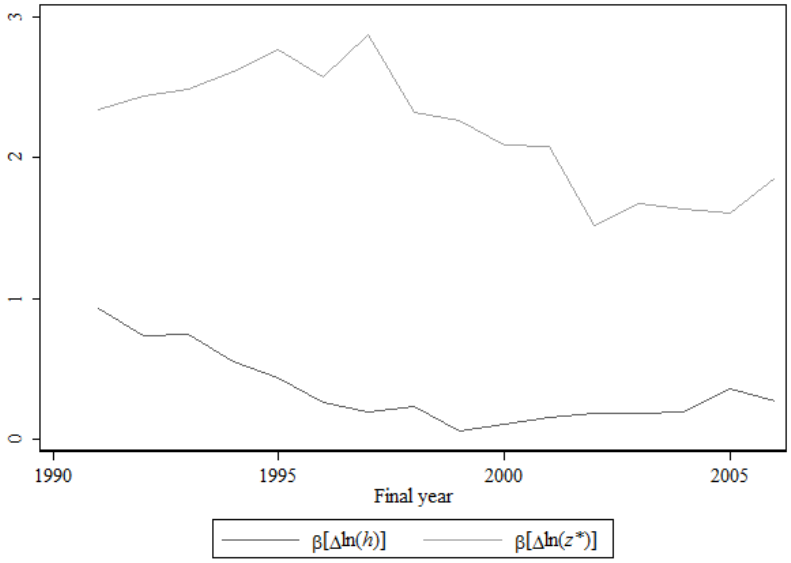
[74] Even though the confidence interval are not shown in the graph, the impulse response of investment to capacity utilization and the profit share is almost always non statistically significant. This is not surprising given the small sample size and it does not affect the results of our analysis that focuses on how the response of investment, on average, changed before and after 1985.

As a robustness check, we also employ rolling regressions to analyse the evolution of the investment function. Regression (j) was estimated using fifteen and twenty years rolling windows (starting from 1975).

j) $\Delta\log(\mathrm{I}) = \mathrm{c} + \Delta\log(h) + \Delta\log(z^*) + \mathrm{y93}$

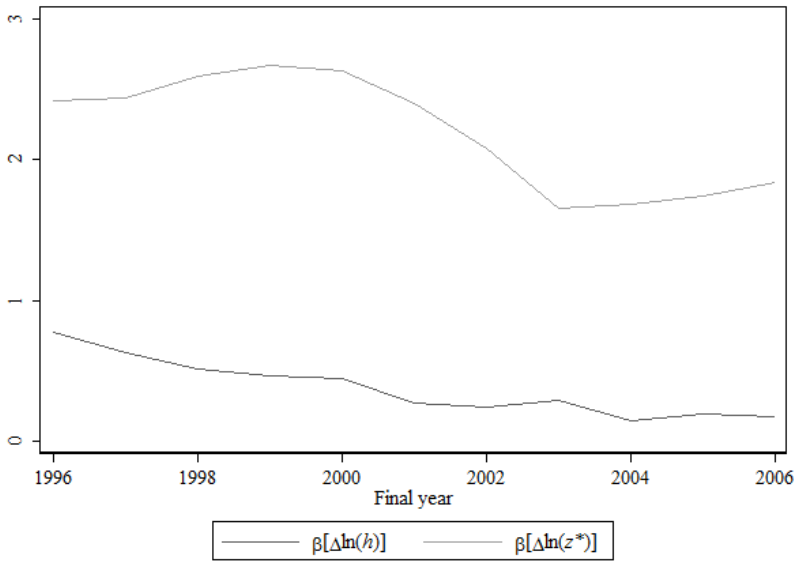
Given the small sample size in each regression, we simply estimate the static equation without taking into account, in this case, the problem of endogeneity. Figures 5.14 and 5.15 report the evolution of the coefficients[75]. The sensitivity of investment respect to the profit share (the darker line in the graphs) has always a negative slope. This is consistent our story: Financialisation decreased the positive effect of profits on investment making the demand regime less profit-led. Similarly, the sensitivity of investment with respect to capacity utilization (the light grey line in the graphs) even though it is always larger than the sensitivity of investment to the profit share, follows a negative path.

Fig. 5.14: *Rolling regression: 15 years window and Proxy I*



[75] To keep the graph tidy, the confidence intervals are not reported. However, the effect of capacity utilization on investment is always statistically significant independently from the proxy and window used while, the coefficient measuring the effect of the profit share is mostly not significant.

Fig. 5.15: *Rolling regression: 20 years window and Proxy I*



The results of the SVAR and of the rolling regression analysis are substantially different from each other. In Table 5.15, we summarize them and we calculate condition (10). As we can see, the results of the SVAR are consistent with our expectations: the demand regime is conflictual from the 1980s because condition (10) does not hold. On the other hand, when we use the average coefficient resulting from the rolling regressions, the condition does not hold and it would appear that the regime is cooperative. In this case, therefore, our results are inconclusive and seem to be dependent on the estimation technique used to calculate I_h and I_z.

The results in the bottom half of Table 5.5 that imply a cooperative regime from the 1980s are inconsistent with both the stylised facts shown in Table 5.1 and Figure 5.1 and the empirical results shown in Table 2. On the one hand, Table 5.1 and Figure 5.2 show how in the 1980s and in the 1990s the growth rate of the wage bill decreased while the growth rate of total profits increases. Had the regime been cooperative the two growth rate should have moved in the same direction. On the other hand, the results in Table 5.2 show that in the second period, the IS curve became flat. Therefore, if in this second period the regime was Wage-led, it was only weakly so. In order to have cooperation, however, the regime should have been strongly Wage-led because an increase in the wage share should have increased growth and capacity utilization enough to allow for an increase in the level of profits as well as wages. Probably a sample size of only fifteen or twenty years is too small to have a meaningful estimation of the investment function. Nevertheless the direction of the estimated coefficients do make sense as the elasticity of investment with respect to the profit share is decreasing over time as predicted.

Table 5.5: *Estimated cooperative and conflictual regimes*

Time period	Regression	I_h	h	I_z	z	$h(I_h) < z(I_z)$
1985 - 2007	SVAR (h)	0.01	0.424	0.006	0.342	×
	SVAR (i)	0.009		0.006		×
1980 - 2007	(Figure 5.14)	0.347	0.407	2.197	0.343	✓
	(Figure 5.15)	0.500		2.336		✓

Note: I_h and I_z in the upper half of the table are the value of the impulse responde function in the period after the shock (t+1). I_h and I_z in the bottom half of the table are the average coefficient of the rolling regressions. The values of h and z are the average values in each period

5.6 Comparison with the literature

To our knowledge the only studies that estimated the demand regime in Italy are Naastepad & Storm (2007) and Onaran and Galanis (2014). They both find, using the single equation approach that the regime is weakly Wage-led from 1960 to the early 2000s. The difference between our results and their results is discouraging but not surprising. Regarding the United States, for example, most of the studies that estimated the demand regime using a single equation approach, including Chapter 3, found a Wage-led demand regime[76]. In contrast, the studies that take into account endogeneity, by using either a VAR (Barbosa-Filho and Taylor 2006, de Carvalho and Rezai, 2015) or a 2SLT (Nikiforos and Foley, 2012) method find that the demand regime is profit-led. We are not suggesting that one technique is better than the other is but, it would be interesting from a methodological point of view to investigate whether even in other countries the results about the demand regime are sensitive to the econometric technique used in the analysis. If this were to be true for other countries, and become a regularity, it would undermine the credibility of the studies.

Regarding the structural break analysis, other studies tried to explain changes in equilibrium point in the (z h) space but they argued in favour of either a non-linear IS curve of a non-linear

[76] Bowles and Boyer (1995), Hein and Vogel (2008), Onaran et al (2011), Onaran and Galanis (2014), Stockhammer and Wildauer (2015), find that the United States in the second half of the twentieth century, was characterised by a Wage-led regime. Only Naastepad and Storm (2006) found evidence of a profit-led regime.

distributive curve. On the one hand, Carvalho and Rezai (2015) extend the linear analysis by proposing a non-linear IS curve. They argue that when personal income distribution increases among wage earners the propensity to save out of wages increases and, therefore, an increase in the wage share has a smaller effect on consumption. When personal income inequality increase the demand regime becomes less Wage-led (or more profit-led). On the other hand, Nikiforos and Foley, 2012 include in their analysis a non-linear distributive curve. They argue that during the business cycle, when capacity utilization is low it is negatively associated with the wage share because, due to fixed costs, an increase in capacity has a stronger positive effect on productivity rather than on wages. At high levels of utilization when fixed costs are a smaller share of total costs, productivity gains decrease and the positive effect of higher capacity on wages - though higher bargaining power - prevails. Tavani et al (2011) make a similar argument about the distributive curve but they base their reasoning on the fact that the wage bargaining power of workers increases (decreases) more than proportionally when unemployment increases (decreases).

From an empirical point of view, Stockhammer et al (2011), test the hypothesis that globalization is changing the demand regime in Germany from Wage-led to profit-led. The reason is that globalization increases the relative weight of trade on GDP. Therefore, since net exports is supposed to be positively related to the profit share, the whole regime should become more profit-led. Using a single equation method, they estimate the investment and the net exports functions divided into two sub periods 1970-1987 and 1987-2005. However, they do not find evidence of a regime switch. Using a Threshold VAR approach instead, Carvalho and Rezai (2015) find that that the demand regime in the United States became more profit-led during the 1980s. This was caused by the high levels of personal income inequality that were reached in the United States after 1981.

5.7 Conclusions

This Chapter showed that the Bhaduri and Marglin model is a useful tool in explaining the stylised facts about the relationship between functional distribution of income and growth in the second part of the twentieth century in Italy. In particular, we have looked at two of the main characteristics of the model that have been predominantly overlooked by the empirical literature: the possibility of a demand regime switch and the distinction between cooperative and conflictual demand regimes.

Our hypothesis - based on the stylised facts discussed in Section 5.4 and shown in Figures 5.1, 5.4, 5.7 and 5.8 and in Table 5.1- was that in the 1960s and in the 1970s, the demand regime was strongly profit-led and cooperative. An increase in the profit *share* was able to stimulate enough growth, and consequently employment, that the wage bill rose together with the total level of

profits in spite of the fall in the wage share. During the 1980s, two processes took place that affected the relationship between distribution and growth. The demand regime became less and less profit-led because of the negative effect of financialisation on the responsiveness of investment to the profit share and because of the negative effect of the exchange rate agreements on the contribution of net exports to growth. At the same time, financialisation and the deregulation of the labour market caused an exogenous increase in the profit share, shifting the distributional curve towards the right.

To our knowledge this is the first study that looks at the dynamics between cooperative and conflictual growth regimes and the second that examines the possibility that changes in the growth regimes are caused by a structural break - even though it is the first that actually finds evidence of it. Indeed, as mentioned in the previous section, Stockhammer et al (2011) do not find empirical evidence of a regime switch in Germany. So far, the most common cause for a change in the growth regime was identified in the non-linearity of either the IS or the distributive curve (Barbosa-Filho and Taylor 2006, de Carvalho and Rezai, 2015, Nikiforos and Foley 2012). A second element of novelty of the analysis carried out in this chapter is the identification of financialization as one of the main underlining causes of the change in the growth regime.

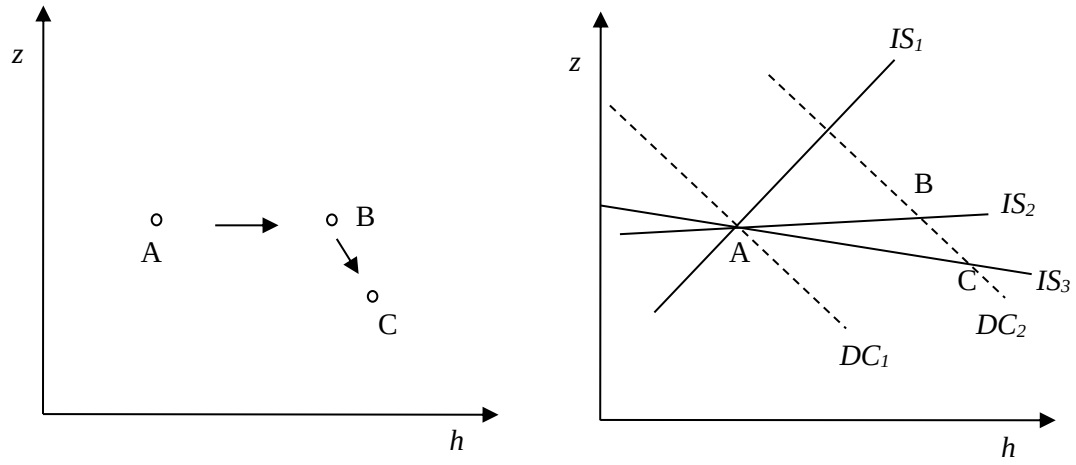
The empirical analysis supports our hypothesis and confirms that the Bhaduri and Marglin model is still a relevant theoretical framework. Firstly, we showed using a 2SLQ estimation that the *effect* of capacity utilization is positive in the first part of the sample and becomes less positive (or negative) and non-statistically significant in the second part. If our instrumental variable method is valid, these results describe a rotation of the IS curve rather than of the distributional curve. In fact, since we removed endogeneity trough the use of instrumental variables, the coefficients in Table 5.2 describe the causal effect from the profit share to capacity utilization: the slope of the IS curve. At the same time, as discussed in Section 5.5.1.2 and in Appendix B, we have found evidence of a negative (lagged) effect of capacity utilization on the profit share through employment: The DC curve could be negative and not positive as assumed in the model. We do not estimate the slope of the DC curve because we could not find a reasonable instrument for capacity utilization. The validity of our story, however, does not depend on the slope of the DC curve but, rather, on its rightward shift. In our opinion, it seems hard to defend that the exogenous shift in the distribution of income, as argued in Section 5.5.1.2, did not happen. Secondly, the empirical analysis showed that the condition that has to hold in a profit-led demand regime in order to achieve cooperation only holds in the first part of the sample until the middle of the 1980s.

The implication of our analysis is that, if the IS curve keeps rotating towards the right, the Italian demand regime could soon become, if it already is not, Wage-led. Unfortunately, since changes in

the regime are slow, initially it will be a weakly Wage-led regime and therefore it will not be possible to achieve cooperation. Therefore, economic policies should try to strengthen the effect of wages on growth. Since, as discussed in the previous chapters, the wage share has its largest positive effect on consumption, policies should try to increase it rather than watering it down. One way of doing this is by incentivising households not to relay on consumer debt to finance consumption, because consumer debt weakens the elasticity of consumption respect to wages, at least in the short run. Furthermore, redistributive policies should target the workers at the lower end of the distributive scale, as they should have the highest propensity to consume: the positive effect on consumption would be higher and the regime would become more Wage-led.

Graphically, assuming that the distributive curve does not shift further, if the IS curve keeps rotating (IS_3) the Italian economy will reach point C which implies a higher profit share and a lower level of capacity utilization and growth. Other things being equal, in order to increase the growth rate, the government will have to implement policies that oppose the existing exogenous forces that are pushing the CD curve towards the right. Any policy that improves the distribution of income exogenously from capacity utilization will shift the DC curve towards the left and increase capacity utilization and growth.

Fig. 5.16: *Italian IS and DC curves in the (h, z) space*



Appenidix A: Variables names, definitions and sources

Table A5.1: *Data sources and definition*

Variable	Description	Source	Note
Yn	Gross domestic product at current market prices	AMECO	
P	Price deflator gross domestic product at market prices	AMECO	
Y	GDP, real (2005)		Y = Yn/p*100
aWS	Adjusted wage share: total economy: as percentage of GDP at current market prices	AMECO	
aRS	Adjusted Profit Share		aRS = 1 - aWS
aW	Adjusted wage bill		aW = Y*aWS
aR	Adjusted gross operating surplus		aR = Y*aRS
I	Investment, real (2005)	AMECO	
K	Net capital stock (2005)	AMECO	
	Contribution of net exports to GDP	OECD_Stats	
	Value added of agriculture	ISTAT	
	Value added of industry	ISTAT	
	Value added of the monetary and financial intermediation	ISTAT	
	Market capitalization of listed companies	Standard & Poor's, Global Stock Markets Factbook and supplemental S&P data	

Appendix B: Capacity utilization and profit share, an endogenous relationship.

Establishing a causal relationship between capacity utilization and the functional distribution of income it is not an easy task and there are reasons to believe that there are feedback effects going in both directions. The profit share has an effect on capacity utilization through changes in the aggregate demand (consumption, investment and net exports) and the sign of this relationship depends on whether the demand regime is wage or profit-led. On the other hand, capacity utilization could affect the distribution of income because of its effect on unemployment. In particular, we would expect that an increase in capacity utilization would increase employment and hence improve the wage bill and the bargain power of workers which would in turn reduce the profit share.

In our view however, at least in Italy, the two variables influence each other with different time lags: while the effect of changes in income distribution on capacity utilization happens within one year, capacity utilization affects the distribution of income only with a time lag of one or two years.

The following graphic analysis cannot be the proof of our hypothesis but it will show its plausibility.

Figure B5.1 and B2 show that while the correlation of profit rate and capacity utilization, at time t, is positive; the profit share is negatively correlated with past values (t-1 and t-2) of capacity utilizations. Figure B5.3 and B5.4, on the other hand, illustrate the relationship between capacity utilization and the profit share at time t, t-1 and t-2. Also in this case there is a contemporaneous positive relationship between the two variables but the lag values of the profit share seem not to have any relationship with capacity utilization.

From this, we can draw some conclusions. Firstly, we can rule out that past levels of profit share have any "meaningful" effect on present capacity utilization. Secondly, we can say that past values of capacity utilization have a negative effect on the present profit share. To support this finding, Figure B5.5 shows that, while the contemporaneous correlation between capacity utilization and unemployment is weak, the effect of capacity utilization on future unemployment is much stronger. Moreover, Figure B5.6 demonstrates that unemployment is positively correlated to the present profit share but the relationship becomes stronger and steeper when we consider future profit share.

If our view is correct, the profit share is exogenous at time t respect to capacity utilization but not at time t+1. This violates the strict exogeneity assumption which would result in biased coefficients. To solve this problem, we regress capacity utilization on the present value of the

profit share instrumented by the lagged residual of the regression of unemployment on present and past values of capacity utilization. Moreover, as in each regression line in Table 5.3, we have divided the profit share into two periods, we have instrumented the profit share in each period separately from the other in order to allow for the effect of unemployment on the profit share to change over time. Finally - in the first stage, when instrumenting the profit share - a time dummy for 1975 was added to the regression line if the proxy for capacity utilization was the capital income ratio and a time dummy for 1975 and 1975 was added when the proxy for capital utilization was the acceleration of growth. In particular, we suspect that 1975 is an outlier in the time series of $\Delta\ln(z^{*})$ and 1975 and 1976 are both outliers in the series of z^{**} because in both cases they fall outside eight times the 95% confidence interval. This does not come as a surprise because in those years the economic contraction caused by the first oil crisis hit Italy.

Fig. B5.1: *Profit share [Δlog(h)] VS present and past capacity utilization [Δlog(z*)]*

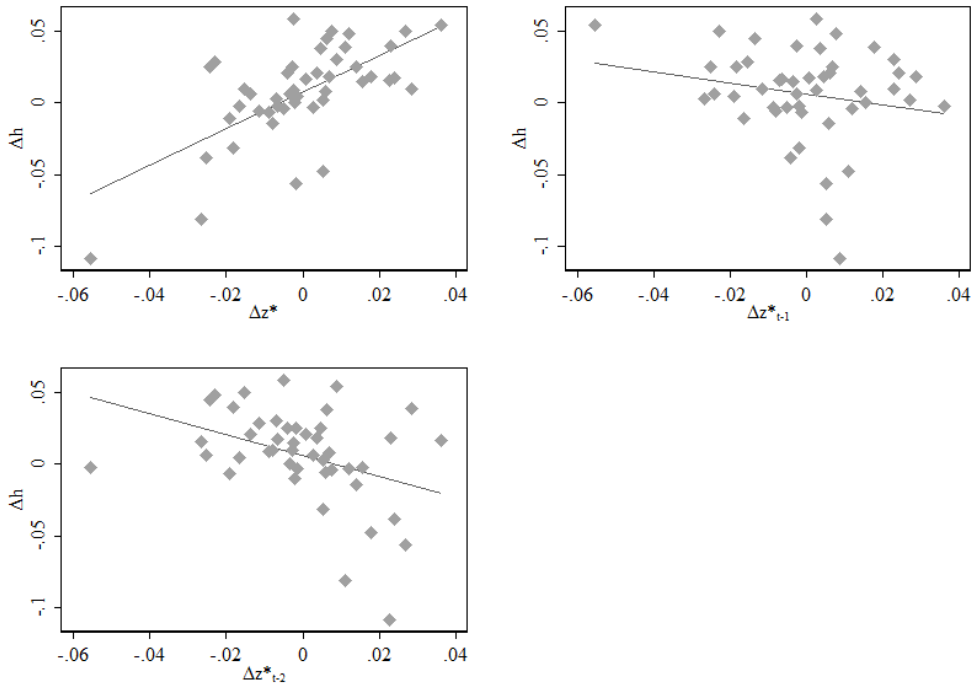


Fig. B5.2: *Profit share [Δlog(h)] VS present and past capacity utilization [z**]*

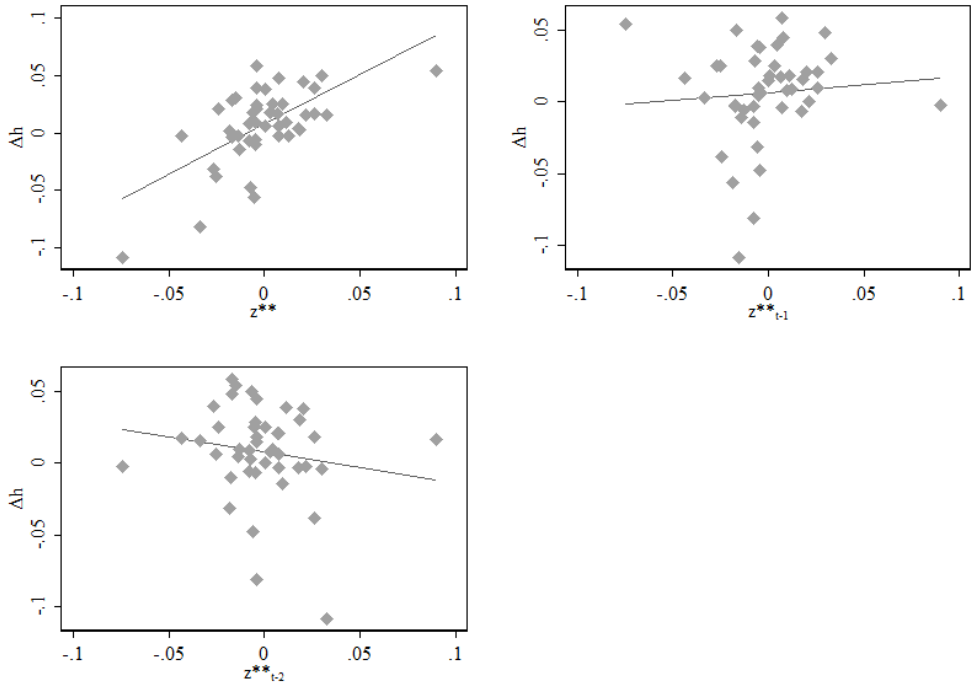


Fig. B5.3: *Capacity utilization [Δlog(z*)] VS present and past profit share [Δlog(h)]*

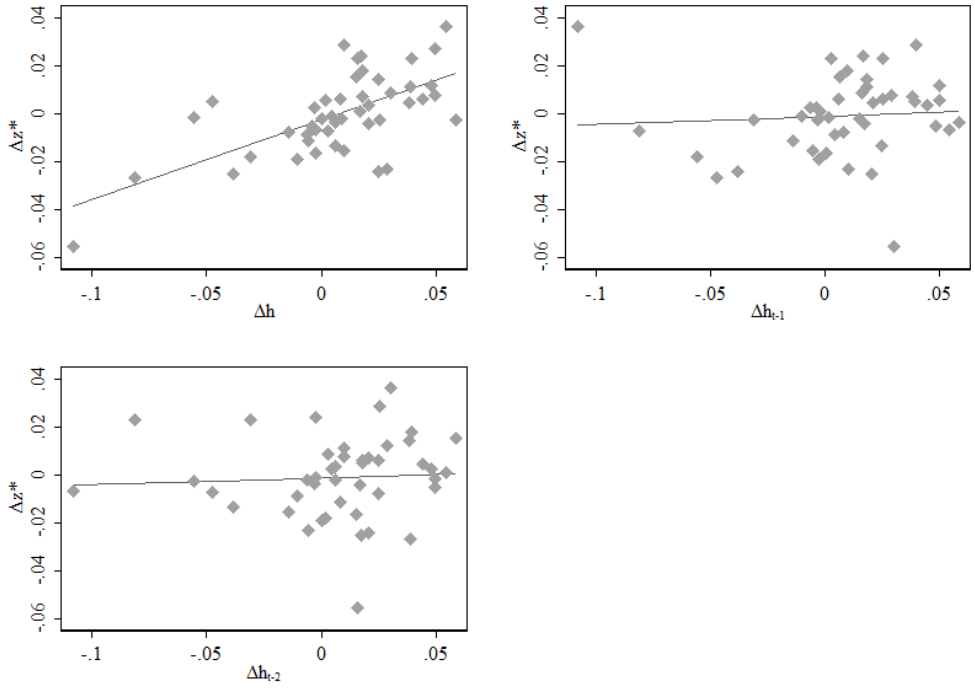


Fig. B5.4: *Capacity utilization [z**] VS present and past profit share [Δln(h)]*

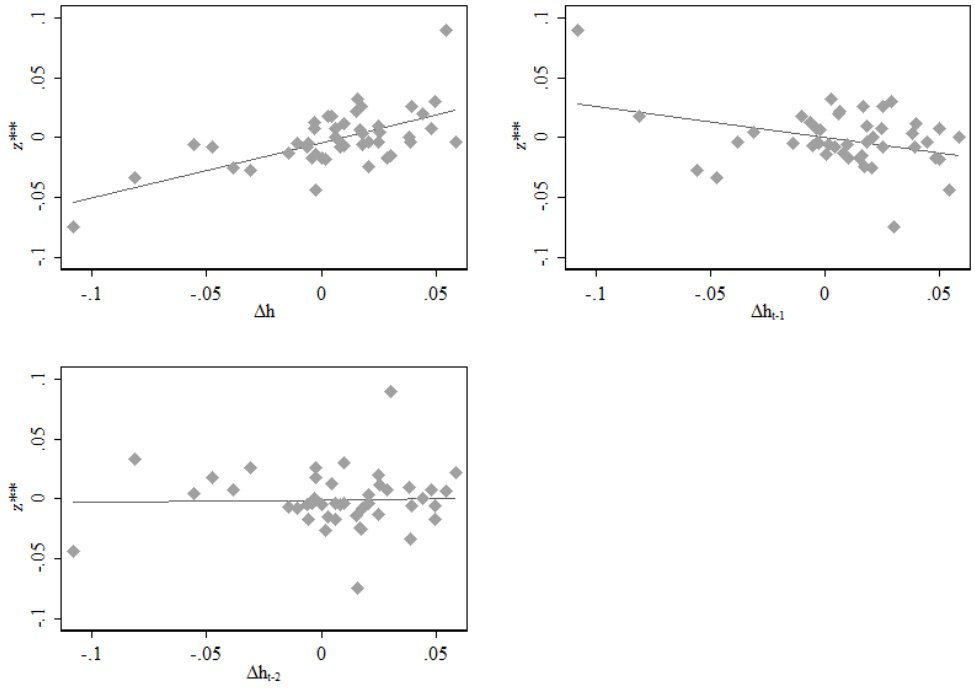


Fig. C5.5: *Present and future unemployment [Δlog(U)] VS capacity utilization (both proxies)*

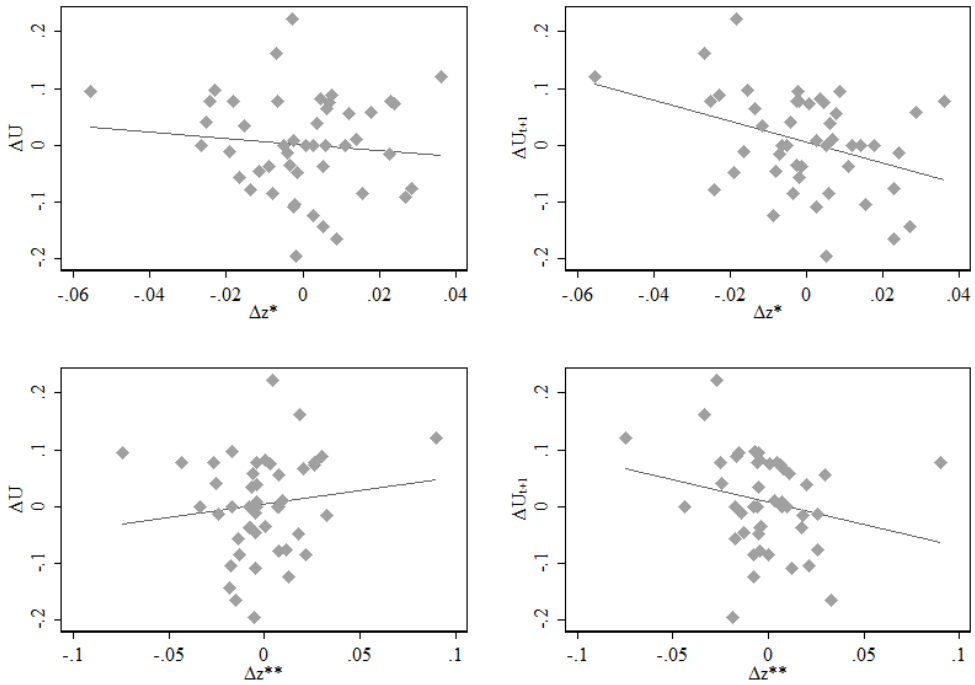
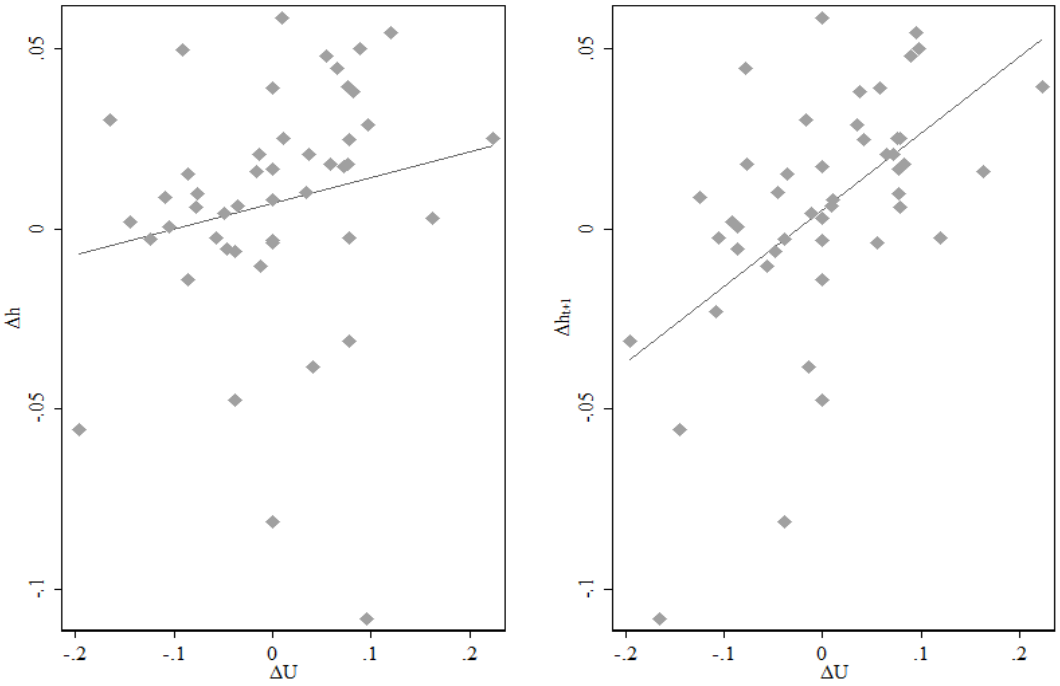


Fig. C5.5: *Present and future profit share [Δlog(h)] VS unemployment [Δlog(U)]*



6 - Concluding remarks

Since the 1980s, income inequality rose in most of the industrialised countries (Smeeding 2002, Picketty and Saez 2006 and Hein 2015). As high inequality is not a desirable characteristic of any society, it should be a priority of national governments as well as of the international community to implement policies designed to reduce it. In order to effectively solve a problem, it is important to know what its causes and its effects are. The aim of this thesis was precisely to study the effects of the rising trend in inequality on economic growth. In particular, we tried to answer the following three sets of empirical questions:

A. *Do changes in the distribution of income in a country have any impact on other countries' economic growth? If so, is this positive or negative?*

B. *Do the effects of changes in the distribution of income on a country's economic growth differ over the short and long-runs? If so, in what ways do they differ, and what is the source of the difference?*

C. *What factors can cause a change from a 'co-operative' to a 'conflictual' growth regime? What is the impact of this change?*

In principle, we were agnostic about the results because we believe that excessive income inequality should be fought independently from its effects on growth. In other words, since inequality is undesirable for society, policies that allow inequality to grow in the hope of increasing economic growth should not be pursued even if inequality were to have a positive effect on growth. In this regard we embrace Pope Francis analysis:

> "*Just as the commandment 'Thou shalt not kill' sets a clear limit in order to safeguard the value of human life, today we also have to say 'thou shalt not' to an economy of exclusion and inequality. Such an economy kills. How can it be that it is not a news item when an elderly homeless person dies of exposure, but it is news when the stock market loses two points? This is a case of exclusion. Can we continue to stand by when food is thrown away while people are starving? This is a case of inequality. Today everything comes under the laws of competition and the survival of the fittest, where the powerful feed upon the powerless. As a consequence, masses of people find themselves excluded and marginalized: without work, without possibilities, without any means of escape.*

> *Human beings are themselves considered consumer goods to be used and then discarded. We have created a 'throw away' culture which is now spreading. It is no longer simply about exploitation and oppression, but something new. Exclusion ultimately has to do with what it means to be a part of the society in which we live; those excluded are no longer society's underside or its fringes or its disenfranchised – they are no longer even a part of it. The excluded are not the "exploited" but the outcast, the 'leftovers'."* – Pope Francis, Evangelii Gaudium [53], (2013).

Nevertheless, it is important to know if a positive effect of inequality on growth exists because policy makers need to know what they are giving up in order to improve income distribution. This thesis contributes to the existing literature by studying, the three sets of questions mentioned above which, to this date, have been explored only marginally.

In Chapter 3, we studied the set of questions A on the effects of a change in inequality in one country on its trade partners. The estimation of the interactions between countries is a new element of the neo-Kaleckian research on growth regimes. To our knowledge in fact, it was examined only in the present thesis and by Onaran and Galanis (2014). Estimating the effects of a change in the functional distribution of income on other countries is particularly relevant at the present time as falling wage share and wage moderation are a global phenomenon that are hardly opposed by governments. This is because lower wages are associated with lower export prices and, therefore, have a positive effect on net-exports. There is, however, a fallacy of composition problem: not all countries can improve their balance of payments contemporaneously. When more countries pursue policies of wage moderation in order to boost exports, they should end up, at least up to a certain point, offsetting each other. The main contribution of this work to the neo-Kaleckian literature is the geographical change of focus of the empirical analysis. This is the first study that determines the growth regime of the member States of a trade agreement which also takes into account the interactions between them. There are three reasons for which we decided to study the growth regimes of individual countries within the same trade area. First, in order to achieve international coordination on wage policies it is necessary to show not only that an area as a whole does not benefit from the present trend of wage moderation but that the individual countries within that area could benefit from an increase in the wage share in the whole area. Second, it would be easier to implement a wage policy coordination between countries that are already part of some sort of political agreement. Third, countries that belong to the same trade area, trade greatly with each other and, therefore, the effect of a change in the distribution in one country on the others is large. In line with our expectations, the analysis of the North American Free Trade Agreement from 1960 to 2007 showed that the effect on exports, following a contemporaneous decrease in the wage

share in Mexico, Canada and the United States, is negative for all countries. The increase in exports that each country experienced because of a reduction in its wage share, is offset by a contemporaneous increase in competitiveness in the other two countries. Moreover, even though an increase in the profit share has an overall positive effect in Mexico and Canada and a negative effect only in the United States, NAFTA is overall wage-led: the profit share has a negative effect on aggregate demand. This is caused by the fact that the negative effect of the profit share in the United States is larger than the sum of its positive effects in Mexico and Canada. A policy of wage coordination in NAFTA is, therefore, plausible if the US were to somehow compensate Mexico and Canada of their losses.

In Chapter 4, we studied the set of questions B on the possibility that the effect of income distribution on economic growth changes from the short to the long run. On this regard, Blecker (2015) argues, without providing much empirical evidence, that, since consumption investment and net exports are all likely to be more wage led (or less profit led) in the long run, the overall growth regime is also more wage led in the long run compared to the short run. Our analysis is the first, to our knowledge, to test empirically Bleckers' hypothesis even though, as discussed in the chapter, there are other studies that implicitly estimate long and short run effects of income distribution on the components of aggregate demand (Kim et al. 2015, Onaran et al 2011, Stockhammer and Wildauer 2015, Chiriko et al. 2011). The results of our empirical investigation support Blecker's hypothesis, at least for the United States over the period 1950-2014: the American growth regime is more wage led in the long run compared to the short run. The estimation of the consumption function revealed that the effect of wages on consumption increases more than proportionally compared to the effect of profits on consumption from the short to the long run. Moreover, consumer debt seems to have only a short-run effect on consumption indicating that in the long run, when debt has to be repaid, consumption depends more on the level of income and on how it is distributed rather than debt. With regard to the consumption function, an element of novelty of our study is the separate estimation of the determinants of goods consumption and service consumption. We found that consumption of both goods and services is more wage led in the short run compared to the long run. Turning to the estimation of the investment function, an innovation of our study compared to the rest of the related literature, is the separate estimation of residential investment and non-residential investment. We make the argument that these two components of overall capital formation could have very different determinants and therefore should be analysed separately. The results confirm both Bleckers' hypothesis and our intuition on the different determinants of residential and non-residential investment. On the one hand, we found that the effect of capacity utilization on non-residential investment is always larger than the effect of the profit share and that the difference between the

two effects is higher in the long run than in the short run. This confirms the hypothesis that in the long run, unless there is an increase in demand, it is likely that firms are not going to increase investments even in the presence of high profits. In addition, the rentier share of profits – that comprises dividends and interest payments – has a long-run negative effect on investment. This result is usually used in the literature to show the negative effect of financialization on investment: rentiers divert firms' profits from investment. Therefore, in the long run, the relationship between profits and non-residential investment is weakened and investment becomes less profit-led. On the other hand, our estimates of the residential investment function suggest that, especially in the long run, the main determinant of residential investment is the wage bill rather than the level of profits. Consequently, also residential investment is less profit led in the long run. From our analysis we can deduce that aggregate demand and the growth regime become less profit led in the long run because both consumption and investment react less to profits in the long run.

Finally, Chapter 5 studies the set of questions C on the dynamics between cooperative and conflictual growth regimes. According to Bhaduri and Marglin (1990), a wage-led cooperative regime is one in which an increase in the wage *share* stimulates enough growth to allow for an increase in *total* profits, in spite of a decrease in the profit *share*. On the other hand, a profit led regime is cooperative if the increase in the profit *share* causes an increase in growth that is large enough to cause, in spite of a decrease in the wage *share*, an increase in the wage *bill* – through higher employment for example. Symmetrically, a conflictual regime is one in which an increase in the profit (wage) *share* does not stimulate the economy enough to allow the *total* level of wages (profits) to grow. Strangely, the distinction (and the dynamics) between cooperative and conflictual regimes have never been empirically studied before in spite the fact that this is one of the main features of Bhaduri and Marglin's (1990) model. In this chapter, we tested the dynamics between cooperative and conflictual growth regime in Italy: our hypothesis is that the Italian demand regime is slowly turning from cooperative profit-led to conflictual wage-led. The institutional changes that - we argue - caused this regime switch are financialization and the European exchange rate agreements such as the European Monetary System and the Euro system. As discussed above, financialization weakens the relationship between profits and investment because it diverts profits from firms: investment become less profit led. At the same time, Italian exports - which have never been particularly competitive - suffered from the European exchange agreements because devaluations were no longer allowed. Therefore, the contribution of net exports to GDP growth fell and so did the relative weight of the positive effect of lower wages on exports. Finally, the relationship between consumption and wages was weakened only marginally by financialization because Italian households did not rely on debt to pay for consumption. The results of the analysis confirmed our hypothesis. During the 1960s and the 1970s, the demand

regime in Italy was cooperative and profit led: an increase in the profit share was accompanied by an increase in both the level of profits and the wage bill. From the 1980s, however, the effect of profits on aggregate demand weakened. Consequently, the increase in the profit share that happened from the 1980s did not manage to stimulate enough growth to allow for an increase in the wage bill together with the level of profits: the profit-led regime became conflictual. If the factors mentioned above continue reducing the effect of profits on aggregate demand, the growth regime will soon become wage-led. Our analysis proves that the change in the growth regime that happened in the 1980s was caused by a structural break that was itself caused by the institutional changes mentioned above. This interpretation is substantially different from the rest of the literature and in particular from the work of Barbosa-Filho and Taylor (2006), de Carvalho and Rezai (2015) and Nikiforos and Foley (2012). These authors, indeed, argue that if the effect of income distribution on growth changes, it is because the relationship between them is non-linear rather than because of institutional changes that cause structural breaks. Only Stockhammer et al (2011) try to find empirical evidence of a structural break in the growth regime in Germany but without success.

The policy implications derived from our empirical work have been already discussed in Chapters 3, 4 and 5. The following is a brief summary of the key (common) points. Firstly, as predicted by the neo-Kaleckian models, our results confirm that the effect of functional income distribution on growth differs across countries. Consequently, each country should be studied individually and an appropriate one size fits all policy to increase growth through changes in income distribution does not exist. Secondly, growth regime tends to become more wage-led both when many countries adopt a policy of wage moderation at the same time and when the long run is considered instead of the short run. These results are relevant because they imply that the effect of a pro-wage redistribution on growth becomes either more positive or less negative. In Chapter 5, we argued that, if financialization only weakens the effect of profit on investment, but it does not alter the effect of wages on consumption, the demand regime should become more wage-led. This has similar policy implications to the other two chapters. However, what if financialization also weakens the effect of wages on consumption as probably happened in the United States and the United Kingdom because of increased availability of consumer credit instruments? In that case, the effect of redistribution and growth would fade away, especially in the contest of a contemporaneous change in the wage share in other countries, as discussed in Chapter 3. This would still be good news for those who believe that high income inequality is damaging for society. In fact, it still drives policy makers into a corner. If they cannot use the negative effect of a pro-wage redistribution on growth as an excuse not to implement redistributive policies, they will have to either implement the policy or to explain their reasons for not doing it: it would damage the rich

part of the population. Finally, independently from whether the demand regime in a country is wage led or profit led, a pro-wage redistribution should be done in favour of the families at the lower end of the wage scale. This would maximise the positive effect on consumption - because of their higher propensity to consume -and, if any, reduce the negative effect of redistribution on growth.

To conclude, we would like to make a methodological consideration. We are aware that mainstream economists would by and large be sceptical that this thesis may be a meaningful contribution to the literature. They would reject both the methodological premises and the theoretical framework that was used to motivate the analysis. As discussed in the Introduction and in Chapter 2, the relationship between income inequality and growth was studied by different schools of thought which reached very different conclusions. The difference in conclusions reflects different analytical methods and theoretical assumptions which are at the heart of their respective economic doctrine. Once we chose the topic of investigation, we decided to study it from a post-Keynesian point of view simply because, in our opinion, this approach is more convincing than its main competitors: the Neoclassical or the Marxist schools. There are three main features of the post-Keynesian approach that we find particularly appealing. From a methodological point of view, we believe that "organicism" is a more appropriate method compared to (the neoclassical) individualism. We find more reasonable to consider individuals as part of social entities and, therefore, stress the importance of social classes in our analysis rather than relying on micro foundation that are based on a utility maximising representative agent. Secondly, a feature that distinguishes the post-Keynesian school from both the Neoclassical and Marxist schools - and that we believe to be reasonable - is the principle of effective demand: In post-Keynesian models, growth is constrained by demand factors rather than by supply as it is in the Neoclassical or Marxist models described in Chapter 2. Therefore, supply adjusts to demand and not the other way around. Finally, as discussed in Chapter 4, we find convincing the use of "historical" time as opposed to the Neoclassical "logical" time. Historical time implies that time is irreversible and a decision cannot simply be undone in the next period: a shock in one variable has an impact on other variables that does not simply disappear when the shock wears out. Consequently, the long run has to be understood as the outcome of a succession of short run positions. To use the words of Kalecki (1971): "*The long run trend is but a slowly changing component of a chain of short period situations; it has no independent entity.*" The economists that reject these premises will not regard this thesis as a useful contribution to the economic literature. The others, hopefully, will.

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